

Hertwig's *The Biological Problem of To-day* (trans. 1896), and W. Roux's *Gesammelte Abhandlungen über Entwicklungsmechanik der Organismen* (1895).

Palæontology:—H. A. Nicholson and R. Lydekker's *Manual of Palæontology* (2 vols. 1889); K. A. von Zittel's *Text-book of Palæontology* (trans. by C. R. Eastman, vol. i. 1900); Gaudry's *Les Enchaînements du Monde Animal* (1888-90); M. Neumayr's *Die Stämme des Thierreichs* (vol. i. 1889); also text-books by Bernard, Hoernes (1886), Koken (1882), Steinmann and Döderlein (1890), A. Smith Woodward, *Vertebrate Palæontology* (1898), etc.

Ætiology:—The works of Darwin, Wallace, Spencer, Haeckel; W. Bateson's *Materials for the Study of Variation* (1894); Samuel Butler's *Evolution, Old and New* (1879); E. D. Cope's *Origin of the Fittest* (1887); *The Primary Factors of Organic Evolution* (1896); G. H. Th. Eimer's *Organic Evolution* (trans. 1890); P. Geddes's article 'Variation and Selection,' *Encyc. Brit.*; J. T. Gulick's 'Divergent Evolution through Cumulative Segregation,' *Jour. Linnæan Society* (vol. xx. 1888, etc.); St. George Mivart's *The Genesis of Species* (1871), *Lessons from Nature* (1876), etc.; C. von Nägeli's *Mechanisch-physiologische Abstammungslehre* (1884); K. Pearson's *The Chances of Death* (1897); *The Grammar of Science* (new ed. 1900); G. T. Romanes's 'Physiological Selection,' *Jour. Linnæan Society* (vol. xix. 1886); *Darwin and after Darwin* (3 vols. 1892-7); Karl Semper's *The Natural Conditions of Existence as they affect Animal Life* (1881); H. de Varigny's *Experimental Evolution* (1892); M. Wagner's *Die Entstehung der Arten durch räumliche Sonderung* (1889); A. Russel Wallace's *Darwinism* (1889); A. Weismann's *The Germ-Plasm* (1893); and *The Evolution Theory* (trans. 1904).

Protoplasm:—For full and critical discussion and bibliography, E. B. Wilson's *The Cell in Development and Inheritance* (2nd ed. 1902); Yves Delage's *La Structure du Protoplasma*, etc. (1895). For physiological aspects in particular, Max Verworn's *General Physiology* (trans. by Lee, 1899); a valuable address by Sir J. S. Burdon-Sanderson, *Nature*, xl., Sept. 1889, pp. 521-526, and Rep. Brit. Association for 1889; and three articles in the *Encyc. Brit.*—'Physiology' (Sir Michael Foster), 'Protoplasm' (P. Geddes), 'Protozoa,' large type (E. Ray Lankester).

For philosophical discussion, see T. H. Huxley's famous address, 'Protoplasm: the Physical Basis of Life' (in his *Collected Essays*); Hutchison Stirling's *As Regards Protoplasm* (1872); the chapter 'Vitalism' in Bunge's *Physiological Chemistry* (trans. 1890).

The cell:—Of great value in itself and in its bibliography, E. B. Wilson's *The Cell in Development and Inheritance* (2nd ed. 1902). See also R. S. Bergh's *Vorlesungen über die Zelle* (1894); Y. Delage, *op. cit.* (1895); L. F. Henneguy's *Leçons sur la Cellule* (1896); O. Hertwig's *Die Zelle und die Gewebe* (1893 and 1898, the first part trans. 1895). Two important initial works in histological analysis were Leydig's *Lehrbuch der Histologie des Menschen und der Thiere* (1857), and E. W. von Brücke's *Elementarorganismen* (new ed. 1898). For instruction as to the practical study of cells, the work of V. Haecker, *Praxis und Theorie der Zellen- und Befruchtungs-Lehre* (1899) can be strongly recommended.

Reproduction and sex.—A convenient introduction, with bibliography, will be found in *The Evolution of Sex* (revised ed. 1901), by P. Geddes and J. A. Thomson; Darwin's *Descent of Man* (new ed. 1901). See also A. Weismann's papers on heredity and kindred

subjects (trans. 1889); J. Cossar Ewart's *The Penicuiik Experiments* (1899); J. T. Cunningham's *Sexual Dimorphism* (1900), with Lamarckian interpretation.

Heredity:—Yves Delage's *La Structure du Protoplasma, l'Hérédité*, etc. (1895); Francis Galton's *Natural Inheritance* (1889); Prosper Lucas's *Traité Philosophique et Physiologique de l'Hérédité Naturelle* (1847); Th. Ribot's *L'Hérédité Psychologique* (new ed. 1882); H. de Vries's *Intracellulare Pangenesis* (1889); A. Weismann's *Essays on Heredity* (trans. 1889), and *The Germ-Plasm* (1893); E. B. Wilson's *The Cell in Development and in Inheritance* (2nd ed. 1902); J. A. Thomson's *Heredity* (1904).

Animal instincts and intelligence:—J. Loeb's *Comparative Physiology of the Brain and Comparative Psychology* (trans. 1901), illustrating the extreme physiological position; E. Mach's *Contributions to the Analysis of the Sensations* (trans. 1897); C. Lloyd Morgan's *Introduction to Comparative Psychology* (1894); *Animal Life and Intelligence* (1890-1), re-ed. as *Animal Behaviour* (1900); *Habit and Instinct*; G. J. Romanes's *Animal Intelligence* (4th ed. 1886); *Mental Evolution in Animals* (1883); J. Steiner's *Die Functionen des Centralnervensystems und ihre Phylogenese* (1885-1898); E. L. Thorndike's 'Animal Intelligence,' in *Psychological Review*, vol. ii. (1898), and other papers; C. O. Whitman's *Animal Behaviour* (Wood's Holl Biological Lectures for 1898, Boston); E. Wasmann's *Instinct und Intelligenz im Thierreich* (1897), well illustrating the more conservative position.

Bionomics.—See the large works on natural history, notably A. E. Brehm's *Thierleben*, 3rd ed., by Peschuel-Loesche (10 vols. 1890-3); the *Cambridge Natural History*, ed. by S. F. Harmer and A. E. Shipley (10 vols., 6 published);

Cassell's Natural History, ed. by P. Martin Duncan (6 vols. 1883); *Standard or Riverside Natural History*, ed. by J. S. Kingsley (6 vols. 1888); the *Royal Natural History*, ed. by R. Lydekker (1893); and for plants, Kerner's *Plant Life* (2 vols. trans. 1891).

It is also very important to consult the works of the travelling naturalists, and a representative list will be found in the preface by J. A. Thomson to the translation of A. E. Brehm's *From North Pole to Equator* (1896). Among the most notable are Darwin's *Voyage of the 'Beagle'* (new ed. 1890), A. R. Wallace's *Malay Archipelago* (10th ed. 1890), H. W. Bates's *Naturalist on the Amazons* (3rd ed. 1873), T. Belt's *Naturalist in Nicaragua* (2nd ed. 1888), Wyville Thomson's *Voyage of the 'Challenger'* (1877), H. N. Moseley's *Naturalist on the 'Challenger'* (1879), W. H. Hudson's *Naturalist in La Plata* (1892).

The general nature of bionomical inquiry may be illustrated by the following books, representative of various lines of work:—C. Darwin's *Formation of Vegetable Mould through the Action of Worms* (1882); A. Espinas's *Des Sociétés Animales* (1877); L. Fredericq's *La Lutte pour l'Existence chez les Animaux Marins* (1889); F. Houssay's *Les Industries des Animaux* (1889); W. Kirby and W. Spence's *Introduction to Entomology* (1815-26); M. Newbigin's *Life by the Seashore* (1901); J. A. Thomson's *The Study of Animal Life* (4th ed. 1901); Gilbert White's *Natural History of Selborne* (new ed. 1902).

Geographical distribution of animals and plants.—For a short introduction to the subject, see chapter by J. A. Thomson in the *International Geography*, ed. by H. R. Mill (1899). See also the maps in the physical atlas by Berghaus and by Bartholomew; F. E. Beddard's *Text-book of Zoo-*

geography (1895); A. Heilprin's *The Geographical and Geological Distribution of Animals* (1887); R. Lydekker's *Geographical History of Mammals* (1896); W. L. and P. L. Sclater's *The Geography of Mammals* (1899); Trouessart's *La Géographie Zoologique* (1890); A. R. Wallace's *Geographical Distribution of Animals* (2 vols. 1876); *Island Life* (1880; 2nd ed. 1892). Geographical distribution of plants: O. Drude's *Die Florenreiche der Erde* (1884), and other works; Kerner's *Pflanzenleben* (1891, trans.); J. Wiesner's *Biologie der Pflanzen* (1889).

History of biology:—J. V. Carus's *Geschichte der Zoologie bis auf Joh. Müller und Charles Darwin* (1864); Julius von Sachs's *Hist. of Botany, 1530-1860* (trans. from the Ger., 1890); K. von Zittel's *Geschichte der Geologie und Palæontologie* (1899). To these three notable historical works J. A. Thomson's *Science of Life* (1899) may serve as a convenient introduction. It contains a selected list of historical references. See also Huxley, articles 'Biology' and 'Evolution,' in *Encyc. Brit.*; E. Ray Lankester's *The Advancement of Science* (1890), which includes a valuable article on the history and scope of zoology; H. F. Osborn's *From the Greeks to Darwin* (1894); E. Perrier's *La Philosophie Zoologique avant Darwin* (1884); H. A. Nicholson's *Natural History: its Rise and Progress in Britain* (1886); E. Haeckel's *History of Creation* (trans. rev. 1876); E. Clodd's *Pioneers of Evolution* (1897); Bastian's *The Evolution of Life* (1907). See DARWINISM, EMBRYOLOGY, EVOLUTION, HEREDITY, and SEX.

Bion (c. 280 B.C.), a poet of the Alexandrian period of Greek literature, a contemporary of Theocritus, and the friend and master of Moschus, who wrote an elegy on him. He was born at Smyrna, but spent his last years in Sicily. Few

of his poems have come down to us entire; they are of the class called bucolic, but deal chiefly with the loves of gods and heroes. The best known is the *Epitaph of Adonis*. Bion is a graceful verse-writer, who manages his metre—the hexameter—with skill and elegance; and he expresses a refined and delicate sentiment, but without the vigour and naturalness of Theocritus. Editions: (with Moschus), Hermann (1849); (with Moschus and Theocritus), Ahrens (1855-9), Hartung (with notes, 1859); Eng. trans. by Andrew Lang (1889).

Bion OF BORYSTHENES (c. 250 B.C.), Greek Cynic philosopher, contemporary with Eratosthenes and Zeno, studied and taught at Athens. Of his trenchant satires only fragments remain, ed. by Mullach (1867).

Biondi, SIR GIOVANNI FRANCESCO (1572-1644), romance writer, born at Lesina, off Dalmatia; passed from the Venetian to the English diplomatic service (1609). Author of *An History of the Civill Warres of England* (trans. 1641) and three romances, *Eromena* (1624; trans. 1632), *La Donzella Desterrada* (1627; trans. 1635), and *Il Coralbo* (1635; trans. 1655), which were very popular in English translations.

Bionomics ('laws of life'), a term suggested by Professor E. Ray Lankester to designate the study of the external life of plants and animals, their interrelations with other individuals, and their adaptations to their organic and inorganic environment. The importance of considering the organism, not as an isolated existence, but as a link in the great chain of living creatures, was first fully realized by Darwin, and his volume on *Earthworms* (1881) may be taken as a typical example of a bionomical investigation. See Professor J. A. Thomson's *Science of Life* (1899). See BIOLOGY.

Biot, JEAN BAPTISTE (1774-1862), French physicist, was born at Paris. He was appointed to the professorships successively of mathematics at Beauvais, of physics at the Collège de France, Paris, in 1800, and of physical astronomy at the Faculté des Sciences in 1809. He experimented on the refractivity of gases in 1803, joined Arago in measuring an arc of the meridian in Spain in 1806, and determined the length of the seconds pendulum along a British arc in 1817-18. The Rumford medal was awarded to him in 1840 for his researches on polarized light. He invented the polarimeter, and published valuable treatises on Curves (1802), on Physical Astronomy (1805), on Physics (1816-17), and on Egyptian Astronomy (1823). He died in Paris.

Biotite, a mineral belonging to the mica group, but distinguished from other micas by its black colour, and by the presence of considerable proportions of magnesia and iron. It is a common and important rock-forming mineral, occurring in most granites, gneisses, schists, and in a great variety of crystalline rocks. When fresh it forms black, shining spangles, with a brilliant surface, and is easily recognized by its softness and by its perfect cleavage, in consequence of which it breaks up into thin, smooth scales.

Bipinnaria, a term used to describe the bilateral larval form of certain echinoderms. The name, like that of Brachiolaria, was given under the erroneous impression that the larva was a distinct animal.

Biplane. See AEROPLANES.

Biquadratic (Lat. *biquadratus* = twice squared), an equation involving the fourth power of the unknown quantity—i.e. of the form $x^4 + px^3 + qx^2 + rx + s = 0$, where p , q , r , and s are constants.

Sometimes a biquadratic can be reduced to a quadratic, as, for instance, when it happens to be a perfect square, or can be reduced to the form $x^2(x+a)^2 + bx(x+a) + c = 0$. In other cases it may be solved by means of an auxiliary cubic, by Descartes', Ferrari's, or Euler's method, unless the roots are all real or all imaginary, when the cubic equation has generally real and unequal roots.

Bir, or BIREJIK, tn., Asiatic Turkey, on the left bank of the Euphrates, 80 m. N.E. of Aleppo; the limit of Euphrates navigation and the crossing point of the great caravan route between Syria and Bagdad. Pop. over 10,000.

Birch. The common species, *Betula alba*, is one of the hardiest trees known, thriving in the most exposed situations, growing as a forest tree at an altitude of 2,500 ft. above sea-level, and as far north as 70°. It is the only tree found in Greenland, and occurs commonly throughout Russia and Siberia. According to climate, the height of the tree varies from 3 to 80 ft. The leaves are small, ovate, and unevenly serrated. The male and female catkins occur on the same tree. The fruit is a very small nut with membranous wings to assist in dispersal. The thin silvery cuticle, which scales off like slips of paper, was once used for writing on, and the enduring character of the bark has long been noted. Thus, the Laplanders often use it as a house-roofing material, and the N. American Indians built their canoes of it. The species of birches are easily propagated by means of seeds, gathered in autumn and sown in spring. The seeds should be barely covered with fine sandy soil. The varieties are propagated by grafting or budding.

Much of the virtue of Russian leather is due to the employment

in its manufacture of the oil obtained from birch bark; and the same oil is used by the Russian peasants as a disinfectant for wounds.

There are many varieties of *B. alba*, the most characteristic being the weeping *B. alba pendula* and the slightly pendulous *B. alba purpurea*. Among the other species may be named *B. nana*, a dwarf species about 2 ft. high; the papery birch, *B. papyracea*; *B. pumila*, a dwarf species; *B. glandulosa*, also a dwarf kind; the Siberian species, *B. daurica*; and the tall red birch, *B. nigra*. See Regel's *Monographische Bearbeitung der Betulaceæ*; C. A. Johns's *Forest Trees of Britain* (1859); F. E. Hulme's *Wild Fruits of the Countryside* (1902).

Birch, CHARLES BELL (1832-93), English sculptor, who, after studying in Berlin, settled in London, and produced in bronze and marble realistic and military groups, as well as statues of public men, notably of Beaconsfield for the Junior Carlton Club and for Liverpool, and of Gladstone for the City Liberal Club, and statues of Queen Victoria at Aberdeen and at Udaipur, India. His best-known work is the bronze griffin on the pedestal which marks the site of Temple Bar, Fleet Street. He was elected A.R.A. in 1880.

Birch, JONATHAN (1783-1847), English translator from the German; born in London. He published a translation of Plutarch's *Banquet* (1833), *Divine Emblems*, an original work (1838), and was the first to translate both parts of *Faust* (1839 and 1843). In 1846 he settled in Prussia, and devoted his latest years to a translation of the *Nibelungenlied* (1848).

Birch, SAMUEL (1757-1841), English dramatist, was a London pastrycook, who became lord mayor (1814). He was a strong supporter of Pitt's administration, but resisted the Catholic claims;

an ardent Tory, but opposed the Corn Bill of 1815. His principal works were two musical dramas, *The Adopted Child* (1795) and *The Smugglers* (1796); the *Speeches in Common Council against the Catholics* (1805 and 1807); and *The Abbey of Ambresbury*, a poem in two parts (1788-9).

Birch, SAMUEL (1813-85), Egyptologist, was grandson of Samuel Birch, lord mayor of London. After studying Chinese, he became in 1836 assistant in the department of antiquities at the British Museum. From 1866 till his death he was keeper of Oriental antiquities. He was one of the founders of the Society of Bible Archæology (1870). He wrote *Hist. of Ancient Pottery* (1858; 2nd ed. 1873); *Ancient Hist. from the Monuments: Egypt* (1875); and descriptions of the Greek Vases (1851), Ancient Marbles (1861), Rhind Papyri (1866), Hieratic and Demotic Inscriptions (1868), and other collections in the British Museum. See his *Life*, by his son Walter (1886).

Birch, THOMAS (1705-66), English historian and biographer, was born of Quaker parents in Clerkenwell, London. Patronized by the Hardwicke family, he was rapidly preferred, until, in 1746, he became rector of St. Margaret Patens, London, and Depden, Suffolk (1761-6). His principal works were the *Life of Robert Boyle* (1744), *Memoirs of the Reign of Elizabeth, 1581-1603* (1754), and *Historical View of Negotiations between the Courts of England, France, and Brussels, 1592-1617* (1749).

Birch, WALTER DE GRAY (1842), son of Samuel Birch, Egyptologist, entered the British Museum MSS. department in 1864, and was senior assistant (1865-1902), since when he has been librarian and curator to the Marquess of Bute. He is a student of the Anglo-Saxon, Mediæval Latin, Spanish, and Portuguese languages, par-

ticularly with reference to monastic records, etc., and has edited the *Journal of the British Archaeological Association* for many years. He is author of numerous papers and works on archaeology and mediæval history.

Birch - Pfeiffer, CHARLOTTE (1800-68), German actress and dramatic writer, was born at Stuttgart. She became one of the leading German actresses; in 1837 manager of the theatre at Zürich, but in 1844 accepted an engagement at the Theatre Royal, Berlin, and stayed there to the end of her life. She was also a prolific playwright and novelist, her plays being still popular in Germany, especially *Die Günstlinge*, *Hinko*, *Die Waise von Lowood* (a dramatization of Charlotte Brontë's *Jane Eyre*), and *Pfefferrösel*. Her *Gesammelte Dramatische Werke* appeared in 23 vols. (1863-80), and her novels in 3 vols. (1863-5).

Bird. Birds constitute one of the best-defined groups in the animal kingdom, being distinguished at once from all other animals by the characteristic covering of feathers. The presence, in addition to feathers, of an epidermic covering of scales over parts of the body is an external character which suggests a descent from reptiles—a suggestion borne out alike by details of internal structure and by geological evidence. Indeed, in spite of the fact that some birds do not fly, we may say, speaking broadly, that birds are distinguished from reptiles by those peculiarities of structure and function which bear, directly or indirectly, upon the power of flight. It may, therefore, be convenient to discuss the characteristics of birds in connection with the power of flight rather than in strict systematic order.

The organs of flight in a bird are the fore limbs, which have been converted into wings. The result of this is that the posterior

limbs only can be used in supporting the body on the ground: the bird—to use an old term—is a biped. Now, these changes of function of fore limb to wing, and hind limb to sole support, have produced striking and, in a sense, independent modifications of structure. For it is exceedingly interesting to notice that of the two rival groups of reptiles which are claimed to be ancestral to birds, the one set (Pterosaurs) have fore limbs converted into wings, and the other (Dinosaurs) have the hind limbs converted, as in birds, into the sole supports of the body. It may, therefore, be convenient to consider the two sets of modifications separately.

Considering first the fore limb, we find that the conversion into a wing has resulted in the reduction of the hand to three fingers, of which one only (the index) is well developed. It is this first or index finger which bears the large *primary* feathers of flight, and it is always of considerable length. The length is partly given by the long palm-bone (metacarpal), which is fused to the palm-bone of the rudimentary middle finger. The first digit, or thumb, is represented by a small rod of bone, which bears a small independent tuft of feathers, known as the false wing (*ala spuria*). In the majority, though not in all existing birds, claws are absent from all the fingers. There are only two separate wrist-bones, and the wrist-joint possesses very little freedom of movement. Without entering into structural details, one would notice the peculiar folding up of the arm when at rest, and the strong ulna, or outer bone of the fore arm, which carries the *secondary* feathers of flight. Especially important in connection with flight are also the united clavicles, which together form the merrythought or wishbone; the strong coracoids, bones repre-

sented in ourselves only by a process on the shoulder-blade; the great keel on the breastbone to which the muscles of flight are attached; the fusion of the vertebræ in the back to form a firm fulcrum on which the wings may play, and so on.

In connection with the modified hind limbs, one would notice especially the great elongation of the pelvis, which extends both in front and behind the cup in which the top of the thigh is placed, so that the weight of the body lies partly in front of and partly behind the point of support. A comparison of a skeleton and a living bird will show how beautifully the body is balanced about the legs; but to this statement swimming birds form an exception, for in them the legs are placed far back, and the gait is in consequence clumsy and awkward. Again, in the limb itself the ankle-bones seem to be absent, and the bones of the sole of the foot (metatarsals) are fused together and with the missing tarsals seem to form a single bone. The little toe is always absent, a bird never having more than four toes.

In living birds the tail is always short, and usually ends in a bony plate, the ploughshare bone, which carries a bunch of tail feathers, of much importance in flight.

The feathers give the necessary resistance to wings and tail during flight, and keep the body warm. Its temperature is unusually high, this being, again, no doubt associated with the quickened respiration necessitated by flight. This respiratory efficiency depends on the development of air-sacs connected with the lungs, and with it is associated a four-chambered heart, and a circulation as perfect as that of a mammal. As in swift-moving animals in general, the head is relatively small, though the brain is better developed than that of a reptile. In living birds

teeth are absent, and the jaws are covered with a horny beak. Birds lay eggs as reptiles do, but the exigencies of flight demand that these should be few in number. This is, again, rendered possible by the fact that their high intelligence enables the parents to protect their eggs and young by many ingenious devices, and the young are also, in almost all cases, cherished with much devotion until the dangers of early life are past. The vast migrations performed by many birds are ascribed by several ornithologists ultimately to the desire to seek safe nesting-places in which the young may be reared. Finally, in accordance with their high specialization, we find that birds not only rank among the most beautiful and highly ornamented of animals, but also frequently possess the power of song, and are believed to exhibit preferential mating in its most pronounced form.

The classification of birds is a matter of great difficulty, for many characters hitherto relied upon prove, on inquiry, to be merely adaptations to a similar method of life.

Most authorities agree that birds should first of all be divided into two great sets—the Archæornithes ('primitive birds'), including only the strange fossil known as Archæopteryx; and the Neornithes ('modern birds'), including all other known birds, fossil or living, in all of which the tail is short and the palm-bones fused. The Neornithes may be divided as follows:—

1. Ratitæ, flightless birds with raftlike breastbone, including the living ostriches, emu, cassowary, and kiwi, with the extinct moas and others.

2. Odontolcæ ('teeth in furrows'), fossil birds with long bills, numerous teeth, and flat breast-bones, such as *Hesperornis* and *Enaliornis*.



Wading and Swimming Birds.

1. Black-vented stormy petrel. 2. Mandarin duck (male). 3. Scarlet ibis. 4. Great northern diver. 5. Common flamingo. 6. Red-breasted goose. 7. King penguin.



Land Birds.

1. Lanner falcon. 2. Stockdove. 3. King bird of paradise. 4. Golden pheasant. 5. Hoopoe.
6. Great bustard. 7. Rufous tinamou. 8. Parrot *Aprosmictus eyampygius*, E. Australia.

3. Carinatae ('sternum with keel'), birds which typically have a keel on the breastbone, including the vast majority of living forms and not a few fossils.

The following are the chief orders as defined by Dr. Gadow:—The Colymbiformes ('swimming birds') include the primitive divers and grebes, and the Sphenisciformes ('penguin-like') include the aberrant penguins, birds with no power of flight, but with well-developed wings used as flippers in swimming and diving. In the Procellariiformes ('petrel-like') are included the petrels and albatrosses, in which the bill has a compound sheath; while the gannets, pelicans, cormorants, and others, together with such wading birds as storks, herons, ibis, etc., fall into the Ciconiiformes ('stork-like'). The last-named birds lead through the flamingo to the ducks, geese, and swans, which, with others, constitute the order Anseriformes ('goose-like'). Very different are the members of the next order, the Falconiformes ('falcon-like'), or diurnal birds of prey, with their strong claws and raptorial beaks. The small order of Tinamiformes ('tinamou-like') includes the primitive tinamous, S. American forms which in external appearance resemble the members of the next order, the game birds or Galliformes ('fowl-like'). In the Gruiformes ('crane-like') are included rails, cranes, bustards, and others which in a sense are transitional between the game birds and the shore birds included in the large order of Charadriiformes ('plover-like'), an order comprising not only limicoline forms like plovers, sandpipers, snipe, but also the sea-gulls and their allies, and the grain and fruit eating pigeons. Parrots and cuckoos are placed together in the order Cuculiformes ('cuckoo-like'); while the very heterogeneous order of Coracii-

formes ('raven-like') includes owls, kingfishers, swifts, humming-birds, woodpeckers, and many others.

Largest of all is the unwieldy order Passeriformes, or perching birds, including all the song-birds (Oscines), and thus the vast majority of the smaller British birds. They are characterized, among other points, by the structure of their feet; and in the birds of paradise reach, perhaps, the summit of avian beauty, and in the crows, according to many ornithologists, the summit of bird intelligence. The weaver-birds and the tailor-birds show also some of the most wonderful forms of nests, and the 'gardens' and bowers of the bower-bird indicate a keen appreciation of beauty. All these are passerine birds.

For general descriptions of birds, see *A Dict. of Birds*, by A. Newton (1893-6), and the volume on *Birds* in the 'Cambridge Natural History,' by A. H. Evans (1899). For British birds, reference should be made to the following, among others: *An Illustrated Manual of British Birds*, by Howard Saunders (1889), and *Handbook of British Birds*, by J. E. Harting (new ed. 1901). Among the more elaborate works on the same subject may be mentioned *A Hist. of British Birds*, by F. O. Morris (6 vols. 1851-7); *A Hist. of British Birds, with Coloured Illustrations of Eggs*, by H. Seebohm (6 vols. 1883-5); *Birds of Great Britain*, by J. Gould (5 vols. 1862-73); *Coloured Figures of Birds of British Islands*, by Lord Lilford (7 vols. 1885-97). See also *Heligoland as an Ornithological Observatory*, by H. Gätke (trans. by R. Rosenstock, 1895). For general accounts of the structure of birds, see *The Structure and Classification of Birds*, by F. E. Beddard (1898), and F. W. Headley's *The Structure and Life of Birds* (1895). See also

Bosworth Smith's *Bird Life and Bird Lore* (1905).

Bird, EDWARD (1772-1819), English subject painter, was born at Wolverhampton, and was self-educated. In 1809 the Royal Academy accepted his *Good News*, which at once established his reputation. Other *genre* paintings, *County Auction* and *Gipsy Boy*, were equally successful; his *Village Politicians* and *Blacksmith's Shop* are well known. He was elected A.R.A. in 1812, and R.A. in 1815. For the *Death of Eli* he was awarded the prize of the British Institution; and by the *Field of Chevy Chase*, his greatest work, he procured the post of court painter to Queen Charlotte. His last historical piece was the *Embarkation of Louis XVIII. for France*.

Bird, GOLDING (1814-54), English physician, born at Downham, Norfolk; was appointed lecturer on natural philosophy at Guy's Hospital (1836), and on *materia medica* at the College of Physicians (1847). He did much to further the application of chemistry to medical practice. Chief works: *Elements of Natural Philosophy* (1839), *Urinary Deposits* (1844).

Bird, ISABELLA. See BISHOP.

Bird, ROBERT MONTGOMERY, (1803-54), American author, was born at Newcastle, Delaware. He early turned his attention to literature, and wrote three successful tragedies—*The Gladiator* (a favourite piece with Edward Forrest), *Oraloosa*, and *The Broker of Bogota*; he was also the author of well-known novels—*Calavar* (1834), *The Infidel* (1835), *Nick of the Woods* (1837), etc.

Bird, WILLIAM. See BYRD.

Bird-catching Spider, the name given to the species of the genus *Mygale*, which are very large, hairy spiders found in tropical countries. They appear to live chiefly on insects, but the

fact that they can kill small birds would appear to be well authenticated. The body may reach a length of 2 in., and the span is stated to be sometimes as much as 7 in.

Bird Cherry (*Prunus padus*) is a species of the order Rosaceæ, and in the same genus as cherry and plum. It belongs to temperate Europe and Asia, and is found in many woods in Britain, where it is known as the hagberry—*i.e.* 'berry of the woods.' It differs from the wild cherry in being in full leaf before it flowers, usually in May. The flowers are much smaller than those of the wild cherry, and are set in racemes from 3 to 5 in. long; these are upright at first, but as the flowers expand the raceme becomes pendulous. The cherries are black, about the size of peas, and somewhat astringent and bitter.

Bird-lice, or MALLOPHAGA, family of pseudo-neuropterous insects which are not blood-suckers like true lice, but have mouths adapted for biting, and feed upon the feathers of birds or the hair of mammals. An active form known as *Menopon pallidum* infests domestic poultry, though other species also occur on these birds. Mallophaga occur on mammals as well as on birds, but it does not appear that they multiply with the same rapidity as true lice, or that under natural conditions they are often numerous enough to cause serious trouble.

Birdlime, a viscid material obtained from the bark of holly by boiling. It is used by bird-snarers for smearing twigs.

Bird of Paradise, a general name given to the members of the family Paradiseidæ, which includes beautiful birds inhabiting the Malay Archipelago, and extending into the Australian region. The birds of paradise are passerine birds, probably most nearly allied to the crows, but

they excel all other birds in their magnificent development of accessory plumes and their glory of colour. As usual, with respect to birds, these statements are true only of the males, the females being less gorgeous. The diet consists largely of seeds and fruits, but these are mingled with insects, and also, to a less extent, with worms, snails, frogs, and lizards. Among the most striking forms are the great bird of paradise (*Paradisea apoda*), the one commonest in collections; *Cicinnurus regius*, or the king paradise bird, which is glossy scarlet with a bright green throat patch; the glossy black rifleman (*Ptilorhis paradisea*); and the magnificent bird of paradise (*Diphyllodes magnifica*), with its wonderful erectile ruff. For descriptions of the birds in their native haunts, reference should be made to A. R. Wallace's *Malay Archipelago* (10th ed. 1890). See also article BOWER-BIRD.

Birds. See BIRD.

Bird's Eyes, in timber, are the nodules that appear in planed wood. They are caused by lateral latent shoots which terminate in dormant buds.

Bird's-foot (*Ornithopus*), a genus of eight species in the order Leguminosæ. Two are natives of the British Isles, but are rare. *O. sativus* is the Serradilla, a forage crop on the Continent, but little cultivated in Britain.

Bird's-foot Trefoil (*Lotus corniculatus*) belongs to the order Leguminosæ, and represents a genus of eighty species which are widely distributed. It has creeping stems and small clover-like leaves; it sends up a naked stalk a few inches long, from the top of which arise three or four flowers, crimson-tipped in the bud and yellow in full bloom. The pods are about an inch long, and spread out like the digits of a straight-toed bird. The plant is common by roadsides and on grassy banks,

and is often sown among permanent pasture.

Birejik. See BIR.

Biretta, or BARETTA, name originally used for a pontifical cap, but now for the square cap worn by Roman and certain Anglican clerics.

Birgus, the robber or cocoanut crab, nearly allied to the hermit crab, found on the coral islands of the Indo-Pacific region. It is a land form, and lives upon coconuts, which it is capable of opening with its very strong claws.

Birjand, or BIRDJAND, tn., prov. Khorassan, Persia, 240 m. S. of Meshed and 210 m. N.E. of Ker-
man. Pop. 14,000.

Birkbeck, GEORGE (1776-1841), the founder of mechanics' institutions, was a native of Settle, in Yorkshire. In 1800, while a professor of natural philosophy at Anderson's College, Glasgow, he established courses of lectures in science to working-men. In 1804 he removed to London. See Godard's *Life of Dr. Birkbeck* (1884).

Birkbeck College, founded by George Birkbeck as the London Mechanics' Institute (1823), with the aid of Brougham, Bentham, Cobbett, and others. The original idea was to teach mechanics the correct knowledge of the principles of their respective trades, but later the field was enlarged, and a comprehensive general education is now aimed at, and provides complete courses for the various degrees of the University of London. It is now known as Birkbeck College, and is situated in Bream's Buildings, Chancery Lane.

Birkdale, par. and tn., S.W. Lancashire, England, on the coast, 1 m. S.W. of Southport, of which it forms a populous suburb; has well-equipped hydropathic. Pop. 15,000.

Birkebeiner, the name of a political party in Norway at the

end of the 12th and the beginning of the 13th century, which first arose in opposition to Erling Skakke and his son Magnus, and subsequently fought for the male heirs of Sigurd Mund, as represented by King Sverre and his descendants. They were so called because they were said to be obliged to wear birch-bark clogs for lack of boots.

Birkenfeld. (1.) Principality of Germany, dependent upon the grand-duchy of Oldenburg, but entirely surrounded by the Prussian province of Rhineland. Its surface is hilly and well wooded, and is drained by the Nahe. Agriculture and horticulture are carried on, and the polishing of gems (agates). It has only a personal union with the grand-duchy. Area, 194 sq. m. Pop. 47,000. (2.) Town of the above, 38 m. by rail N. by E. of Saarbrücken. Pop. 2,300.

Birkenhead, par., co., parl., and munic. bor., mrkt. tn. and seapt., on l. bk. of Mersey, opposite Liverpool, 15 m. N.W. of Chester, N.W. Cheshire, England. Though dating from the 12th century, it became important only after the opening of the dock at Wallasey Pool in 1847. The docks have a water area of 165 ac., and a lineal quayage of 9½ m. Woodside Lairage is one of the largest and best-equipped abattoirs in the kingdom. The town was incorporated in 1877 with Claughton, Oxton, Tranmere, and part of Higher Bebington. In 1831 it was a village of little over 200 inhabitants; now (1910) the pop. is 122,000. The tunnel under the Mersey, between Birkenhead and Liverpool, was opened in 1886. Shipbuilding forms the chief industry, and there are engineering works, breweries, and iron-smelting works. Coal is largely exported. Here are St. Aidan's theological college, the fine Birkenhead Park opened in 1847, Mersey Park, and

Bidston Hill (observatory). See Mott's *Reminiscences of Birkenhead* (1900); and Aspinall's *Birkenhead* (1903).

Birkenhead, a British steam troopship wrecked in Simon's Bay, S. Africa, on Feb. 26, 1852, when 454 of the crew and soldiers perished. The gallantry of those on board, and especially of the troops, will ever be remembered. See Addison's *The Story of the Birkenhead* (1902).

Birkenhead, SIR JOHN (1616-1679), English pamphleteer, born near Northwich, Cheshire, and educated at Oriel College, Oxford. During the civil war he wrote the weekly sheet *Mercurius Aulicus* (1642-5), the royalist rival to the parliamentary *Mercurius Britannicus*. Appointed reader in moral philosophy, he was ejected by Parliament, and went into exile with Charles II. (1648), but after the restoration he was knighted (1662).

Birks, THOMAS RAWSON (1810-1883), English theologian, born at Staveley, Derby; was second wrangler at Cambridge (1834), and succeeded Maurice as professor of moral philosophy there (1872). He was a strong controversial theological writer on the evangelical side, producing *Horæ Evangelicæ* (1852), *The Bible and Modern Thought* (1861), *Modern Utilitarianism* (1874), *Modern Physical Fatalism* (1876), etc.

Birmingham, parl. bor., munic. bor., city (lord mayor since 1896), and co. bor., Warwickshire, England, 112 m. N.W. of London. The municipal borough (1838) includes the parishes of Birmingham, Edgbaston, Aston, Balsall Heath, and Harborne, the city having been extended to be coterminous with the parliamentary borough in 1891. The latter is divided into seven single-member constituencies. Birmingham is the commercial capital of the Midlands. Though men-

tioned in Domesday, and sacked by Prince Rupert during the civil war (1643), the city is essentially modern, and has no antiquities worth mentioning, except Aston Hall and some monuments of the Berminghams (St. Martin's church), who held the manor from at least the reign of Edward I. Many of the streets, notably Corporation Street, are wide and stately, and the public buildings are metropolitan in character. The town hall, of Corinthian design, with massive detached columns copied from those of the temple of Jupiter Stator at Rome, contains a fine organ, and is famed for the Birmingham musical festival (instituted 1768), which is held triennially. Mendelssohn's *Elijah* was here first produced in 1846. The council house, the corporation museum and art gallery, and many other public and educational buildings, are also notable. Birmingham University, founded 1900, possesses the usual faculties, but has a stronger modern scientific and commercial bias than any other British university. It owes much to its chancellor, the Right Hon. Joseph Chamberlain, M.P., who has been closely associated with the municipal progress of the city. The university has its nucleus in Mason College, founded by Sir Josiah Mason in 1875 for scientific education; other educational establishments are Queen's College (1828), King Edward's grammar school (founded 1552), the new school of art (1885), the corporation technical school, Birmingham or old library (1797). The foundation of the bishopric of Birmingham dates from 1905. It gives name to a Roman Catholic see (1879); the cathedral (1839-41) was designed by A. W. Pugin. Amongst many statues is one to the chemist Dr. Priestley, whose house was sacked and burnt and his library and MSS. destroyed by

a 'church-and-king' mob in 1791. Birmingham has twelve public parks, the largest being Warley Woods and Park, covering 110 ac., acquired in 1906. The proximity of Birmingham to the S. Staffordshire coal field makes it the hardware metropolis of the kingdom. Steam-engines, gas-engines, railway plant, small-arms (Birmingham Small-arms Factory), ammunition, bicycles, screws, and metal ornaments are a few of its many manufactures. Birmingham is the birthplace and chief centre of the brass trade, and jewellery, glass, electro-plate, steel pens, and chemicals are largely manufactured. Brewing is also a large industry. Watt perfected the steam-engine here, and, in conjunction with Boulton, founded the Soho Works. Murdock, Eginton, John Wyatt, and other mechanics, have also been closely associated with the town. Birmingham took a leading part in the reform agitations of 1832 and 1835, and was the centre of the Chartist movement resulting in the riot of 1839. Pop. (1901) 522,204; as extended in April 1911, about 1,000,000. See Dent's *Making of Birmingham* (1894); Anderton's *The New Birmingham* (1900); and Cornish's *Birmingham Illustrated* (1900).

Birmingham, city of Alabama, U.S.A., the co. seat of Jefferson co., situated near the middle of the state, 95 m. N.W. of Montgomery. It is in the heart of a rich coal and iron mining district, and has large iron and steel works; manufactures cotton and cottonseed oil, and has a trade in lumber and agricultural products. Pop. (1910) 132,685.

Birmingham Daily Post was established in 1857 by the late Mr. John Frederick Feeney, in association with Sir John Jaffray, and was one of the first daily newspapers to be published in the provinces at the price of one

penny. The *Post* maintained the Liberal Unionist cause at the Home Rule split in 1886, and has come to be regarded almost as the semi-official organ of Mr. Joseph Chamberlain. It has always prided itself upon its independence, and during the American civil war it stoutly supported the cause of the North. It is edited by Mr. G. W. Hubbard.

Birnam, vil. in par. of Little Dunkeld, Perthshire, Scotland, on r. bk. of Tay, 1 m. s. of Dunkeld, on Highland Ry. South of the village rises Birnam Hill (1,324 ft.), once covered by a royal forest (see *Macbeth*, act iv. sc. 1, line 92, etc.). Remains of 'Duncan's Camp,' a vitrified fort, on s.e. slope.

Birney, JAMES GILLESPIE (1792-1857), American anti-slavery politician, was very active from about 1832, and in 1837 became secretary of the American Anti-Slavery Society. He unsuccessfully stood in 1840 and 1844 for the United States presidency. See W. Birney's *J. G. Birney and his Times* (1890).

Biron, ERNST JOHANN (1690-1772), Duke of Courland, whose real name was Bühren, was the favourite of the Empress Anna Ivanovna, niece of Peter the Great, and became practically ruler of all the Russias. A blood-thirsty tyrant, he was responsible for the execution or banishment of hundreds who stood in his way. Biron assumed the regency when the empress died (1740); but a conspiracy was formed against him by Münnich, with the result that he and his family were exiled to Siberia. He was recalled (1741) by the Empress Elizabeth.

Biron, family of French generals. ARMAND DE GONTAULT, BARON DE BIRON (1524-92), fought against the Huguenots. His son, CHARLES (1562-1602), became marshal (1594) of France and (1598) duke, and governor of Burgundy. He was beheaded in the Bastille

for treasonable practices. ARMAND LOUIS (1753-94), Duc de Lauzun, accompanied Lafayette to America (1778), and, returning in 1783, commanded various armies on the Rhine, in Italy, and in Vendée. He was executed during the Reign of Terror.

Birr. See PARSONSTOWN.

Birrell, RIGHT HON. AUGUSTINE (1850), English barrister and author, was born near Liverpool. He became Quain professor of law at University College, London (1896), M.P. for W. Fifeshire (1889-1900), and for Bristol North in 1906. In the Campbell-Bannerman administration (1906) he was appointed President of the Board of Education, and conducted through the House of Commons the Education Bill of 1906, which, however, on account of the Lords' amendments, was dropped. In 1907 he was made chief secretary to the lord-lieutenant of Ireland. His works include *Obiter Dicta* (two series, 1884, 1887); *Life of Charlotte Brontë* (1885); *Res Judicatæ* (1892); *Men, Women, and Books* (1894); *Sir Frank Lockwood* (1898); *Collected Essays* (1900); *Miscellanies* (1901); *Andrew Marvell*, English Men of Letters (1905). He has been editor of several official Liberal publications, and in 1904 was president of the National Liberal Federation.

Birs, small riv. in N.W. of Switzerland, joining the Rhine E. of Basel. In 1444, at the leper house of St. Jakob-bei-Birsfelden, a body of confederates, less than 1,500 strong, stood to the death against 30,000 Armagnac free-lances advancing on Basel.

Birsk, tn., Orenburg gov., Russia, 52 m. N.N.W. of Ufa, on the Bielaia, sub-affluent of the Volga; founded in 16th century as an outpost against the Bashkirs. Pop. 9,000.

Birs Nimrud. See BABYLONIA.

Birstal (ac. 13,976), par. and tn., 7 m. s.w. of Leeds, W. Riding,

Yorkshire, England; has woollen mills, an iron foundry, coal mines, etc. Pop. of tn. 6,600.

Birth. For Registration of Birth, see REGISTRATION. For Statistics, see VITAL STATISTICS.

CONCEALMENT OF BIRTH. In England, every person, including the mother, who endeavours to conceal the birth of a child by a secret disposition of its dead body, whether the child died before, at, or after its birth, is guilty of a misdemeanour, and liable to two years' imprisonment (Offences against the Person Act, 1861). In Scotland, if a woman conceals her pregnancy during the whole period of it, and neither calls for nor has assistance at the birth, then if the child is found dead, or is missing, she is guilty of the offence of concealment of pregnancy, and is liable to imprisonment for two years (43 Geo. III. c. 14).

Birth-palsies are those paralytic conditions in infants which are due to injury received at birth. The cause is abnormal pressure of some kind on the brain centres, and in many cases the effects pass off in a few days. See PARALYSIS.

Biru. See WALATA.

Bisaccia, comm., Italy, prov. of and 32 m. E.N.E. of Avellino. Pop. 7,500.

Bisacquino, tn., prov. Palermo, Sicily, 25 m. S. of Palermo. Pop. 10,000.

Bisalnagar, or VISNAGAR, tn., dist. Kadi, Baroda, Bombay Presidency, 50 m. N. of Ahmedabad; cotton manufactures. Pop. 20,000.

Bisanthe. See RODOSTO.

Bisbee, tn., Cochise co., Arizona, U.S.A., 80 m. S.E. of Tucson, and 8 m. from the Mexican boundary. It is the centre of an important copper-mining region, and has large smelters. Pop. about 7,000.

Biscay. See VIZCAYA.

Biscay, BAY OF (anc. *Cantabrium Mare* and *Aquitanus Sinus*, and the Fr. *Golfe de Gascogne*),

a bay of the Atlantic; fills the wide angle between the N. coast of Spain and the W. coast of France. Except between the estuary of the Gironde and the mouth of the Adour, where it is lined by low sand-dunes and lagoons, its shores are bold and rocky. Besides the two rivers just named, it receives the Vilaine, Sèvre, Charente, and Dordogne. From the extreme points (Brittany to Galicia) it measures some 340 m. Along its N.E. shore are the small islands of Belleisle, Noirmoutier, Ré, and Oléron. Its depth along this part of the coast of France is in places as little as 20 fathoms, but increases off the N. coast of Spain to 200 fathoms. Under the impact of N.W. winds it becomes extremely boisterous.

Bisceglie, seapt. and episc. see, prov. Bari, Italy, 21 m. N.W. of Bari. It has a 12th-century cathedral, and ruins of an old Norman castle. Pop. 32,000.

Bischof, KARL GUSTAV (1792-1870), German chemist and geologist, was born near Nuremberg. He became, in 1819, professor of chemistry at Bonn. In 1840 he published in French an able treatise on means to avoid explosions in mines, and greatly improved the safety-lamp. He also made important contributions to geology, chiefly in *Lehrbuch der chemischen u. physikalischen Geologie* (1847-54; 2nd ed. 1863-71).

Bischoff, THEODOR LUDWIG WILHELM (1807-82), German physiologist, anatomist, and embryologist, was born at Hanover. In 1844 he was appointed professor of anatomy and physiology at Giessen, where he founded an anatomical museum and a physiological institute. He also held chairs at Heidelberg (1836) and Munich (1855-78).

Bischofswerda, tn., Saxony, 20 m. E.N.E. of Dresden. Pop. 7,500.

Bischweiler, tn., Alsace-Lorraine, Germany, in Lower Alsace, 15 m. N.N.W. of Strassburg; manufactures jute and grows hops. Pop. 8,300.

Biscuit (Fr. 'twice baked'), flat cakes dried and hardened by baking. Flour, water, and salt are the basis of all kinds of biscuits, these ingredients alone forming ship's bread. The making of ordinary biscuits is entirely done by machinery. A measured quantity of flour and water, and the other ingredients required, are supplied to a mixing machine, by which they are kneaded with revolving knives into a stiff dough. The dough is then rolled out between two heavy iron rollers into a long, thin sheet, which is carried on a web of felt or canvas to the cutting machine. Here punches of the required size cut out the biscuits, the scraps being returned automatically to the rolling machine. The biscuits are next conveyed to the oven on a travelling wire-gauze frame. The motion through the oven, which is 30 or 40 ft. long, is continuous; the time of baking varies from five to forty minutes. After leaving the oven the biscuits are packed in tin boxes.

Bisharin, or BEJA, a people inhabiting the lands E. of the Nile, between about 24° N. lat. and the frontier of Abyssinia. They are probably the descendants of the ancient Blemmyes. Their language belongs to the Ethiopian group of the Hamitic languages. See Hartmann's *Die Bedscha* (or Bisharin) in *Zeit. für Ethnologie* (1882).

Bishnupur, the ancient cap. of Bankura dist., Bengal, India, 80 m. W.N.W. of Calcutta; a municipal town with manufactures of fine cotton and silk cloths. Pop. 20,000.

Bishop. See EPISCOPACY.

Bishop, SIR HENRY ROWLEY (1786-1855), British musical composer, pupil of Francesco Bianchi;

was early (1810) associated with the Covent Garden house as composer of ballet and incidental music, and afterwards with Drury Lane (1825) and Vauxhall Gardens (1830). He was professor of music in Edinburgh (1841-3) and Oxford (1848). Bishop wrote several operas (e.g. *The Virgin of the Sun*, 1812), but is best known by his settings of songs (e.g. *Should He Upbraid; The Bloom is on the Rye; Home, Sweet Home*). He was knighted in 1842.

Bishop, ISABELLA (née BIRD) (1832-1904), English traveller and author. Canada, Prince Edward Island, and the United States were the scenes of her first journey. She next visited the Sandwich Islands, the Rocky Mountains, and Japan. Her later travels were in Malaysia, China, Siberia, and Korea. She always took a warm interest in medical missions, and built five hospitals and an orphanage in the East. She was the first lady to be elected (1892) a fellow of the Royal Geographical Society. Her works include *The Englishwoman in America* (1855), *Six Months in the Sandwich Islands* (1873), *A Lady's Life in the Rocky Mountains* (1874; 4th ed. 1881), *Unbeaten Tracks in Japan* (1880; 5th ed. 1900), *The Golden Chersonese* (1883), *Korea and her Neighbours* (1898), *The Yangtze Valley* (1899), and *Pictures from China* (1900). See *Life* by Anna M. Stoddart (1906).

Bishop Auckland, par. (ac. 2,564), and mrkt. tn. in Durham, England, 9 m. S.W. of Durham, on the N.E.R., at the junction of the Gaunless and the Wear. Auckland Palace or Castle, the residence of the bishop of Durham, was founded by Bishop Antony Bek during the reign of Edward I. There are large coal mines in the vicinity, and engineering works in the town. Pop. of tn. 12,000.

Bishops, THE SEVEN. In 1687 James II. published illegally a Declaration of Indulgence, permitting all his subjects to worship in their own way. Primarily intended for Roman Catholics, it also granted liberty of conscience to dissenters. A second and more important Declaration (April 1688) was followed by an Order in Council, commanding all ministers to read the same from their pulpits on two successive Sundays. This order the London clergy refused to obey; and Sancroft, the primate, Lloyd, bishop of St. Asaph, Ken of Bath and Wells, Turner of Ely, Lake of Chichester, White of Peterborough, and Trelawney of Bristol, drew up a petition against the Declaration. For this the seven bishops were committed to the Tower, and, after one of the most notable state trials which ever took place before the court of King's Bench (29th June 1688), they were acquitted. The most vivid account of the trial is that of Macaulay (*History of England*).

Bishop's Ring, the corona or halo extending from 20° to 30° from the sun, first observed by Mr. Bishop at Honolulu on Sept. 5, 1883, after the great Krakatoa eruption. The colour of this halo was bluish white in the centre, shading off to reddish brown. This phenomenon, associated with the twilight glows and coloured suns which were conspicuous after the eruption, was a diffraction corona produced by exceedingly small dust particles ejected from the volcano, the heavier particles having been sifted out by gravitation, leaving the remainder so nearly of the same size that they were capable of producing coloured diffraction. Kiessling has produced similar rings by submitting pulverized cement to the action of solar light. The Bishop's Ring reached its maximum bril-

liancy in the spring of 1884, and gradually declined until June 1886, when it disappeared. The ring and twilight glows were seen again in 1902-3 after the eruption of Mt. Pelée in Martinique. See Symons's *Eruption of Krakatoa and Subsequent Phenomena* (1888). See also BLUE SUNS.

Bishop-Stortford, par. (ac. 3,272), mrkt. tn., on G.E.R., 12 m. N.E. of Hertford, E. Herts, England; has maltings, breweries, brickfields, and limekilns; named from its position on the Stort, and because it was granted by William I. to Maurice, bishop of London. Pop. 7,000.

Bishops-Waltham, par. (ac. 7,408), and mrkt. tn. on L. & S.W.R., 9 m. S.E. of Winchester, Hampshire, England. The ruins of Waltham Palace, built in 1135 by Henry de Blois, bishop of Winchester, lie to the S.W. Pop. 2,300.

Bishop Wearmouth, formerly a par. and seapt. in Durham, England, on R. Wear, now forms a part of Sunderland.

Bishopweed (*Ægopodium podagraria*), also called GOUT-WEED, belongs to the order Umbelliferae. In Britain it is one of the commonest wayside plants, growing to a height of one to two feet, with compound leaves; the leaflets are broad, triangular, and in groups of three. The leaflet, from its resemblance to a goat's foot, gave origin to the generic name; *gout* is therefore a misnomer. The flowers are small and whitish, in dense compound umbels.

Biskra (the Roman *Ad Piscinum*), tn. and health resort, Algeria, 150 m. by rail S.W. of Constantine; famous for its date palms. There are hot sulphur baths at Hammam Salahin, 4 m. N.W. of the town. Pop. 10,000 (Europeans, 1,100). See Pease's *Biskra* (1893), and Tripp's *Beautiful Biskra* (1903).

Biskupitz, vil., Oppeln dist., Silesia, Prussia, 7 m. w. by s. of Beuthen; with large iron works. Pop. 13,000.

Bisley, a common near Brookwood and Woking, in the co. of Surrey, England, on the L. & S.W.R., where since 1890 rifle ranges have been established, and the National Rifle Association has held its annual meeting, lasting for a fortnight. This was formerly held at Wimbledon, but the adoption of the small-bore rifle necessitated the provision of longer and safer ranges. The competitions are chiefly confined to volunteers, but there are many open to the regular forces, militia, yeomanry, colonial forces, and to civilian members of the N.R.A. The chief competition is that for the 'King's Prize' (formerly the Queen's), founded at Wimbledon by Queen Victoria in 1860, and open only to past and present volunteers. It is divided into three stages, viz.:—(1) Seven shots at each of 200, 500, and 600 yards. This decides the 300 best shots. (2) These then fire twenty rounds at 600 yards. This decides the 'Hundred,' who (3) fire ten rounds at 800, 900, and 1,000 yards. The winner receives the King's Prize of £250 and the N.R.A.'s gold medal and badge. The most important of the other competitions with the service rifle include the St. George's (volunteers; seven shots at 500 and 600 yards, fifteen at 900), *Daily Graphic* (all comers; seven at 200), *Graphic* (all comers; seven at 500), *Daily Telegraph* (volunteers; seven at 500), *Alexandra* (all comers; seven at 200 and 600), and the Prince of Wales's (volunteers; ten at 200 and 600); the Elcho Challenge Shield, for the best of the four 'eights' representing the different nationalities of the British Isles (fifteen shots at 800, 900, and 1,000 yards); the Ashburton Challenge

Shield, for the best 'eight' from the public school volunteer corps (seven at 200 and 500 yards); and the Humphry Challenge Cup, for Inter-University competition (same shots as in the Elcho Challenge Shield); Kolapore Cup (seven at 200, 500, and 600 yards), for competition between teams representing the mother country and the colonies. See Peddie's *The New Wimbledon at Bisley* (1892).

Bismarck, HERBERT, PRINCE (1849-1904), eldest son of Prince Otto von Bismarck, born at Berlin. After 1873 he was engaged in various diplomatic missions. In 1877-81 he assisted his father at the chancellery. In 1882 he was appointed attaché at London; in 1884, at St. Petersburg; and in 1886, secretary of state for foreign affairs, a post which he filled until 1890, when he resigned office along with his father. From 1893 till his death he was a member of the Reichstag.

Bismarck, OTTO EDUARD LEOPOLD, PRINCE VON (1815-98), or, more accurately, **PRINCE VON BISMARCK-SCHÖNHAUSEN**, was the son of a Pomeranian squire. Born on his father's estate of Schönhausen—which name he assumed in after life in addition to Bismarck—he was sent in 1832 to the University of Göttingen, where he distinguished himself chiefly in physical exercises, and in fighting successfully twenty-seven duels. In 1846 he entered the Saxon provincial Diet, and the general Diet of Prussia in 1847. He was appointed representative of Prussia at the Diet of Frankfort in 1851. In March 1859 he was sent as ambassador to St. Petersburg, and in May 1862 to Paris, whence he was recalled in September 1862, to become minister-president and minister for foreign affairs. Bismarck, whose anti-democratic spirit had declared itself from

the first, now rode roughshod over the opposition of the deputies and the press, dominating his enemies with unconstitutional severity. After the war of spoliation against Denmark, Bismarck carried out his long-nourished policy for the humiliation of Austria. The sanguinary war of 1866, culminating in the defeat of Austria at Sadowa, extinguished the leadership of Austria in Germany, and Prussia became the dominant power. The unification of Germany now set in. Frankfort received a Prussian garrison, Hanover was incorporated in the Germanic Confederation, and treaties were concluded with Bavaria, Baden, and Württemberg. In 1867 Bismarck organized the North German Confederation, and for his services was made chancellor of the Confederation and president of the Federal Council. The Luxemburg difficulty between France and Prussia was adjusted by the neutralization of the Luxemburg territory and the dismantling of the fortresses.

In July 1870 France declared war against Prussia; and on the capitulation of Paris, Bismarck dictated the terms of peace. In January 1871 the king of Prussia was crowned as German emperor at Versailles. Bismarck was appointed chancellor of the German empire, and raised to the rank of prince. He now occupied himself with domestic reform, and with the promotion of the drastic Falk laws against the Roman Catholics—a measure which resulted in the temporary expulsion of the Jesuits and the imprisonment of several bishops. In December 1872 he resigned the presidency of the state ministry, but still continued to advise the emperor, and was reappointed Prussian premier in 1873. The chief object of Bismarck's foreign policy was the preservation of the peace of Europe by the isolation of

France, the conciliation of Russia, and the preservation of an alliance between Germany, Austria, and Italy. In 1878 he presided over the Berlin Congress. His efforts to found a German colonial empire have borne fruit, and he did much to spread German trade throughout the world.

After the accession of William II. in 1888, difficulties arose between the new sovereign and his minister. The former was exacting and imperious, and the latter expected to retain all his old power and influence. At length, in March 1890, Bismarck retired into private life, and the emperor created him Duke of Lauenburg. Personal differences between them became more pronounced, and Bismarck frequently enlarged upon his grievances through the press. There was, however, an interchange of courtesies between the sovereign and the ex-minister after the latter's serious illness in 1893. In private life Bismarck was a man of warm affections. Though imperious in character, and sometimes unscrupulous and vindictive, he was cast in a large mould. At one time he wielded an immense personal influence, and as the chief creator of modern Germany he will hold a conspicuous place in history.

See Blum's *Fürst Bismarck und seine Zeit* (6 vols. 1884-95); Heyck's *Bismarck* (3rd ed. 1904); S. Whitman's *Personal Reminiscences of Prince Bismarck* (1902); C. Lowe's *Prince Bismarck* (new ed. 1898); *The Love-Letters of Prince Bismarck* (Eng. trans., 1901); *Politische Briefe Bismarcks* (4 vols., 1889-93); *Correspondence of William I. and Bismarck* (Eng. trans. 1903); *Die Politischen Reden des Fürsten Bismarck* (ed. by H. Kohl, 14 vols. 1892-1905); M. Busch's *Bismarck—some Secret Pages of his History* (1898); W. H. Daw-

son's *Bismarck and State Socialism* (1890); J. W. Headlam's *Bismarck and the Foundation of the German Empire* (1899); *Bismarck's Table Talk* (ed. by C. Lowe, 1895); and *Bismarck—the Man and the Statesman* (trans. under supervision of A. J. Butler, 2 vols. 1898).

Bismarck, cap. of North Dakota, U.S.A., on the l. bk. of the Missouri, 190 m. w. of Fargo. Has flour mills, machine shops, and breweries, and a large trade in agricultural products and coal. Pop. 5,000.

Bismarck Archipelago, a general name for the Pacific islands lying immediately E. of New Guinea, which for the most part were acquired by Germany in 1884–5. The archipelago embraces the groups and islands of Neu-Pommern (formerly New Britain), Neu-Mecklenburg (New Ireland), Neu-Lauenburg (Duke of York), Neu-Hannover, Matthias, Admiralty, French, Hermit, Shortland, Rook, Dampier, Long, and some smaller ones. The entire area is estimated at nearly 20,000 sq. m., and the total population at approximately 190,000. The inhabitants are indigenous tribes of Melanesian descent, standing at a low stage of civilization, and not yet free from cannibalism. Physically, as well as in their plant and animal life, these islands have a close affinity with New Guinea, but except the coasts they are relatively little known. They are mostly mountainous; partly of coralline formation, and partly volcanic. They have a hot, moist climate, with the N.W. monsoon (Dec. to April). In addition to the usual native fruits and vegetables, the archipelago produces copra, cotton, rubber, trepang, mother-of-pearl, and tortoise-shell; the aggregate trade being valued at nearly £200,000 per annum. The residence of the governor is at Her-

bertshöhe, on Neu-Pommern. The German New Guinea Company is the chief agency for the exploitation of the islands.

Bismarckburg. (1.) District of German E. Africa, touches the E. shore of the S. end of Lake Tanganyika, and includes Lake Rikwa. The native population in the two districts of Bismarckburg and Ujiji is estimated at over 3,000,000 (more than half the total population of German E. Africa). (2.) Capital of the above dist., on the E. shore of the S. end of Lake Tanganyika.

Bismarck Mts., a range in S.W. German New Guinea, reaching an alt. of 15,000 ft.

Bismuth (Bi, 208.5) is a metallic element which occurs in many places free, as well as in combination as sulphide, oxide, and carbonate. Bismuth is extracted from the ore by melting the free metal out, the oxides and sulphides being decomposed by the addition of carbon and iron. It is a white, crystalline, brittle metal with a pinkish tinge, has a sp. gr. of 9.8, is a poor conductor of electricity, and is very diamagnetic. It melts at 268° C., and solidifies with expansion. Bismuth burns to oxide in air, and unites with sulphur if heated with it. Its soluble salts are characterized by forming insoluble basic salts on addition of water—a property that is made use of in their detection. Bismuth itself is used in the preparation of fusible alloys, which are useful on account of their low melting points, and for expanding on solidification, thus enabling them to be employed, among other uses, in taking sharp casts of objects that would be damaged by a high temperature. The basic nitrate and chloride of bismuth are used as pigments under the name of 'flake' and 'pearl' white. Bismuth is of value in medicine, and is used chiefly as

the subnitrate, acting on inflamed surfaces, as in eczema, and on mucous membranes, as a mild astringent and anodyne; its powdery form also dries a 'weeping' surface. Bismuth is much used in all forms of gastric irritation and pain, including gastric catarrh, gastric ulcer, cancer of the stomach, and the vomiting of pregnancy and hysteria. If combined with beta-naphthol, it is also antiseptic for the stomach and intestines.

Bison, the name applied to two closely allied species of the ox genus *Bos*—viz. the American bison (*Bos americanus*) and the European bison (*Bos bison*), mis-called the 'aurochs' or 'bonasus.' Both differ from the domestic ox (*Bos taurus*) in the elevation of the body at the withers, the presence of a heavy mane, and the beard beneath the chin. But while the true ox—apparently a descendant of the urus (*Bos primigenius*)—has been introduced by man over the greater part of the globe, no effort has been made to domesticate the bison. As a wild animal the European bison is extinct, but it is preserved in a few forest regions—e.g. in Lithuania. It may be said that the American bison is also extinct as a wild animal, or nearly so, in spite of the fact that at the beginning of the 19th century it existed on the prairies in countless numbers. In the Yellowstone Park, and in a few private parks, what are perhaps the last remnants of these hordes are now carefully protected. See J. A. Allen's *The American Bisons* (1876); *The Extinction of the American Bison*, by Homaday (1889); and *American Big-Game Hunting*, by T. Roosevelt and G. B. Grinnell (1893).

Bissagos Islands, a group of low, sandy islands off the w. coast of Africa, opposite the estuary of the Geba, between 11° and 12° N. lat. The largest (Bolama, Orango,

Gallinhas, etc.) belong to Portugal. Area, about 1,550 sq. m. Chief tn. Bolama.

Bisschop, CHRISTOFFEL, the painter of Friesland who, with Israels, has revolutionized Dutch painting. He paints sunlit interiors and enclosed spaces luminously warm—e.g. *The Morning Sun*, *Winter in Friesland*, *Sunshine in Heart and Home*, etc. See Muther's *History of Modern Painting* (1895-6). He was born at Leeuwarden in 1828.

Bissell, GEORGE EDWIN (1839). American sculptor, born at New Preston, Conn., U.S.A.; studied at Paris, Rome, and Florence; has executed the rilievo of Burns and Highland Mary (Ayr, Scotland), the group *The Navy* (New York), President Arthur (New York), *Hospitality* (Buffalo Exposition), and several statues and group for the St. Louis Exposition. He has obtained several decorations.

Bissen, HERMANN WILHELM (1798-1868), Danish sculptor who studied at Rome (1823) under Thorwaldsen, by whose will he was appointed to complete his master's unfinished works and to take charge of his museum. Returning to Denmark, Bissen fostered there the classical traditions of Thorwaldsen, and he executed, among other works, a frieze for the palace hall at Copenhagen, an *Atalanta*, *Cupid sharpening his Arrows*, and *Valkyrie*. See *Le Sculpteur Danois V. Bissen* by Plon (1871).

Bisson, ALEXANDRE CHARLES AUGUSTE (1848), writer of French comedy, born at Briouze, dep. Orne. Several of his plays have been produced in England in adapted form. Among these are *Un Voyage d'Agrément*, by Bisson and Godinet (adapted as *Fourteen Days*), 1881; *Le Député de Bombignac* (*The Candidate*), 1884; *Les Surprises du Divorce*, by Bisson and Mars (*Mamma*),

1890; *Feu Toupinel* (*The Late Lamented*), 1890; *M. le Directeur*, by Bisson and Carré (*The Chili Widow*), 1895; *Le Contrôleur des Wagons-Lits* (*On and Off*), 1898. Of his other plays, some of the more popular are *La Famille Pont-Biquet* (1892); *Les Erreurs du Mariage* (1896); *Jalouse*, by Bisson and Leclercq (1897); *Docteur*, by Bisson and Thurner (1900); *Le Bon Juge* (1901), comedy; *Les Apaches* (1903), comedy; *Les Trois Anabaptistes* (with B. de Turique) (1904); *Le Péril Jaune* (with A. de Saint Albin) (1906); *Mariage d'Etoile* (1908); and *La Femme X* (1908).

Bistritz (Hungarian, *Besztercze*), a royal free tn., Hungary, Transylvania, cap. of the co. of Bistritz-Naszód, 50 m. N.E. of Klausenburg. In the 15th and 16th centuries it was one of the principal commercial towns of Transylvania. Saw-milling and tanning are the principal industries. Pop. 11,000.

Bithur, tn., United Provs. of Agra and Oudh, India, 12 m. N.W. of Cawnpur, on r. bk. of the Ganges; is much frequented by pilgrims, and is devoted to the worship of Brahma. Here, on Aug. 16, 1857, Havelock, on his way to relieve Lucknow, defeated Nana Sahib, who had strongly fortified the town. Pop. 7,000.

Bithynia, dist., Asia Minor, bounded on the E. by Paphlagonia, S. by Phrygia, W. by Mysia, and N. by the Black Sea. Its inhabitants were immigrants from Thrace. In the 7th and 6th centuries B.C. it was part of the kingdom of Lydia, and then of the Persian empire, until its decline, when the princes of Bithynia became independent, and, resisting Alexander and his successors, founded a kingdom which lasted until Nicomedes III., in 74 B.C., bequeathed it, after his death, to the Romans, of whose empire it became a province. It came into

Turkish possession in 1298. See Ramsay's *Historical Geography of Asia Minor* (1890).

Bitlis, tn., Asiatic Turkey, 105 m. E.N.E. of Diarbekir; lies in a ravine, surrounded by hills above 2,000 ft. high. The people are largely engaged in the manufacture of firearms, and of cotton cloths noted for their bright-red dye. Tobacco of a very fine quality is exported. Here, in 1554, the Persians defeated Solyman the Magnificent. The town suffered from violent earthquakes in 1907. Pop. 40,000. The vilayet of Bitlis has an area of 13,500 sq. m. and a pop. of about 500,000.

Bitonto (anc. *Butuntum*), tn. and episc. see, prov. Bari, Italy, 9 m. W. of Bari, on the Apulian plain. The old town, surrounded by walls, and with narrow streets, has a Romanesque cathedral, a castle, and a theological seminary, and is encircled by modern quarters. It manufactures olive oil and good wine. Pop. 30,000.

Bitsch, tn., Lothringen, Germany, 20 m. E.S.E. of Saargemünd. It is commanded by a citadel, partly hewn out of the solid rock, which was unsuccessfully besieged by the Prussians in 1793, by the Bavarians in 1815 and 1818, and by the Germans in 1870-71. From 1766 to 1871 it was held by the French. Pop. 4,800.

Bitter Almonds, OIL OF, or BENZALDEHYDE. See ALMONDS, OIL OF.

Bitter Apple, or BITTER CUPS. See COLOCYNTH.

Bitter Ash. See QUASSIA.

Bitterfeld, tn., prov. Saxony, Prussia, 19 m. N.E. of Halle, with lignite mines, manufacture of drain-pipes and roofing felt, iron foundries, engineering shops, and steam-sawmills. Pop. 13,000.

Bitter Lakes, GREAT and SMALL. The smaller is 6 m. N. of Suez, Egypt; the larger lies between that lake and Lake Tim-

sah. The two lakes form 23 m. of the Suez Canal.

Bittern (*Botaurus stellaris*), a bird allied to the heron, once abundant in Britain, but now only an occasional visitor. It is a nocturnal bird, which, like its allies, inhabits swampy ground, and is remarkable for the booming cry uttered at the breeding season. The common bittern is widely distributed, and allied species occur in most parts of the globe. In the common bittern the prevailing tint is brown, with black streaks or markings.

Bitter Root, range of mountains on the boundary line between Idaho and Montana, U.S.A.; a part of the Rocky Mountain system, having an altitude ranging between 9,000 and 10,000 ft.

Bitters, a large and important group of drugs, including gentian, calumba, quassia, and others. Certain alkaloids have the general properties of bitters, in addition to their distinctive and more important characteristics. Their action begins in the mouth, where, by medicinal doses, the nerves of taste are stimulated, producing a flow of saliva, and thus assisting the first stage of digestion and increasing appetite. On reaching the stomach the bitter principle (berberine, quassin, quinine, or whichever may be present) acts directly on the gastric nerves, stimulating secretion and causing hunger, or, more accurately, the sense of hunger. Bitters, both in stomach and intestine, have also an antiseptic action, preventing fermentation and decomposition. In overdoses, or if too long used, they irritate rather than stimulate. They are anthelmintics, and for that purpose are used in injections. The stimulating properties of bitters are taken advantage of in the well-known preparations angostura, orange, or the newer peach bitters, etc., which are taken with sherry or

spirits before meals. The bitter principle of hops is one of the most important ingredients in beer.

Bittersweet, or WOODY NIGHTSHADE (*Solanum dulcamara*), a climbing plant common in copse and hedgerow in the north temperate zone. Its stems, which die down every winter, bear lance-shaped leaves with two little wings at the base of each, small purple flowers, and poisonous red berries. An extract from the stem is used for rheumatism and certain affections of the skin.

Bitterwood. See QUASSIA.

Bitumen, in its popular meaning, includes all those mineral products, of organic origin, which are characterized by a high percentage of carbon and hydrogen, by a powerful and peculiar smell, and by the facility with which they burn, giving off a heavy, sooty smoke. Among these are asphalt, naphtha, petroleum, pitch, elaterite, ozokerite, the so-called mineral resins, and the oils procured from marl and shale. The sp. gr. of bitumens is low; almost all of them float on water.

Bituriges, a powerful tribe in Aquitanian Gaul; their chief cities were Avaricum (Bourges) and Burdigala (Bordeaux). They were conquered by Cæsar (52 B.C.).

Bitzius, ALBRECHT (1797-1854), was a Swiss Protestant minister who, under the name of JEREMIAS GOTTHELF, wrote a long series of tales illustrating Swiss peasant life. He was minister of Lützelflüh, in the Emmenthal, from 1832 to his death, and his types are mostly taken from that district. His first work was *Bauernspiegel* (1837). Others are *Uli der Knecht* (1841), and its continuation, *Uli der Pächter* (1849); *Anne Bäbi* (1843-4), *Käthe* (1847), and *Geld und Geist* (1842). See new complete ed., with *Life* by Vetter (1898-1900); and *Life* by Bartels (1902).



Bivalves.

1. *Teredo navalis*, in floating wood. 2. *Arca zebra*. 3. *Arca navicularis*. 4. *Pecten magnificus*. 5 and 10. *Pecten Crouchi*. 6. *Pecten sanguinolentus*. 7. *Pholas dactylus*, in rock. 8. *Mya arenaria*, in mud. 9 and 11. *Nucula radiata*.

Bivalves, or LAMELIBRANCHS, are molluscs or shell-fish in which the shell consists of two valves placed at the right and left sides of the animal. The body is bilaterally symmetrical, and compressed from side to side; there is no distinct head region as in gastropods—*e.g.* the snail—and there are therefore no tentacles, no jaws, no salivary glands, and no radula or tooth-ribbon; the foot is ploughshare-shaped, and may contain a byssus gland; the gill filaments are often fused into plates, hence the name Lamellibranch. Other peculiarities are that the food consists of microscopic particles; there are usually two larval stages—the veliger and trochosphere; and the nervous system consists of three pairs of ganglia. Bivalves occur both in salt and in fresh water, but none are adapted for a terrestrial life. In the oyster, mussel, scallop, cockle, clam, we have forms of considerable commercial importance; while the pearl oyster (*Meleagrina*) is valued on account of the size, brilliancy, and colour of the concretions or pearls formed around minute irritants introduced between the mantle and the shell. Many bivalves are boring animals, and contribute to the disintegration of rocks—*e.g.* *Pholas*; or, as in the case of the destructive teredo, or shipworm, undermine wooden piers and breakwaters, and attack wooden ships. In tropical regions the bivalves may reach a great size, as witness the giant clam (*Tridacna*), whose valves may measure two feet across. Though the majority are sedentary or slow-moving, the Limas and scallops are capable of swimming by means of rapid jerks.

Several different classifications of bivalves exist, but perhaps the most satisfactory is that based on the structure of the gills, according to which the existing forms fall into four orders:—

1. Protobranchia, those with simple gills, like the gills of gastropods—*e.g.* *Nucula*.

2. Filibranchia, those with gills consisting of long, reflected filaments only slightly connected with one another—*e.g.* *Arca*.

3. Pseudo-lamellibranchiata, those with the gill filaments loosely connected to form gill-plates—*e.g.* *Pecten*, oyster.

4. Eulamellibranchiata. The gills are double flattened plates, the separate filaments being no longer obvious. To this order belong most of the living bivalves—*e.g.* *Pholas*, *Mya*, and *Anodon*.

Biwa Lake (Jap. *Biwa-ko*, 'a guitar'), in prov. of Omi, Japan, 10 m. N.E. of Kyoto; is drained into Osaka Bay. It measures 36 m. in length by 12 m. in width, is the largest lake in Japan, and is justly celebrated for its beauty, especially at the S. end. Lake Biwa Canal, 6 m. in length, connects it with Kamogawa Canal, and is utilized to drive the mills and factories of Kyoto. According to the Japanese legend, the lake was produced by an earthquake in 286 B.C., which also upheaved the volcano of Fusiyama.

Bixa Orellana, a plant common in tropical America, and much cultivated in the W. Indies; belongs to the order Bixaceæ, of the violet group of orders. The seeds are protected by a red pulp from which is derived the dye annatto. The S. American Indians paint themselves with it.

Biya, or BIALAH, tn., Gharbieh prov., Egypt, 12 m. N.W. of El Mansura. Pop. 10,000.

Biysk, tn., Siberia, 270 m. S. of Tomsk, on r. bk. of Biya R., near its confluence with the Obi. A pass here crosses the Altai range into China. Pop. 17,000.

Bizerta (Fr. *Bizerte*; anc. *Hippo-Diarrhytus*), seapt. in Tunis, on the N. coast, 60 m. by rail N.W.

of Tunis. There are two harbours, one at each end of a canal connecting the sea and the Lake of Bizerta (31 m. in circuit), the outer or seaward harbour protected by two piers. The little native town and the European town both lie to the N. of the canal. Its fisheries are very productive. Bizerta is principally a naval station and port of call, and as a commercial port it competes with Tunis. It was occupied by the French in 1881. Pop. 10,000 (3,000 Europeans). See Guest's *The Tunisian Question and Bizerta* (1881).

Bizet, ALEXANDRE CÉSAR LÉOPOLD, called GEORGES (1838-75), French musical composer, was born at Bougival, near Paris. He studied at the Paris Conservatoire under Halévy, and gained the Grand Prix de Rome in 1857. His operas, *Les Pêcheurs de Perles* (1863), and *La Jolie Fille de Perth* (1867), based on Scott's novel, and produced at the Théâtre Lyrique, exhibited strong traces of Wagnerian influence. *Djamileh* (1872) did not meet with much success, but *L'Arlésienne* (1872) was enthusiastically received. Bizet's great masterpiece, *Carmen*, performed at the Opéra Comique in 1875, and shortly afterwards in Vienna, Brussels, Berlin, and London (1878), was a remarkable success. It had much influence on the development of the lyric opera. See *Lives*, in French, by Pigot (1886) and Bellaigne (1891).

Bjerregaard, HENRIK ANKER (1792-1842), Norwegian author, studied law, and rose to be one of the chief justices of Norway; author of the Norwegian national anthem, *Sønner af Norge*. His little operetta *Fjældeeventyret* (1825) was the best Norwegian play before the appearance of Björnson and Ibsen. See his *Blandede Digtninger* (1829-30) and *Digtninger* (1848).

Björn OF SCARDSA, otherwise known as BJÖRN JONSSON (1575-1656), Icelandic historian. His *Annals* are marked by poetic insight and beauty of style. See Vigfusson and Powell's *Corpus Poeticum Boreale* (1883).

Björneborg, seapt., Finland, N.W. Russia, province of Abo-Björneborg, in the Gulf of Bothnia, 75 m. N.N.W. of Abo. Imports about £180,000 per annum; exports—wood, beer, oats, iron—at nearly £500,000. The fisheries of Björneborg are important. Pop. 14,000.

Björnson, BJÖRNSTJERNE (1832-1910), Norwegian poet, dramatist, and novelist, was born in Osterdalen, and educated at Molde and the University of Christiania. From 1857-9 he was director of the theatre at Bergen. His earliest and best works were his peasant stories *Arne* (1858), *Synnöve Solbakken* (1857), *En Glad Gut* (1860), whose vigour and originality at once established his reputation. His earlier dramas, too (e.g. *Halte-Hulda* in 1859, *Mellem Slagene* in 1855), are full of force and beauty, and both tales and plays are distinguished by a terse style. From 1860-2 Björnson lived principally at Copenhagen and Rome. In Italy he composed the drama *Kong Sverre* (1861) and the famous trilogy *Sigurd Slembe* (1862) two of the noblest productions of Norwegian literature. On his return to Norway in 1863 the Parliament granted him an annual pension in recognition of his literary merit; from 1861-7 he was director of the National Theatre at Christiania, and from 1866-71 editor of the *Norsk Folkeblad*, in which capacity he took an active part in politics on the Radical side, being a very eloquent public speaker. He was always a strenuous and somewhat violent partisan, and his anti-Swedish diatribes did much to accentuate the differ-

ences between the Swedes and the Norwegians. For a time (1882-8) he resided at Paris. In 1903 he received the Nobel Prize for literature. Of his later works the best are the dramas *Maria Stuart* (1864) and *Sigurd Jorsalfar* (1872), the tales *Fiskerjenten* (1868) and *Brude-Slaatten* (1872), and the poetical romance *Arnliot Gelline* (1870). Latterly he wrote, though not with complete success, psychological and analytical romances (e.g. *Det Flager i Byen og paa Havnen*, 1884; *Pa Guds Veje*, 1889), using social and religious questions as media for his advanced opinions; and in the same spirit, with more or less success, plays such as *En Fallit* (1874), *Redaktören* (1874), *En Handske* (1883), *Geografi og Kjaerlighed* (1885), *Det ny System* (1879), *Over Ævne* (i. 1883; ii. 1895). But in the little tales *Mors Hænder* and *Een Dag* (published in *Nye Fortællinger*, 1894) he again revealed his original power. See his novels, in English, ed. Gosse (1895); Brandes's *Björnson og Ibsen* (1882); and the *Life*, written in Norwegian, by Ch. Collin (1903).

Björnstjerna, MAGNUS FREDRIK, COUNT (1779-1847), Swedish statesman, born at Dresden. He fought (1813) in the battle of Leipzig against Napoleon, and countersigned the treaty (1814) uniting Norway and Sweden. He was ambassador to Great Britain (1828-46). He is author of *The British in E. India* (1839), *Hindu Theogony* (1843), both in Swedish, and *Anteckningar—i.e. Notes* (1851-2).

Black, ADAM (1784-1874), Scottish politician and publisher, was born in Edinburgh, where he established the publishing house of A. and C. Black. His firm acquired (1827) the copyrights of the *Encyclopædia Britannica* and Scott's Waverley Novels. He was an uncompromising advocate of municipal and political reform.

Twice elected lord provost of Edinburgh (1843-8). He represented that city in Parliament from 1856 to 1865. See Nicolson's *Memoirs of Adam Black* (1885); B. W. Crombie's *Modern Athenians*, ed. Scott Douglas (1882).

Black, JOHN (1783-1855), Scottish journalist, was born near Duns. In 1810 he went to London, walking all the way, and obtained a situation on the staff of the *Morning Chronicle*. He became a parliamentary reporter, and eventually edited the *Chronicle* from 1817 to 1843. He made several good translations from German, French, and Italian works, and wrote, in 1810, a *Life of Tasso*. Charles Dickens was one of his reporters, and he was on intimate terms with James Mill, Palmerston, and Brougham.

Black, JOSEPH (1728-99), chemist, of Scottish extraction, was born at Bordeaux. He became professor of medicine at Glasgow (1756), and at Edinburgh (1766). His graduation thesis, on *Magnesia Alba* (1754), published in an extended form in 1756, announced his discovery of the distinction between carbon dioxide and common air, and laid the foundation of quantitative analysis. He was the first to propound the theory of 'specific heat,' but he is better known as the discoverer of 'latent heat,' which formed the foundation of modern thermo-dynamics, and gave the first impulse to Watt's improvements on the steam-engine in 1761. See Robison's Preface to Black's *Lectures on Chemistry* (1803); Grant's *Univ. of Edinburgh*, vol. ii., p. 395.

Black, WILLIAM (1841-98), novelist, was born in Glasgow, where he studied art. In 1864 he removed to London, and was for some time literary editor of the *Examiner*, and editor of the *London Review*; and finally became assistant editor of the *Daily News*. His first novel, *Love or Marriage*,

was published in 1866, and was followed by *In Silk Attire* (1859) and *Kilmeny* (1870). *A Daughter of Heth* (1871; several editions), perhaps the best of his many stories, established his reputation. The most important of his works are *The Strange Adventures of a Phaeton* (1872), *A Princess of Thule* (1873), *Madcap Violet* (1876), *Macleod of Dare* (1878), *White Heather* (1885), *In Far Lochaber* (1888), *Briseis* (1896), and *Wild Eelin* (1898). His monograph on *Goldsmith* appeared (1887) in the 'English Men of Letters Series.' As a novelist his strength lay in descriptions of Highland scenery, fishing, and yachting. A lighthouse to his memory was erected at Duart Point on the Sound of Mull in May 1901. See Wemyss Reid's *Life* (1902).

Black Act, an act passed in 1722, punishing, as felons, marauders who (*e.g.* in Epping Forest) with blackened faces went about robbing and blackmailing. It was repealed in 1827. The name BLACK ACTS is also given to acts of the Scottish Parliament (1424-1594) printed in black letter. This name was further applied to the Acts of James VI. of Scotland of 1584, which declared (1) the king the Head of the Church; (2) that no General Assembly was to meet without royal sanction; (3) that there must be bishops, and these appointed by the king; and (4) that no minister was to give an opinion on current politics under pain of treason. See P. Hume Brown's *History of Scotland*, vol. ii. (1902).

Blackadder, JOHN (1615-86), Scottish divine, became minister of Troqueer in Galloway (1652). Deposed on the introduction of episcopacy (1662), and outlawed for preaching to conventicles (1674), he fled to Rotterdam (1678); but, returning, was arrested (1681) and sent to the Bass Rock, where he

died. See A. Crichton's *Memoirs* (2nd ed. 1826).

Black Agnes, daughter of Thomas Randolph, Earl of Murray, and Countess of March, who defended Dunbar Castle for nineteen weeks against the English under the Earl of Salisbury in 1339. So called because of her complexion.

Black - and - Tan Terrier, sometimes known as the Manchester terrier, is bred in two varieties—the ordinary, which weighs up to twenty pounds; and the toy, which must be under seven pounds. Formerly its ears were always cropped. Points: head long and narrow, flat from the base to the nose, with no bumps at the sides or cheeks; muzzle long and tapering, but not weak; eyes small and black; correct carriage of ears debatable, but drop-ear favoured; neck light and graceful; shoulders sloping; chest rather narrow, yet deep, and the body slightly arched, with good back ribs; fore legs quite straight, with well-arched toes and jet-black nails; hind quarters rather powerful, with hocks well let down; tail very fine, and carried straight; coat short and close; colour black, with rich tan markings along the jaws, breast, on the insides of the hind legs, under the vent, and on the fore legs up to above the pastern joint. The toes, however, have black lines, called pencil-ing, running up them, and there is a black spot, the 'thumb mark,' just along the pastern joint, in front of the limb. Points for the toy variety precisely the same. Round skulls and apple heads are a great defect. The toy black and tan terrier is very difficult to rear.

Black and White, the first illustrated weekly to challenge the monopoly long enjoyed by the *Illustrated London News* and the *Graphic*. It was founded

in 1891 by Mr. Charles Norris Williamson. Between 1895 and 1897 it was edited by Mr. J. Nicol Dunn, afterwards editor of the *Morning Post*. It began as an artistic paper, and practically led the way in the reproduction of photographs of events of the day. It publishes fine art supplements from time to time. Among the artists who have drawn for *Black and White* are Herkomer, Max Cowper, Linley Sambourne, and G. F. Watts; while among its literary contributors have been Algernon Charles Swinburne, Bret Harte, Rudyard Kipling, Robert Louis Stevenson (who wrote letters from Samoa), and Barry Pain.

Black Art. See MAGIC.

Black Ash. See SODIUM.

Black Assizes, a pestilence which appeared at the conclusion of the assizes at Oxford, July 6, 1577. Between that date and the 12th August following, 300 people, including the high sheriff and other officials, died.

Blackband, a name given by Scottish miners to an ironstone of intensely dark colour, mined in thin seams in certain coal fields, and formerly much used as a source of iron. The black colour is due to a mixture of coal; and as less fuel was therefore consumed in calcining the mineral, the ore was highly valued. It is now nearly exhausted.

Blackberry. See BRAMBLE.

Blackbird (*Turdus merula*), a common British song-bird, of which the male only is black. The female is of a brown colour, paler beneath, and lacks the bright orange beak of the adult male. Though subsisting largely on worms, the blackbird consumes large quantities of fruit during the summer months. The birds are very prolific, as many as four broods in a season being sometimes produced. They are passerine birds, belonging to the

same genus as the thrushes, and occur in Britain both as migrants and as residents. A more or less uniform black tint is not uncommon among birds, and the name blackbird is therefore applied to various other birds—*e.g.* to members of the family Icteridæ in N. America, where *Turdus merula* is absent.

Blackbirds, FIELD OF, or KOSOVO POLJE, a small plain in Turkey in Europe, now the vilayet of Kossovo, stretching s. from Pristina; was the scene of two great battles—(1) in 1389, when Sultan Murad I. defeated the Servians and overthrew their ancient empire, Lazar, their emperor, perishing in the battle; (2) in 1448, in which John Hunyady of Hungary was defeated and captured by Sultan Murad II. and George Brancovics, prince of Servia.

Black Bulb Thermometer (also called *in vacuo* or radiation thermometer) is a sensitive maximum registering thermometer, having the bulb and a portion of the stem covered with lamp-black, the whole being enclosed in a glass tube from which all moisture and air have been removed. The instrument is fixed horizontally four feet above the ground, at a distance from walls or trees which may obstruct the full rays of the sun. The difference between the maximum temperature which it registers in the sun and the corresponding maximum in shade gives a rough measure of the amount of solar radiation.

Blackburn, par., munic. and co. bor., Lancashire, England, on L. & Y.R. and L. & N.W.R., 9 m. E. of Preston and 21 m. N.W. of Manchester, and on Leeds and Liverpool Canal. From 1650 it was famous for Blackburn 'checks,' and afterwards, till 1764, for Blackburn 'grays.' After that year it began to take a foremost place in cotton-weaving, and is

now the centre of the Lancashire cotton spinning and weaving industries, with some 140 mills and 1,250,000 spindles. Here, in 1764, Hargreaves invented his 'spinning jenny.' The grammar school was founded by Queen Elizabeth in 1567. The Corporation Park and the Queen's Park are well laid out and extensive. Besides cotton mills there are engineering works, breweries, etc. Blackburn returns two members to the House of Commons. Pop. 140,000. See Shaw's *Bits of Old Blackburn* (1888) and Abram's *Hist. of Blackburn* (1897).

Blackburn, COLIN, BARON (1813-96), judge, was born in Selkirkshire, Scotland; called to the bar in 1838, and in 1859 promoted by Lord Campbell to a puisne judgeship in the Court of Queen's Bench. He was knighted in 1860, and made a lord of appeal and a life peer in 1876. He is recognized as an authority on common law, and was the author of *Contract of Sales* (2nd ed. 1885).

Blackburne, FRANCIS (1782-1867), lord chancellor of Ireland, was born in Co. Meath. Called to the English bar in 1805, he was appointed in 1830 attorney-general for Ireland. He became Master of the Rolls in 1842, chief-justice of the Queen's Bench in 1846, and helped to prepare a code of general orders for the Court of Chancery. He was lord chancellor in 1852, and a commissioner of national education. In 1856 he was appointed lord justice of appeal, and again acted as lord chancellor for a brief term in 1866. See *Life* by Ed. Blackburne (1874).

Blackburne, LANCELOT (1658-1743), Archbishop of York, educated at Westminster and Christ Church, Oxford; was created bishop of Exeter (1717), and Archbishop of York (1724)—the latter, according to popular report, for having married George I. to his

mistress, the Duchess of Munster. See Walpole's *Last Ten Years of George II.* (1846); Walpole's *Letters* (1891).

Blackcap (*Sylvia atricapilla*), a small British song-bird, and one of the sweetest and cleverest of feathered songsters. The male has a black head, whence the name. The blackcap is closely allied to the thrushes, and is usually placed in the family Turdidæ. It is a migrant.

Blackcock, also HEATHCOCK, a name strictly applicable to the male only of the true or black grouse (*Tetrao tetrix*), the female being called grayhen, but the term is now frequently applied to both sexes. The black grouse ranges throughout N. Europe and Asia, is common in Scotland and the wilder parts of England, but is absent from Ireland. The male is remarkable for the lyrate tail and peculiar courting display, which is carried on in the early morning, and is accompanied by a drumming noise. The diet is varied, but is chiefly vegetable.

Black Country. See STAFFORDSHIRE.

Black Death. See PLAGUE.

Black Earth, soil of the nature of loess; is fine-grained, charged with black humus, rich in phosphoric acid, ammonia, and potash; having a considerable organic ingredient (up to 16 per cent.); reaching a thickness over 18 ft. It is extremely fertile, yielding the richest crops without manuring. It lies spread over wide areas in the regions of the Dnieper, Don, Volga, and Vistula. Similar kinds of soil are known also in Siberia and in Texas.

Blackfeet, or SIKSIKA, a large division of the Algonquin linguistic stock, formerly ranging from the Missouri R. north to the Saskatchewan along the slopes of the Rocky Mts. They are divided into three groups—the Blooch, the Piegans, and Blackfeet. At

one time they were very powerful and owned great herds of horses; but the smallpox broke out among them about 1840, with such deadly effect that they never afterwards gave the U.S. or the Canadian government serious trouble. While they lived upon the buffalo and possessed the same general culture as the Plains Indians, they practised a highly developed form of ceremonial religion in which bundles of sacred objects with long rituals were a special feature. They now live upon reservations in Montana and Alberta, engaged in stock-raising.

The name is also applied to a small division of the Teton, a subdivision of the Dakota Sioux. See Grinnell's *Blackfoot Lodge Tales* (1903), Cone's *Early History of the Greater North-West* (1897), and Petitot's *Vocabulaire Pieganien* (1885).

Black Flux, used in assaying as a reducing agent, is obtained by burning together a mixture of one part of potassium carbonate with three parts of argol.

Black Forest (Ger. *Schwarzwald*), a mountainous wooded region in S.W. Germany; stretches through the grand-duchy of Baden for a distance of 100 m., with a breadth of 20 to 40 m., along the r. bk. of the Rhine, parallel to the similar range of the Vosges on the l. bk. It is a region of lovely valleys winding among wooded heights (highest alt. 4,900 ft., in the Feldberg), and is inhabited by an industrious race of woodcutters and lumbermen, and makers of wooden clocks, barrel organs, musical boxes, and straw hats. The Black Forest is one of the favourite summer resorts of the Germans, and is also of great strategic importance as a barrier to the direct passage of troops east or west between S. Germany and Alsace and France, the principal bulwark being the intrenchments (1704) of Kniebis

(3,180 ft.). In 1796, however, Moreau twice forced his way through its network of narrow valleys. In German legend and literature, too, the Black Forest plays no inconsiderable part. It is the home of many quaint legends. Auerbach made it the scene of his peasant stories (*Schwarzwälder Dorfgeschichten*, 1843-53), and its scenery and life form the substance of J. P. Hebel's dialect poems, *Alemannische Gedichte* (1803). See Wood's *In the Black Forest* (1882); Strahan's *The Black Forest* (1885); Wolff's *Rambles in the Black Forest* (1890); Hughes's *Book of the Black Forest* (1910).

Blackfriars Bridge, London, was built from the designs of J. Cubit, the foundation-stone being laid (1865) and the bridge opened (1869) by Queen Victoria. The old Dominican or Blackfriars monastery, dating from 1276, which gave name to the bridge, stood near its north end. In order to permit of trains crossing the bridge, it was in 1907 widened at a cost of about a quarter of a million. The abutments and river piers were extended 30 ft. farther west, the old arch ribs lifted bodily to their new bearings, the original cast-iron parapets were transferred to the face of the new masonry, and a new roadway and footway constructed. The new portion of the bridge was formally opened in Sept. 1909.

Black Hand, a symbol used by members of a widespread Italian society, and affixed to blackmailing letters containing threats of personal injury or even death on failure of compliance. Recently the outrages committed and terror inspired by the society in the United States have led influential Italians in many large cities to organize White Hand societies to aid the authorities in suppressing the desperadoes of the Black Hand. In New York

Italian detectives have been useful in discovering offenders.

Blackheath, an elevated common in Kent, England, 5 m. S.E. of London, and near Greenwich Park; 70 acres. On it stands Morden College, founded in 1605 for decayed merchants who had been engaged in the Levant trade. The Danes encamped on it in 1012, and here Wat Tyler (1381) and Jack Cade (1450) assembled their followers. At the end of the 18th century the common was much frequented by highwaymen. Golf was first played on the common about 1608. See Drake's *History of Blackheath* (1886).

Black Hills, group of mountains mainly in the W. part of S. Dakota, U.S.A. It is an elliptical uplift, about 6,000 sq. m. in area, from the summit of which the more recent stratified beds have been eroded away, in the W. part down to the underlying Carboniferous rocks, in the E. part to the underlying granites. The remains of these younger beds surround the mountain group quite continuously in the form of ranges of hog-backs. The highest summit, Harney Peak, has an altitude of 7,216 ft.; average elevation, 2,500 to 3,000 ft. The region is one of the richest gold-producing districts in the United States, and contains also numerous other metals. The group obtains its name from the black pine forests, with which it is extensively covered.

Black Hole. See CALCUTTA.

Blackie, JOHN STUART (1809-95), Scottish author and professor, was called (1834) to the Scottish bar, but soon devoted himself to literature, executing a translation, in verse, of Goethe's *Faust* (1834). From 1841-52 he held the chair of humanity in Marischal College, Aberdeen, and from 1852-82 that of Greek in Edinburgh University. He was an ardent student of many subjects—politi-

cal, scholastic, philological, and ethical; and his striking figure was almost as familiar in London as in Edinburgh. All Scottish questions interested him deeply, and he succeeded (1874-6) in raising £12,000 for the foundation of a Celtic chair at Edinburgh. Blackie was a voluminous writer. His chief works were a metrical translation of *Æschylus* (1850); *Lays and Legends of Ancient Greece* (1857; 2nd ed. 1880); *On Beauty* (1858); *Homer and the Iliad*, in 4 vols. (1866); *Horæ Hellenicæ* (1874); *The Natural History of Atheism* (1878); *Self-Culture—Intellectual, Physical, and Moral* (1877); *War Songs of the Germans*, a translation (1870); *Lays of Highlands and Islands* (1872); *The Language and Literature of the Scottish Highlands* (1875); *The Wisdom of Goethe* (1883); *Life of Robert Burns*, in the 'Great Writers Series' (1888); *Scottish Song* (1889); *Essays on Subjects of Moral and Social Interest* (1890); *Christianity and the Ideal of Humanity* (1893); and some volumes of verse (1860, 1876, etc.). See *Life* by Anna M. Stoddart (2 vols. 1895); also his *Letters to His Wife*, ed. by A. S. Walker (1909), and his *Autobiographical Notes*, ed. by the same (1910).

Blacking. The use of blacking and other polishes for leather dates back to the times of the ancients, but the compound now known to us as such was introduced from Paris in the reign of Charles II. The manufacture is now of considerable extent, the chief seat of the industry being London.

Black Isle, peninsula separating Cromarty Firth from Beaully and Moray Firths, Ross-shire, Scotland. A branch of the Highland Ry. traverses it in a N.E. direction from Muir of Ord to Fortrose.

Black Lead, PLUMBAGO, or preferably GRAPHITE, an allotropic

form of carbon, found in mica-schist, gneiss, granite, meteoric iron, argillite, etc., in beds, sheets, detached masses, and crystals, in Siberia, Ceylon (chief source of black lead in commerce and the arts), New Brunswick, Canada, New Zealand, and Germany. At Borrowdale (Cumberland) fresh discoveries were made in 1875. Black lead is a stove and grate polish, and a lubricant in machinery, but is most used in the manufacture of pencils and crucibles. The black lead of Alibert, Siberia, is the monopoly of Faber, the pencil-maker of Nuremberg. Black lead is also used as an inner covering of electrotype moulds, and for conductors of electricity. It can be obtained artificially by crystallizing any form of carbon from its solution in molten iron, and is prepared commercially by heating coke in the electric furnace. Graphite is a soft, dark gray, opaque solid (sp. gr. 2.1 to 2.5), of a greasy metallic lustre. It crystallizes in hexagonal plates, and is volatile only at the temperature of the electric arc. It is a fair conductor of heat and electricity, and, though it can be burnt to carbon dioxide, is less combustible than diamond. On oxidation with nitric acid and potassium chlorate it yields graphitic acid.

Black Letter, a name invented in the 17th century for the types imitated from the handwriting in use in England in the 15th century, as contrasted with those founded on the Roman or Italian hand revived by the Italian scholars of the renaissance. All Caxton's books are printed in black letter, and his immediate successors only used the Roman types for books in Latin. Except for large Bibles, for proclamations, and cheap broadsides, in which it was used nearly a hundred years longer, black letter gradually died out during the 16th cen-

tury, the last important book of secular literature printed in it being the 1602 edition of Chaucer. It is now chiefly used in headlines and in fancy printing, but was revived, under the name of Gothic or Old English, by William Morris in many of the books printed at the Kelmscott Press. A form of it is still in use in Germany. It is now known to practical printers as Old English or Elizabethan. See Duff's *Early English Printing* (1896).

Black List. (1.) The name in Great Britain of printed lists—*e.g.* Stubbs'—abstracted from public records, of English, Scottish, and Irish bankruptcies, insolvencies, liquidations, bills of sale, protested bills, assignments, trust deeds, judges' orders, decrees in absence, judgments for debt, compositions, dissolutions of partnership, warrants of attorney, and other information affecting the financial standing of firms and individuals, issued weekly, some bi-weekly, and circulated in private for guidance in mercantile transactions. The Scottish trade protection societies, from the middle of the 18th century, were among the first to supply such information. In the United States similar institutions (commercial agencies) are established in all commercial centres. (2.) By the Licensing Act of 1902, sec. 6, a list of convictions for habitual drunkenness is to be kept by the authorities of the police area in which the court is situated; and no person on that list can obtain, nor publican or club supply to him, any intoxicating liquor within three years after the date of conviction. This list is also familiarly termed 'the black list.'

Blacklock, THOMAS (1721-91), Scottish poet, born at Annan; lost his sight by smallpox while still an infant. He is remembered chiefly for the fact that

a letter of his induced Robert Burns to abandon his intended emigration to Jamaica. Four volumes of his poems were published—one in 1746; a second in 1754; a third in 1756, with *Life* by Joseph Spence, the friend of Pope; and a posthumous volume in 1793, with *Life* by Henry Mackenzie.

Blackmail. See THREATS.

Blackmore, SIR RICHARD (d. 1729), English court physician and author, was born in Wiltshire. He became physician-in-ordinary to William III. and Queen Anne, and was knighted (1697). He was a voluminous writer of poetry and prose, of medical treatises and controversial divinity. *Prince Arthur*, a tedious compilation of verse, appeared in 1695. His *Satyr against Wit* (1700) provoked many enemies; and in 1705, a second epic, *Eliza*, was received with indifference. But his *Creation* (1712), a philosophical poem, was praised by Addison and Johnson. He also published *Modern Arians Unmasked* (1721), *National Theology* (1728), *Discourse on the Plague* (1720), and *Treatise on the Smallpox* (1723). See Johnson's *Lives of the Poets* (1779-81). He is not unjustly ridiculed by Pope in *The Dunciad*.

Blackmore, RICHARD DODD-RIDGE (1825-1900), English novelist. *Clara Vaughan*, his first novel, appeared in 1864, succeeded in 1865 by *Cradock Nowell*, a work distinguished by its beautiful studies of New Forest scenery. *Lorna Doone*, a romance of Exmoor, and the author's most popular work, appeared in 1869, and has since passed through many editions. The characters are cast in the true heroic mould, and the story is told in a masterly manner. The *Maid of Sker* (1872) is scarcely less vigorous. It was followed by *Alice Lorraine*, a tale of the South Downs (1875); *Cripps the*

Carrier, a woodland tale (1876); *Erema*, a strong and weird story (1877); *Mary Anerley* (1880); *Christowell*, a tale of Dartmoor (1882); *Springhaven*, with glimpses of Nelson (1887); *Kit and Kitty* (1889); *Perlycross*, a story of the western hills (1894); *Fringilla*, some tales in verse (1895); *Tales from the Telling House* (1896); and *Dariel*, a romance of Surrey (1897). Blackmore's novels are distinguished for their remarkable fidelity in the delineation of nature, and their intimate acquaintance with the people and customs of the west and south of England. For many years he carried on the business of market gardening at Teddington, Middlesex.

Black Mountains, a short range of mountains in N. Carolina, U.S.A., a part of the Appalachian system. Mount Mitchell has an altitude of 6,711 ft., and is the highest peak in the U.S.A. east of the Mississippi R.

Blackness, seapt. vil. in par. of Carriden, Linlithgowshire, Scotland, on s. shore of Forth, 3½ m. E. of Bo'ness and 5½ m. N. of Linlithgow, of which it was formerly the port. The castle was a state prison in Covenanting times.

Blackpool, wat.-pl. and munic. bor. (incorporated in 1876, extended in area in 1879) in Lancashire, England, between the mouth of the Ribble and Morecambe Bay, 15 m. w. by N. of Preston. Its excellent bathing facilities and beautiful promenade, with electric tramway, have given it the name of the 'Brighton of the North.' There are three piers—the North, the Central, and the Victoria. The town possesses winter gardens, theatres, an aquarium, and a steel Eiffel tower 520 ft. high, built in 1893-6. Blackpool attracts large numbers of visitors—sometimes as many as 100,000 daily during the holiday weeks

of the surrounding districts in Lancashire and Yorkshire. Pop. 70,000.

Black Prince, EDWARD, THE (1330-76), eldest son of Edward III. of England; created Duke of Cornwall (1337) and Prince of Wales (1343); commanded the van at Crécy (1346); said to be called the Black Prince from the colour of the armour he wore at this battle; defeated and took captive John, king of France, at Poitiers (1356), and brought him to London; created Prince of Aquitaine and Gascony (1362); defeated Henry of Trastamare at Najara (1367); relinquished the principality of Aquitaine and Gascony (1372). He was buried in Canterbury Cathedral, where his helmet, shield, surcoat, gauntlets, and other relics, are preserved. See R. P. Dunn-Pattison's *The Black Prince* (1910).

Black Prince, a British armoured cruiser (13,550 tons; 22.3 knots), launched in 1904 by the Thames Ironworks and Shipbuilding Co. This ship-name was introduced into the navy about 1648. The first *Black Prince* left England with Prince Rupert, and was driven ashore by Blake's squadron in 1650.

Black River, or BIG BLACK, riv., U.S.A., rising in S.E. Missouri, and flowing S.E. then S.W. to join the White R. at Jacksonport, Arkansas. Length, 400 m.

Black Rock, bathing resort, Co. Dublin, Ireland, 2 m. N.W. of Kingstown. Pop. 8,000.

Black Rod. The gentleman usher of the Black Rod is usher of the Order of the Garter. His symbol of office is a black rod surmounted by a gold lion. He is also an officer of the House of Lords. He, or his deputy, the yeoman usher, acts as messenger when the Lords desire the attendance of the Commons. He has the custody of persons committed for breaches of privilege or con-

tempt, and assists at the introduction of peers and at other ceremonies. See May's *Parliamentary Legislation* (1881).

Black Sea (anc. *Pontus Euxinus*), an enclosed sea in the S.E. of Europe, having Russia on the N. and E., Asia Minor on the S., and Turkey, Bulgaria, and Roumania on the W. It communicates with the Mediterranean through the Sea of Marmora and the Dardanelles. Its shores are high where they abut upon the Caucasus region, and upon the slopes of the Istranja Mts. in Turkey. It measures some 700 m. from E. to W., and 350 m. from N. to S., and its area is estimated at 150,000 sq. m. It is a steep-sided basin with a nearly flat bottom. Immediately E. and W. of the peninsula of the Crimea, which projects into it from the N., its waters are shallow for some distance from the shores, owing to the large deposits of sedimentary matter there laid down by the rivers—the Kuban from the Caucasus and the Don through the Sea of Azov, and the Dnieper, Bug, Dniester, and Danube entering on the N.W. In other parts of the sea the 100-fathom line runs close to the shores, and parallel with them. Between the 100-fathom line and the 800-fathom line the slope is in general very steep, and from the 800-fathom line the depth increases very gently down to the maximum of 1,227 fathoms in the centre of the basin. During the summer there is a thin stratum of relatively warm surface water (55.4° F. in May to 78.8° in August) resting upon an almost equally thin layer of colder water (mean temp. 47.7°), below which, again, there is the bulk of the sea with an almost uniform temperature throughout of 48.2°. The Black Sea is not only subject to annual fluctuations of level, ranging from 3½ to 6½ in. above the mean level

of the year in May and June down to 2½ to 4 in. below that level in October and in February, but it also seems to fluctuate over unequal periods, in close dependence upon the volumes of rainfall which come down over its drainage basins. The salinity is only about half that of the ocean, and the restriction of the circulation to the thin upper strata is, on the whole, inimical to marine life, and is conducive to the formation in the deep parts of the sea of vast quantities of sulphuretted hydrogen, as well as of chemical precipitations on its floor. The only forms of life which thrive in these waters belong to very lowly species. The Black Sea is practically destitute of islands, and seldom freezes, even along the shores. Various schemes have been proposed for uniting the Black Sea and the Baltic by establishing canal connection between the Dnieper and the Western Dwina. The treaty of Paris (1856) provided for the neutralization of the Black Sea by excluding from it ships of war of every flag, and Russia and Turkey agreed to abstain from establishing maritime arsenals on its coasts. The latter provision was abrogated in 1871, and it was then declared that while the established principle of closing the straits (recognized by treaty in 1841) is maintained, power should be given to the Sultan to admit, in time of peace, the warships of friendly or allied powers if the Porte should consider such a course necessary, in order to secure the stipulations of the treaty. In the 18th protocol of the treaty of Berlin (1878) Lord Salisbury made a declaration which apparently reserved liberty to British ships of war to enter the straits with the consent of the Sultan.

Black Sea Government, or CHERNOMORSKAYA, a narrow strip

of country in Transcaucasia lying along the north-east coast of the Black Sea. The country is mountainous. The temperature is high and the rainfall heavy. Novorossisk is the one great port. Area, 2,837 sq. m. Pop. 80,000.

Blackstone, tn., Worcester co., Massachusetts, U.S.A., 20 m. S.E. of Worcester; manufactures cotton. Pop. 6,000.

Blackstone, SIR WILLIAM (1723–80), writer on English law, the son of a London citizen, was educated at Charterhouse and Pembroke College, Oxford, obtaining a fellowship at All Souls College, Oxford (1744). Although called to the bar in 1746, he was not very successful in practice. His first appearance as an author was in a tract on the law of consanguinity (1750), occasioned by a dispute as to the limits of the claims of founder's kin at All Souls. In 1759 he published an edition of the Great Charter, with a valuable introduction. With great courage he began to deliver voluntary lectures on English law at All Souls, and his enterprise was rewarded with the newly-founded Vinerian professorship in 1758. The publication of his famous *Commentaries*, based upon his Oxford lectures, followed in the years 1765–70. They had an immediate and overwhelming success. Their great merit is the admirable way in which the author handles an immense mass of materials, and unloads it gently and without fatigue upon the reader. After having acquired reputation as a lecturer, Blackstone returned to practice, and soon gained a lucrative position. He refused the chief-justiceship of the Irish Common Pleas in 1761, being made principal of New Inn Hall in that year. In 1763 he became solicitor-general to the queen; he was already a member of Parliament, but did not distinguish

himself in that capacity. In 1770 he was made a justice of the Common Pleas in England; and though he was removed to the King's Bench almost at once, he returned after a short time. He was an indifferent judge, hesitating and formal in his pronouncements. Blackstone's only work of permanent value is the *Commentaries on the Laws of England*, the last verbatim edition of which appeared in 1844, but which has been 'adapted' by various editors, and is still used by candidates preparing for the solicitors' examinations; and *Reports*, prefixed to which is a Life by J. Clitherow (1813).

Blackthorn, or SLOE (Lat. *Prunus spinosa*), belongs to the plum division of the rose order. In March and April it produces miniature white, hawthorn-like sprays of flowers in profusion before the leaves expand; its branches form hard thorns; its bark is black, hence the name; and in September or October its fruits or sloes ripen: they are elliptical, black, with a plumlike bloom on the skin, and sour.

Black Thursday, the name given in Victoria, Australia, to a terrible bush-fire which occurred on Thursday, Feb. 6, 1851.

Black Vomit. See YELLOW FEVER.

Blackwall, dist. of London, par. of Poplar, containing the E. India Docks and large shipbuilding yards. Blackwall Tunnel affords communication between Blackwall and E. Greenwich. It is 6,200 ft. in length, 1,222 ft. being beneath the river; the external diameter is 27 ft.; the roadway 16 ft. wide, with sidewalks of 3 ft. 1½ in.; the headway at the centre of the roadway is 17 ft. 7½ in. The total cost of the tunnel (excluding the rehousing of the working-classes displaced) was £1,323,663. It was begun March 1892, and was com-

pleted and formally opened on May 22, 1897.

Black Water. See SHEEP.

Blackwater, the name of fifteen rivers and streams in the United Kingdom, the most important of which are:—(1.) River in Munster, Ireland; rises on borders of Cork and Kerry, and after a course of 100 m. falls into Youghal harbour. Next to the Shannon it is the largest river in Ireland. (2.) River in Ulster, Ireland; after a course of about 50 m. falls into Lough Neagh. (3.) River in Essex, England; rises near Saffron Walden, and enters the North Sea after a course of about 40 m.

Blackwater Fever is a disease of a malarial type, which has been described under many different names, generally suggested by prominent signs or symptoms—*e.g.* hæmoglobinuria, hæmatinuria, bilious hæmaturic fever, hæmorrhagic malarial fever, yellow remittent fever, bilious remittent fever, and melanuric fever.

It is an acute infectious fever, accompanied by rapid and great destruction of red blood corpuscles, starting very often, like most fevers, with general malaise, followed by a severe rigor and rise of temperature, which may soon reach as high as 105° or 106°. Great nausea is characteristic, with a vomit which passes from yellow to dark green. The urine is quickly red, passing to the darkness of porter. Meanwhile pain appears in the hypochondriac region and the loins; and on palpation the liver and spleen are found to be swollen and tender. The skin and the conjunctivæ rapidly assume a jaundiced yellow colour. Constipation is usual, but diarrhœa is not uncommon. Very often in a few hours there are profuse perspiration and a fall of temperature, with clearing of the urine, or free

flow if it has been suppressed; but generally a few hours more will bring another rise of temperature, and an aggravation of all the symptoms. A paroxysm may occur every few hours for a few days, or one a day may be the rule, or there may be intervals of one or two days between the attacks. Within a week the patient may be rid of it; or his strength may fail, sometimes quickly, sometimes in five or six days, with fatal results. Relapses, even months after the first attack, are very common.

Blackwater fever is prevalent all through tropical Africa, in S. America, Madagascar, Sicily, Sardinia, the Greek Archipelago, and in India. Indeed, it may apparently be looked for wherever there are low marshy districts with a tropical climate. It so frequently follows on malaria that it has been considered essentially the same disease, but in suitable districts it seems likely to attack any whose health is below par from any cause whatever without any previous malarial attack. Some, again, have held it to follow the excessive use of quinine, and to be, in fact, a quinine poisoning.

Treatment.—No quinine should be given. The patient should take to bed, have hot fomentations over the liver and spleen, copious hot alkaline drinks, and a free purge. No solid food should be taken during the attack, and no alcohol unless for extreme weakness. In E. Africa and in Dahomey it has lately been ascertained that the natives use decoctions of cassia with considerable success. See Sambon's article in the *Encyclopædia Medica*, and J. W. W. Stephens's treatise in *Thompson, Yates, and Johnston Laboratories Report*, vol. v. (new series), part i. (1903).

Blackwell, ALEXANDER (d. 1747), Scottish adventurer, was

born in Aberdeen about 1704. Having failed (about 1734) as a printer in London, he became a practical agriculturist, and in 1741 published *A New Method of improving Cold, Wet, and Clayey Grounds*. The following year he appeared in Sweden as a physician, where he received a royal appointment; but he was obliged to return to farming. By the publication of *An Essay on the Improvement of Swedish Agriculture* he procured the directorship of a model farm at Allestad in 1745. Two years later he took part in an abortive plot to alter the succession to King Frederick, and was beheaded.

Blackwell, ELIZABETH (fl. 1737), botanical delineator, wife of the above, and daughter of an Aberdeen merchant. About 1735 her husband was imprisoned for debt, and in two years she earned his release by her talent and devotion. She made drawings of 500 medicinal plants, engraved them on copper herself, and then coloured the prints. The work appeared in 1737, in 2 vols. folio, as *A Curious Herbal*. Her husband supplied the letterpress. The work was republished at Nuremberg (1757-73).

Blackwell, GEORGE (?1545-1613), archpriest of the Roman Catholic Church, born in Middlesex, and elected perpetual fellow of Trinity College, Oxford, in 1566; was appointed archpriest over the secular Catholic clergy in England by Cardinal Cajetan (1598), and held that office until 1608, when he was deprived of it for advising Catholics to take the new oath imposed on them by James I. in 1606. See T. Flanagan's *History of the Church in England* (1857).

Blackwell, THOMAS (1701-57), classical scholar, born in Aberdeen; was appointed professor of Greek at Marischal College in 1723, and principal in 1748. He

published anonymously, in London, *An Enquiry into the Life and Writings of Homer* (1735), and *Letters concerning Mythology* (1748). His unfinished *Memoirs of the Court of Augustus* appeared in 3 vols. (1753-64).

Blackwood, ADAM (1539-1613), Scottish writer, born at Dunfermline; studied at Paris, and as reward for his *De Vinculo* (1575), a justification of religious intolerance, was appointed judge of the parliament of Poitiers. He wrote an *Apologia pro Regibus* (1581) against George Buchanan, and, after Queen Mary's death, a *Martyre de la Royne d'Escoce* (1587), and religious works in Latin. See *Works*, ed., with Life, by Gabriel Naudé (1644); D. Irving's *Scottish Writers* (1839).

Blackwood, VICE-ADMIRAL THE HON. SIR HENRY, BART. (1770-1832). As first lieutenant of the *Invincible*, he took part in Howe's battle of June 1, 1794; and he was made a commander in the same year. In Bridport's action of 1795 he commanded the *Megara*. Being posted soon afterwards, he took part in an action against two French frigates of superior force in 1798. In 1800, when attached to the squadron which was blockading Malta, he distinguished himself in the *Penelope* in the attack upon the *Guillaume Tell*, which was captured. At the battle of Trafalgar he rendered important service in the *Euryalus*, and brought home the dispatches announcing that victory. In Sir J. Duckworth's fleet he commanded the *Ajax* in 1807, but his ship took fire and blew up a few days before the passage of the Dardanelles. In 1827 he was appointed commander-in-chief at the Nore.

Blackwood, JOHN (1818-79), Scottish publisher, was born at Edinburgh, and assumed superintendence of the London branch

of the business in 1840; became editor of *Blackwood's Magazine* (1845), and head of the publishing business after 1852. He recognized the first Lord Lytton's genius, and discovered George Eliot, all of whose novels save one were published by him. See Mrs. Porter's *Annals of a Publishing House*, vol. iii. (1898).

Blackwood, WILLIAM (1776-1834), founder of the celebrated Edinburgh publishing house, came of an old Scottish family which has been traced back to the 15th century. One of the family was lord provost of Edinburgh from 1711 to 1713, and, in spite of loss by the Darien speculation, was able to purchase the Fifeshire estate of Pitreavie. From a grandson of this Blackwood the publisher was descended. He started as an Edinburgh bookseller in 1804. The first number of *Blackwood's Magazine* was issued in April 1817. William Blackwood undertook the editorship, and gathered round him a staff of distinguished contributors, including Scott, Lockhart, Hogg, Wilson (Christopher North), De Quincey, Galt, Maginn, Thomas Aird, and Dr. Moir (Delta). See Mrs. Oliphant's *Annals of a Publishing House*, vols. i. and ii. (1897).

Bladder. The bladder is the reservoir for the urine. It is a musculo-membranous sac, situated in the pelvis, behind the pubes and in front of the rectum, in the male; in the female, the uterus and vagina lie between it and that intestine. In infancy it is conical in shape; in the adult, when empty, it is a small triangular sac lying deeply in the pelvis, flattened backwards from the front. When slightly distended, it is rounded in shape; when greatly distended, ovoid, and rises from the pelvis into the abdominal cavity. When moderately full it contains about a pint, but is capable of great dis-

tension, and has been known to hold twenty pints. It has three openings into it—those of the two ureters from the kidneys, and that of the urethra. The bladder is composed of four coats, which are, from without inwards, the serous peritoneum, the muscular, the submucous, and the mucous.

Diseases.—Inflammation or cystitis, usually a chronic affection, and in the majority of cases due to the introduction of micro-organisms from without. When the vitality of the mucous membrane of the bladder is lowered and micro-organisms are present, pus is formed, and there is suppurative cystitis. If the urine, though containing bacteria, is free from pus, the condition is catarrhal cystitis. If the irritant is a calculus or stone, or uric acid or oxalate of lime crystals, simple cystitis may occur. Examined with the cystoscope, the mucous membrane of the bladder then appears much congested. Any obstruction to the escape of urine predisposes to cystitis. The treatment of cystitis is to remove the cause and to give urinary antiseptics, such as boric acid, salol, benzoic acid, naphthalin, benzonaphthol, benzoates of soda and ammonia. Absolute rest, hot baths and fomentations, laxatives and bland fluids are all helpful in acute cases, and sometimes opiates are needed. Alcohol must be avoided. Washing out the bladder is an effectual method of treating chronic cystitis. Tuberculous disease of the bladder is usually a secondary affection, due to extension of the same condition from the kidneys, prostate, or seminal vesicles. The treatment is mainly constitutional. Ulceration of the bladder may occur in the course of chronic cystitis. Calculus, or stone in the bladder, may occur at any age, and is treated surgically. The nuclei of most calculi form

in the kidney and pass down into the bladder, where they increase in size by successive deposits from the urine. Climate and the nature of the drinking water influence their formation. Calculus is especially frequent in Norfolk in England, and in Egypt. In the bladder, calculi are generally from a half to one and a half inches in diameter, and are mainly phosphatic. They give rise to pain, sudden interruption in the flow of urine, hæmaturia, and frequent intense desire for micturition; they are removed by a crushing operation (lithotrity), or by a cutting operation (lithotomy). Rupture occurs from a blow when the bladder is full; immediate surgical operation gives the best chance of recovery. The bladder is frequently the seat of tumours, such as papilloma, sarcoma, and carcinoma or cancer, which may be removed by surgical operation, but are liable to return. See also URINARY DISORDERS.

Bladder Nut. The *Staphyleas*, or bladder-nut trees, are hardy, deciduous shrubs, all of which do well in ordinary good soil in the open air of England. The best known is *S. colchica*, which is often forced into bloom in early spring. It commonly attains to a height of about four feet. Job's tears (*S. pinnata*) is a much taller-growing species, and its early summer flowers are followed by white nuts with pistachio flavour. *S. trifolia* is another tall species (about ten feet), blooming in early summer. The two remaining species, *S. Bolanderi* and *S. Bumalda*, are both late summer bloomers—the former being a native of N. America, whilst the latter belongs to Japan. All the species are readily propagated by suckers or cuttings taken in August.

Bladder-plum, or POCKET-PLUM, is a malformation of the fruit of plum, caused by the

attacks of a fungus (*Exoascus pruni*), which also occurs in other species of the same genus, such as bird cherry and blackthorn. See M. Ward's *Disease in Plants*.

Bladder Seed (*Physospermum cornubiense*) is an umbelliferous plant with bladder-like fruits. It occurs in the south of France and Spain, whence it has reached the south of England.

Bladder Senna (*Colutea arborescens*) is a leguminous shrub with yellow flowers. It prefers a dry, sandy soil, is a native of S. Europe, and is sometimes grown in shrubberies in Britain. Its pods are inflated like those of the bladder nut, and its leaves have been used for mixing with true senna.

Bladder-worms, the larval stages of tapeworms; sometimes more dangerous parasites than the adults, owing to the great destruction of tissue which they can produce in such organs as brain, liver, etc. In the case of one of the tapeworms of man, *Tænia solium*, the eggs of the parasite leave the body of the host with the excreta, and are eaten by the pig. Within the alimentary canal of the pig the embryos hatch out, and bore their way into the muscles, where they become encysted and form bladder-worms. A bladder-worm consists of a head, or scolex, and a distended bag of fluid. If imperfectly cooked pork containing these bladder-worms is swallowed by man, the bladder-worms lose the bladder, and the head or scolex attaches itself to the wall of the alimentary canal, and grows into a tapeworm. Man may become infected with bladder-worms owing to imperfect cleanliness, and especially to close companionship with dogs whose health is not carefully looked after, for the dog is peculiarly liable to tapeworm. One of the most dangerous bladder-worms found in man is *T. echinococcus*, a common tape-

worm in the dog. The bladder-worm of *T. cœnurus*, again, which is also found in the dog, is peculiarly fatal to sheep, producing the disease known as sturdy. Bladder-worms were known in man and the domestic animals before their relation to tape-worms was discovered, and they are therefore sometimes still designated by names which are different from the names applied to the adult forms: e.g. the bladder-worm of *T. cœnurus* is called *Cysticercus cerebralis*, and that of *T. solium* receives the name of *C. cellulosa*.

Bladderwort (*Utricularia*), a genus of water plants which are rootless and grow suspended in the water. Although widely distributed, there are only four British species, all found in the pools of marshy districts. The common bladderwort (*U. vulgaris*) has a stem the thickness of whipcord, and this is fringed with fine leaves which are repeatedly divided into linear segments. Some of the leaf divisions form intricate bladders, which have an aperture protected by bristles and fitted with a trap-door. Larval crustaceans and other water animals take shelter inside the bladders, but the trap-door prevents their return; they die, and the dissolved substances of their bodies provide the plant with food.

Bladensburg, vil., Maryland, U.S.A., on E. branch of Potomac R., 5 m. N.E. of Washington. Here, on Aug. 24, 1814, the British defeated the Americans, and as a result captured the town of Washington.

Blaeberry. See VACCINIUM.

Blaenau Festiniog, par. and tn., N. Merionethshire, Wales, 2 m. N. of Festiniog; with large slate-quarries. Pop. 8,000.

Blaenavon, vil., Monmouthshire, England, 5 m. N.W. of Pontypool; has coal-mines. Pop. 11,000.

Blaeu, or BLAEUW, JAN, Dutch cartographer, died 1673, author of *Magnum Theatrum Urbium Belgicæ* (1649), *Atlas Magnus* (1650-62), and *Theatrum Civitatum Italicæ* (1663). The *Atlas Magnus* includes 49 maps of Scotland prepared by Timothy Pont, the originals of which are preserved in the Advocates' Library, Edinburgh. Blaeu's father, WILLEM JANSZON (1571-1638), pupil of Tycho Brahé, published a map of the heavens, and *Novus Atlas* (1634-62).

Blagden, SIR CHARLES (1748-1820), English physician, followed the army medical service until 1814. In 1784 he was elected secretary to the Royal Society. He was the author of many papers on freezing—e.g. *The Cooling of Water below its Freezing-Point*, read to the Royal Society, Jan. 31, 1788. See Weld's *Hist. of the Roy. Soc.* (1884).

Blagodatskiy, mt. (1,260 ft.) on E. slope of Urals, Russia, N.E. of Perm; source of supply (some 50,000 tons annually) of magnetic iron ore worked at Kushvinsk and Goro-Blagodatskiy iron works. Pop. of dist. 50,000.

Blagoveshchensk, the only town in the Amur prov., Asiatic Russia, situated on the Amur near the confluence of the Zeya, 530 m. N. by W. of Vladivostok. It is the centre of a gold-mining district, and has a shipbuilding yard. In 1904 there was a serious massacre of the Chinese. Pop. 40,000.

Blaikie, WILLIAM GARDEN (1820-99), Scottish theologian; was minister of Drumblane (1842) and of Pilrig (1844-68), having meantime gone over to the Free Church. From 1868 to 1897 he was professor of apologetics and pastoral theology at New College, Edinburgh. He edited the *North British Review* (1860-3), *Sunday Magazine* (1873-4), and *Catholic Presbyterian* (1879-83).

Blain, tn., Loire-Inférieure dep., France, 20 m. N.W. of Nantes; has zinc mines. Pop. 6,700.

Blaina, dist., W. Monmouthshire, England, 3 m. N.N.E. of Abertillery; has coal mines and blast furnaces. Pop. 14,000.

Blaine, JAMES GILLESPIE (1830-93), American statesman, born at W. Brownsville, Pennsylvania, of Scoto-Irish parentage; was successively teacher, journalist, and newspaper editor. In 1858 he was elected to the state legislature as a Republican; then to Congress in 1862, where he served for seven successive terms, and was for three sessions Speaker of the House. He became secretary of state under President Garfield (1881), but resigned after the latter's assassination. He again accepted that office under President Harrison (1888), and finally retired in 1892. Three times he stood, unsuccessfully, as a candidate for the Republican nomination for the presidency. As a senator he strongly opposed the issue of 'greenbacks' during the civil war, the Bland Silver Bill of 1878, and the unrestricted immigration of Chinese, but was an advocate for the subsidizing of various industries. When secretary of state he took up a firm position regarding the seal fisheries disputes with Great Britain, and energetically worked for closer commercial relations with the South American states, and for reciprocity treaties with foreign nations. He wrote *Twenty Years of Congress* (2 vols. 1884-6) and *Political Discussions* (1887). See Stanwood's *James G. Blaine* (1905), and *Biography* by G. Hamilton (1895).

Blainville, HENRI MARIE DUCROTAY DE (1777-1850), French naturalist, professor of anatomy and zoology at Paris University (1812); succeeded (1832) to the chair at the Collège de France

vacated by Cuvier. His works include *De l'Organisation des Animaux* (1822), *Physiologie Générale et Comparée* (1833), *Actinologie* (1834), and *Ostéographie* (1839).

Blair, HUGH (1718-1800), Scottish divine and author, born in Edinburgh, and became minister successively of Collesie, Fifeshire (1742); Canongate Church, Edinburgh (1743); Lady Yester's Church (1754) and the High Church (1758). In 1759 he began a course of lectures on rhetoric under the auspices of Edinburgh University, and these were so popular that a professorship was founded, to which he was appointed in 1760. His *Lectures on Rhetoric and Belles Lettres* were subsequently issued in 2 vols. (1783). He was much admired as a preacher, and his *Sermons*, published at various times from 1777 onwards, the first volume mainly by the influence of Dr. Johnson, procured him (1780) a pension of £200 from George III. He wrote, besides, *A Critical Dissertation on the Poems of Ossian* (1763). A Life by J. Finlayson is prefixed to the fifth volume of his *Sermons* (1801).

Blair, ROBERT (1699-1746), Scottish divine and poet, was born in Edinburgh, the eldest son of the Rev. Robert Blair. Was in 1731 presented to the living of Athelstaneford, E. Lothian, where he remained till his death. His well-known poem, *The Grave*, although of unequal merit, rises in places to a dignity almost Shakespearean. The best account of his life is given in Dr. William Anderson's edition of *The Grave*.

Blair, ROBERT (d. 1828), Scottish astronomer, was born at Edinburgh, and was appointed to the chair of practical astronomy in the university there in 1785—a post which he held for forty-three years. He made valuable improvements in the astronomical telescope. He also advocated

successfully the use of lime-juice in the British navy as a prophylactic against 'scurvy.' In 1827 he published a small volume of *Scientific Aphorisms*.

Blair Atholl, or BLAIR ATHOLE, par. and tn. in N. Perthshire, Scotland, on the Garry and Tilt, 3 m. N.W. of Pass of Killiecrankie, on Highland Ry. Cattle fairs. Near it is Blair Castle, the seat of the Duke of Atholl. Pop. 1,500.

Blairgowrie, par. and tn. on r. bk. of the Ericht, E. Perthshire, Scotland, 5 m. N.W. of Coupar-Angus; has flax-spinning and jute mills, and is a great fruit-growing centre. Connected with Rattray by bridge. Pop. 4,500.

Blake, ROBERT (1598-1657), English admiral, was born at Bridgwater, Somersetshire, and sat for Bridgwater in the Short Parliament of 1640. Joining the Parliamentary forces, he distinguished himself at the defence of Bristol (1643), held Lyme against the royalists (1643-4), and captured and defended Taunton (1644-5). In 1649, after unsuccessfully blockading Prince Rupert at Kinsale, Blake, in conjunction with Deane and Popham, was appointed to command the fleet, and in the following year destroyed most of Prince Rupert's squadron at Malaga, in the south of Spain. In 1651 he captured the Scilly Isles and Jersey from the royalists. In 1652, being appointed to the chief command of the fleet against the Dutch, and, assisted by Rear-admiral Bourne, he defeated first Van Tromp in the Downs, and then De Witt and De Ruyter off the mouth of the Thames, but himself sustained a reverse at the hands of Van Tromp off Dungeness. In the following year, after fighting, along with Deane, Monck, and Penn, an indecisive action with Van Tromp off Portsmouth, Blake met the same antagonist once more off the Dutch coast,

and finally routed him, Van Tromp being killed in the action. In 1655 Blake was sent to punish the pirates of Tripoli, Algiers, and Tunis. This he successfully accomplished. In 1656, when war broke out with Spain, Blake took charge of the blockading squadron off Cadiz; but hearing of the presence of a Spanish treasure fleet at Teneriffe, he sailed thither, and finding a naval force at Santa Cruz strongly protected by shore batteries, sank or burnt the former and silenced the latter. Failing health then compelled his return to England, and he died on board his flagship, *The George*, within sight of Plymouth Sound. He was buried in Westminster Abbey, but after the Restoration his body was dug up and flung into a hole in the churchyard of St. Margaret. Blake was supremely honest, brave, patriotic, and self-sacrificing, and ranks among the very greatest of Englishmen. See Hepworth Dixon's *Robert Blake* (1852); a *Life* by Dr. Samuel Johnson (1777); D. Hannay's *Life of Blake* (1886).

Blake, WILLIAM (1757-1827), English mystic, poet, painter, and engraver, was born at 28 Broad Street, Golden Square, London, the son of a hosier whose real patronymic is said to have been O'Neil. From the age of four to the end of his life Blake had times of exaltation, when he saw visions—a real or fancied prophetic power which influenced all his future work. When he was ten he began to study art under a Mr. Par, in the Strand, and at fourteen he was apprenticed to the engraver Basire. In 1782 he married Catherine Boucher, a woman of humble rank, whom he taught to be the skilful assistant of his art labours. For some years (1784-7) he had a print-seller's shop; but engraving was the practical business of his life, although his soul was in poetry

and creative art. In 1799 appeared his first original work as an artist—two engravings from his own water-colour drawings; and in 1783 his earliest poems were published. Thereafter he began the wonderful series of publications with which his name will ever be associated, and in which poetry and art united to give expression to his unique genius. As painter and as poet Blake has been idolized, and he has been reviled. His works, however, show him to be a true poet, a seer as well as a visionary, instinct with melody, and yet often as indifferent as his disciple Walt Whitman to the music of verse. As a draughtsman and a designer he was a master; nevertheless his Wiertz-like conceptions and barbaric colouring seem at times the productions of a disordered imagination. After a long life of toil and neglect, Blake died in London, where he had mostly lived. His greatest works were the *Songs of Innocence* (1789), *Songs of Experience* (1794), and the 'prophetic' series—*Thel* (1789), *The Marriage of Heaven and Hell* (1790), *The Gates of Paradise* (1793), *The Vision of the Daughters of Albion*, and *America* (1793), *Europe* and *The Book of Urizen* (1794), *The Song of Los* and *The Book of Ahaniah* (1795); and his many pictorial designs and engravings (dissociated from his poetry), of which the most notable were his illustrations to the *Book of Job* (1826), *Young's Night Thoughts* (1777), and Blair's *The Grave* (1804-5). Mr. W. Rossetti's edition of his *Poems* (1857) in the Aldine series contains his best poetic work. There is another edition by J. Sampson (1905). *The Prophetic Books* were issued (1904, etc.) by E. R. D. Maclagan and A. G. B. Russell. See his *Life*, by A. Gilchrist (new ed. 1906); *William Blake*, by A. C. Swinburne (new ed. 1906); *Works*, very fully analyzed by E. J. Ellis and

W. B. Yeats (1893); Dr. Garnett's *William Blake* (1895); A. Symons's *Life* (1907); and *Letters*, ed. by A. G. B. Russell (1906).

Blakesley, JOSEPH WILLIAMS (1808–85), dean of Lincoln, born in London; in 1831 was elected fellow, and in 1839 tutor, of Trinity College, Cambridge. He took orders in 1833, was appointed classical examiner at London University (1850), and became canon of Canterbury (1863) and dean of Lincoln (1872). He was a member of the revision committee on the New Testament; he also produced an edition of *Herodotus* (1852–4).

Blakey, ROBERT (1795–1878), English miscellaneous writer, was born at Morpeth. After an unsuccessful period as editor and proprietor of the *Northern Liberator and Champion*, he proceeded to France and Belgium to prosecute his philosophical studies. He was appointed professor of logic and metaphysics in Queen's College, Belfast (1848), and received a pension of £100 from the civil list in 1860. His principal productions are the *History of the Philosophy of Mind* (1848), and his *Historical Sketch of Logic* (1851). See *Memoirs* (ed. by Miller, 1879).

Blakiston, THOMAS WRIGHT (1832–91), English explorer and ornithologist. In 1861 he sailed up the Yangtse-kiang for 1,800 m., and published an accurate map (1861) and an account of the voyage—*Five Months on the Yang-tsze* (1862). Settling in Japan, he studied its birds, and published numerous papers on the subject.

Blamire, SUSANNA (1747–94), English poetess, born at Cardew Hall, near Carlisle. As many of her poems were written in conjunction with Catharine Gilpin of Scaleby Castle, the authorship is sometimes difficult to determine. The best of her songs—e.g. *What ails this heart o' mine?* *The Sol-*

dier's Return, and *Ye shall walk in silk attire*—are written in the Scots dialect. See *The Poetical Works of Susanna Blamire, the 'Muse of Cumberland,'* ed. by P. Maxwell and H. Lonsdale (1842).

Blanc, MONT, the loftiest mountain (15,782 ft.) in the entire chain of the Alps. It rises towards the s.w. end of the chain to which it gives its name, to the s. of Chamonix (France) and to the n.w. of Courmayeur (Italy). By the treaty ceding Savoy to France in 1861 it was agreed that the highest summit should become wholly French. It was originally named simply Les Glacières, or the Montagne Maudite, the first certain occurrence of the name Mont Blanc being found in an Italian document of 1694. Great glaciers stream from it on all sides, the Italian slope being by far the steepest and grandest. It was first ascended in 1786 by two Chamonix men—Dr. Paccard and Jacques Balmat. The third ascent (1787) was made by the famous Genevese naturalist, H. B. de Saussure (statue at Chamonix), and a week later the first Englishman, Colonel Beaufoy, achieved the ascent. Now the ascent is frequently made in summer from Chamonix by way of the Grands Mulets (inn) and the Bosses du Dromadaire (shelter hut), the easiest route. The finest ascents are made from Courmayeur, the Brenva route being one of the most difficult climbs in Europe. The first winter ascent was made by Miss Isabella Straton in January 1876. Plans have been projected for a railway connecting Chamonix and Aosta through a tunnel 8½ m. in length under Mont Blanc. See Charles Durier's *Le Mont Blanc* (1st ed. 1877; 4th ed. 1897); Charles E. Mathews's *The Annals of Mont Blanc* (1898); P. Güssfeldt's *Der Mont Blanc* (1894). The best map (scale 1–50,000) is

that by Imfeld and L. Kurz, published in 1896.

THE CHAIN OF MONT BLANC stretches from the Col de Balme (7,221 ft.), on the N.E., to the Col du Bonhomme (8,147 ft.) and the Col de la Seigne (8,242 ft.), on the S.W., and is mainly divided between Italy and France. The chief passes (all glacier) are the Col de la Brenva (14,217 ft.), the Col d'Argentière (11,536 ft.), the Col de Miage (11,077 ft.), the Col du Géant (11,060 ft.), and the Col du Tour (10,762 ft.). See L. Kurz's *Guide de la Chaîne du Mont Blanc* (1892; and in English, same date), and his *Carte de la Chaîne du Mont Blanc* (1896).

Blanc, FRANÇOIS, French financier. In 1863 the Casino of Monte Carlo was leased to him for fifty years. After his death the lease was taken up by the Société Anonyme des Bains de Mer et Cercle des Etrangers, with a capital of thirty million francs. See MONTE CARLO.

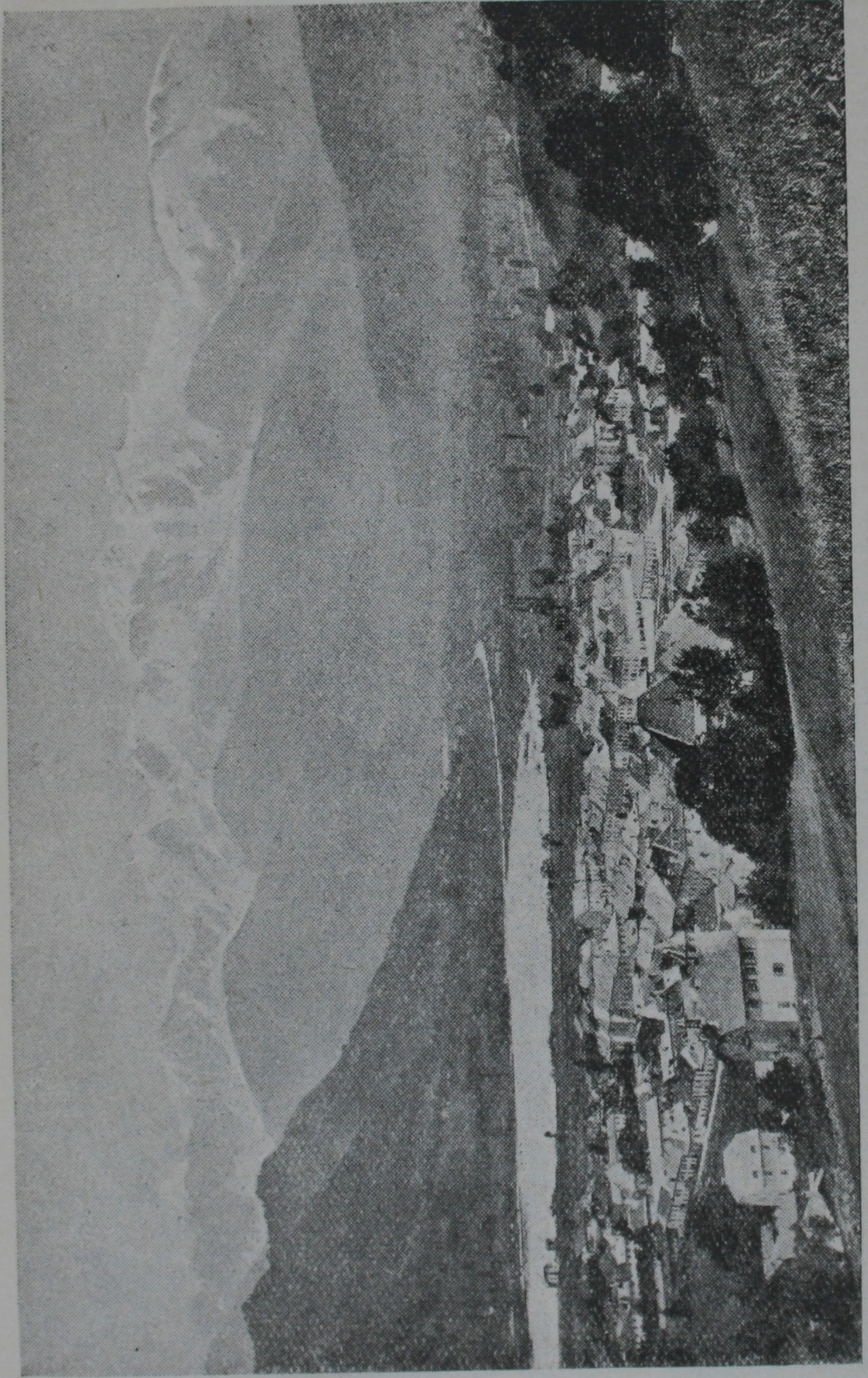
Blanc, JEAN JOSEPH LOUIS (1811-82), French historian and revolutionist, was born at Madrid. He was educated at Paris, where in 1839 he founded the *Revue de Progrès*, printing in it his important work on socialism, the *Organisation du Travail*. This treatise, which attracted wide attention, was the first exhaustive manifesto of state socialism. A pamphlet on *Idées Napoléoniennes* was succeeded in 1841 by Blanc's *Histoire de Dix Ans 1831-40*, which created an immense sensation, and by its revelations shook the throne of Louis Philippe. In 1847 appeared the first two volumes of his *Histoire de la Révolution Française*. Upon the revolution in 1848, Blanc was elected a member of the provisional government. He enjoyed great popularity with the working-classes, and in March 1848 a procession of 200,000 workmen, organized by

Blanqui, offered him the dictatorship, which he refused. He was falsely charged with complicity in the disturbances of May, June, and August; and being condemned by a large majority, he sought refuge in Britain, where he remained for upwards of twenty years. He was there chiefly engaged on his *Histoire de la Révolution Française* (completed in 1862), his *Histoire de la Révolution de 1848* (1870), and his correspondence to the *Temps*, collected and published as *Dix Années de l'Histoire d'Angleterre* (1879-81). Returning to Paris on the downfall of the empire, he afterwards opposed Thiers, and denounced the conclusion of peace with loss of territory. Until his death at Cannes, in 1882, he was a deputy for Paris.

Blanca Peak, mt., Colorado, U.S.A., 10 m. N. of Fort Garland. It occupies an isolated position, and is one of the most magnificent summits of the Park Range, with an alt. of 14,400 ft. It is the second highest mountain in the U.S.A.

Blanchard, SAMUEL LAMAN (1804-45), English author and editor, was born at Great Yarmouth. In 1828 he published his *Lyric Offerings*, with a dedication to Charles Lamb. After his death Bulwer-Lytton collected his prose essays, under the title of *Sketches from Life* (3 vols. 1846), and Blanchard Jerrold collected his poetical works (1876). Most of Blanchard's work as an editor was connected with *The True Sun* and *The Courier*. See Memoir in *Sketches from Life*.

Blanche, DENT, one of the grandest peaks (14,318 ft.) of the Alps, near Zermatt, to the W. of which it rises, nearly opposite and N. of the slightly higher Matterhorn. This difficult climb was first made in 1862, by T. S. Kennedy and W. Wigram.



Mont Blanc from Sallanches.

Blanch Holding, or **BLENCH HOLDING**, an ancient tenure of the law of Scotland (like the *feudum francum* of the Lombards) under which the vassal has to pay to the superior a merely nominal yearly duty, as a penny Scots, a rose, a pair of gilt spurs, etc., and only if demanded within the year. Compare the English tenure by peppercorn rent.

Blanching of Vegetables.

By the exclusion of light certain changes take place in the metabolism of plants. This fact is made use of by the gardener in growing certain vegetables which under normal conditions are tough, bitter, and harmful, yet when etiolated or blanched are tender and pleasant. Among the plants treated in this way are celery, seakale, lettuces, cardoons, and endive. In gardens, seakale may be blanched by placing over each crown in February a mound of sand, or, if this is not obtainable, a six-inch flower-pot or drain-pipe, the open end being well covered and the lower end pressed well into the soil. Celery is commonly blanched by successive earthings up, care being taken not to bury the summit of the leaves. Two long boards, with one edge of each resting along the ground, the other meeting its fellow just below the crowns of the plants, are also sometimes used. Cos lettuces are usually tied up with pieces of bass, so that the outer leaves serve to exclude light from the hearts; and a similar method is often adopted with endive. Inverted flower-pots with the bottom holes stopped, or proper blanching-pots, are, however, somewhat more convenient for this purpose. Cardoons are blanched by tying each plant compactly together, so that it presents a long, oval shape. They are then earthed up, or a drain-pipe, placed over each, is filled

with sand. The process occupies about three weeks.

Blanco, CAPE, on the W. coast of Africa, in about 20° 50' N., at the western extremity of the Sahara.

Blanco, ANTONIO GUZMAN (1830-99), president of Venezuela, was born at Carácas; was nominated provisional president in 1870 and constitutional president in 1873; this office he held until 1877, and again in 1879-87; and spent the rest of his life as Venezuelan ambassador at Paris. Whilst in power he was virtually dictator, and with a firm government combined an enlightened zeal for the progress of his country.

Blandford Forum, par., munic. bor., and tn. on r. bk. Stour, 16 m. N.E. of Dorchester, Dorsetshire, England; ancient camps and barrows in the neighbourhood. Pop. 3,700.

Blane, SIR GILBERT (1749-1834), Scottish physician, was born in Ayrshire. With Rodney's help he effected great sanitary reforms in the W. Indies fleet (1779-83), and the disappearance of scurvy from the navy is due to his efforts. From 1783 he practised in London. His most important works are *Observations on the Diseases of Seamen* (1785), and *Elements of Medical Logick* (1819).

Blanford, WILLIAM THOMAS (1832-1905), English geologist and zoologist, served on the Geological Survey of India (1855-82), as geologist to the Abyssinian expedition (1867-8), and with the Persian Boundary Commission (1872). His researches were published in his *Geology and Zoology of Abyssinia* (1870), *Eastern Persia* (1876), and contributions to the *Manual of the Geology of India* (1879) and *Fauna of British India* (4 vols. 1888-98).

Blankenberghe, seaside resort of Belgium, prov. W. Flanders, 9 m. N.W. of Bruges and 13 m.

N.E. of Ostend. It has quite recently developed out of a fishing village into a popular summer resort visited by nearly 30,000 persons annually. Pop. 5,000.

Blankenburg. (1.) Town of the German duchy of Brunswick, on the N. edge of the Harz Mts., 12 m. S.W. of Halberstadt; is a favourite summer resort, has a ducal castle, and grows fruit and vegetables. It stands amidst the fantastic sandstone region of the Teufelsmauer and of Regenstein. Pop. 10,000. (2.) Town in the principality of Schwarzburg-Rudolstadt, Germany, at the N. foot of the Thüringer Wald, 27 m. S.W. of Jena. Here Froebel opened his first kindergarten school in 1840. Pop. 3,000.

Blanket, one of the coverings of a bed. The best blankets are wholly composed of wool. Their manufacture is similar to that of other woollen goods, but the soft fluffy matting on the surface, which is more characteristic of English than of Scotch blankets, is obtained by a process called 'teaseling,' scratching it with teaseling-cards or brushes made of wire. In large manufactories this operation is performed by a machine called a gig mill, consisting of a cylinder bristling with teasels, and made to revolve rapidly while the cloth is drawn over it. Scotch blankets, though not so comfortable as English blankets, are more durable. The principal seat of the English blanket manufacture is in Yorkshire, at Dewsbury, Keighley, and Liversedge; but blankets are also extensively made at Witney and Bath. The manufacture in Scotland is mainly confined to Ayrshire, Berwickshire, and Markinch in Fife.

Blanketeers, a band of Lancashire Radical reformers who, at a meeting in St. Peter's Field, Manchester, Mar. 10, 1817, determined to march to London, joining others

from Derby, to present a petition for parliamentary reform. They were so called because each man carried a blanket for camping out at night. See *Political History of England*, vol. xi. ch. 8 (1906).

Blank Verse, a term which signifies, etymologically, all verse in which the rhymes are 'blank' or lacking, but which is generally restricted in ordinary usage to the unrhymed iambic decasyllable, the common medium in English of narrative and dramatic poetry. This measure was first used in our language, in the translation of the second and fourth books of the *Aeneid*, by the Earl of Surrey (1516-47), and was almost certainly copied from the *versi sciolti*, or unrhymed verse of eleven syllables of the Italians—Surrey's immediate example being probably F. M. Molza's translation of Virgil, published in Venice (1541). Surrey's metre was used by Nicholas Grimald in two pieces published in Tottel's *Miscellany* (1557), which, while worthless as poetry, show a curious anticipation of some of Milton's most characteristic rhythms. It was again used by Gascoigne in his satire *The Steele Glas* (1576), but was not employed in any other considerable non-dramatic work until the publication of Milton's *Paradise Lost* in 1667. As a vehicle of dramatic expression it was first used in Sackville and Norton's *Gorboduc* (1561), and continued in 'scholarly' dramas, such as Gascoigne's *Jocasta* (1566) and Thomas Hughes's *Misfortunes of Arthur* (1587; new ed. 1874); until, being adopted by Marlowe in his tragedy *Tamburlaine* (1587), it attained such an immediate popular success that dramatists like Peele and Greene, who had previously been writing in rhymed verse, were forced to abandon their own medium and to employ the new measure. Except for a brief period after the Restoration, when

the couplet and the 'heroic' play reigned supreme, its position as the only suitable dramatic verse has never been disputed; and even Dryden himself, the high priest of the heroic school, reverted to blank verse in his later plays, confessing himself 'grown weary of his long-loved mistress, rhyme.' The special adaptability of the measure for dramatic purposes is generally attributed to the fact that it approaches nearer the language of ordinary speech than any other English form of verse. But this is simply to place the emphasis at the wrong end of the scale; and, as a matter of fact, the measure holds its position principally because the absence of rhyme frees the poet from the necessity, inherent in all forms of rhymed verse, of occasionally inserting lines and phrases merely for the sake of securing metrical balance, and thus leaves him at liberty to employ only the words absolutely necessary for expressing his thought, and to follow without hindrance the most abrupt transitions of passionate feeling. Moreover, the obvious artificiality of rhyme requires the maintenance of a certain height of poetic feeling in order to justify its presence; while blank verse, depending as it generally does for its music on subtle modifications of pause and emphasis, raises no fettering expectations of regularity of movement in the hearer's mind, and may be applied with equal suitability to the loftiest or to the humblest themes. The extreme flexibility of the medium is shown at a glance by the widely varied effects it has produced in the hands of individual dramatists. Nothing can be more unlike than the rhythm of Marlowe—regular, grandiose, and slightly monotonous—and the tripping, unrestrained, and rather undignified movement of Fletcher. In the matter of metrical develop-

ment these two poets exercised a preponderating influence on Shakespeare, who in his own person summarizes the history of dramatic blank verse. Shakespeare's earliest manner (after he has once got rid of his fondness for rhyme) is very similar to that of Marlowe. The end of each line is very strongly marked, and usually coincides with a grammatical pause; double (or 'feminine') endings are comparatively infrequent; and there is a tendency—more strongly marked, however, in Marlowe—to adapt the blank verse to something resembling the older stanzaic arrangement. In his later manner, as represented by the *Merchant of Venice*, there is a steady decrease in the number of lines which close with a grammatical pause, the sense is more frequently carried forward from one line to another, and double endings become more common, amounting in this case to some 15 per cent. of the whole. His final manner, of which the *Tempest* may be taken as the type, shows a metrical system largely assimilated to that of Fletcher, a proportion of double endings amounting to 33 per cent. of the whole, the sense carried on into the next line in about a third of the total; while nearly 5 per cent. of his lines have 'weak' or 'light' endings—i.e. endings such as 'his,' 'for,' 'and'—on which the reader can scarcely make any pause.

Dramatic blank verse had quite ceased to be written when Milton produced the first original example of narrative blank verse in his epic of *Paradise Lost* (1667). To the second edition of this work Milton, at the request of his publisher, prefixed a brief preface, in which he defended his use of the measure, and pronounced rhyme 'no necessary adjunct or true ornament of poem or good verse, in longer works especially, but the invention of a barbarous age

to set off wretched matter and lame metre.' By this declaration Milton links himself with such Renaissance scholars as Ascham, who had declaimed against rhyme (see *Schoolmaster*, ed. Mayor, p. 176). But Milton was very far from sharing the scholarly objection to the whole recognized system of accentual verse, as his reference to 'lame metre' would alone suffice to show; and in his preface he goes on to define the chief beauty of verse as lying in 'apt numbers, fit quantity of syllables, and the sense variously drawn out from one verse into another.' In other words, he clearly perceived that rhyme was only one method of procuring the measured effect essential to poetry, and that, for narrative poetry at all events, a greater effect, combined with greater ease of manipulation, could be produced by deliberate variations of cadence alone. This discovery of the poetical value of a studiously varied cæsura is of first-rate importance in the history of English prosody; and whatever may be thought of the actual originality of Milton's verse, it can scarcely be denied that he was the first to observe clearly the scientific basis on which the harmonies of blank verse depend. For the rest, his metrical excellences are the result of admirable poetic criticism, and wise selection of devices already exemplified by the dramatists, rather than of actual invention. He availed himself to the full of the dramatic liberty of trochaic, spondaic, and anapæstic substitutions for the normal iambs of the verse, and did not hesitate to employ the most daring of Shakespeare's metrical licences—following an overflow line by a line containing a cæsura after the first syllable. In the matter of double endings he seems to have made a distinction between epic and dramatic verse, using

them more freely in the latter than in the former; while his fondness for the device increased with his years. In *Paradise Lost* the double endings amount to between 1 per cent. and 2 per cent. of the whole, and in *Paradise Regained* to between 3 per cent. and 4 per cent. On the other hand, *Comus* and *Samson Agonistes* contain 9 per cent. and 16 per cent. respectively. The double endings that occur in the epics, moreover, are more numerous in the speeches and debates than in the purely narrative parts. Where, however, Milton can best claim an absolute originality is in the paragraph form into which he threw his verse. Without this arrangement blank verse becomes monotonous beyond measure, and it is the absence of such division that makes a great part of Wordsworth so hard to read.

Milton's blank verse was received with little favour by his own generation, his most considerable follower being Lord Roscommon, who published a paraphrase of Horace's *Art of Poetry* in 1684. The blank verse of Lee the dramatist shows also a strong Miltonic influence; and John Philips (1676–1708) wrote a clever and not ill-natured imitation of his manner in his *Splendid Shilling* (new ed. 1808). The measure languished even more while the influence of Pope prevailed, but it revived in Young's *Night Thoughts* (1742) and Thomson's *Seasons* (1726–30), and was continued in Akenside's *Pleasures of the Imagination* (1744) and Cowper's *Task* (1785) into the period of romantic revival proper. The gloomy but powerful *Grave* (1743) of Robert Blair is Shakespearean rather than Miltonic in versification, and abounds in double endings. There are few of the 19th century poets who have not employed blank verse in some of their compositions; but while they

may have widened its range of application—as Wordsworth, for example, in his *Lines on Revisiting the Wye* applied it to meditative lyric, or as Tennyson in his *Tears, Idle Tears* applied it to the lyric of pure emotion—none of them have innovated to any marked degree in the technique of the metre, and the verse remains substantially the old Miltonic blank verse. Meanwhile, in the dramas that continue to be written, British poets have reverted to the versification of the minor Elizabethans, as one may find exemplified in the influence of Ford on Shelley's *Cenci*, or of Webster on Swinburne's *Rosamund* (1899). See J. Addington Symonds's *Blank Verse* (1895); J. B. Mayor's *Chapters on English Metre* (1886; new ed. 1901); *Handbook of Modern English Metre* (1903); Guest's *English Rhythms* (ed. Skeat, 1882); and Omond's *English Metricists of 18th and 19th Centuries* (1907).

Blanqui, JÉRÔME ADOLPHE (1798–1854), French political economist, born at Nice. A student of J. B. Say, he succeeded (1833) him in the chair of political economy at the Conservatory of the Arts and Crafts. A free trader, he edited the *Journal of Commerce, Courier*, etc.; was director of the School of Commerce (1830), and deputy of the Gironde (1848). His *Hist. de l'Economie Politique en Europe* was published in 1838.

Blanqui, LOUIS AUGUSTE (1805–81), was born near Nice. All his life he was the 'stormy petrel' of French politics. He was wounded at the barricades in 1827, and decorated for his services in the revolution of 1830. He was repeatedly imprisoned, and once condemned to death. In 1848 he became leader of the extreme socialist party, and served two terms of imprisonment under the Second Empire. In 1870 he resumed his communistic propaganda, and founded a paper

called *La Patrie en Danger*. He was involved in the conspiracy against the Government of Defence, and once more incarcerated in 1872. In 1885 one of his followers collected his economic writings in a work called *Critique Sociale*. See L. Combes's *Portraits Révolutionnaires* (1872), and G. Geffroy's *L'Enfermé* (1897).

Blantyre. (1.) HIGH BLANTYRE, vil., par. of Blantyre, Lanarkshire, Scotland, 3 m. N.W. of Hamilton. Coal and iron works. Pop. of par. 14,000. (2.) BLANTYRE WORKS, or LOW BLANTYRE, vil., par. of Blantyre, Lanarkshire, Scotland, on l. bk. of Clyde, opposite Bothwell, and 1½ m. N.E. of High Blantyre. Dye-works and weaving-mills, and centre of an important colliery district. Dr. Livingstone, the African explorer, was born here in 1803. Pop. 1,700. See Wright's *Annals of Blantyre* (1885). (3.) Mission stn. and chief settlement of the (British) Nyasaland Protectorate, on the Shiré Highlands, at an alt. of 3,600 ft., between the Shiré R. and Lake Chilwa. It was founded in 1876, and named after the birthplace of Livingstone.

Blaps, the name of a genus of beetles belonging to the large family Tenebrionidæ. The dark-coloured *Blaps mortisaga*, widely distributed throughout Europe, is in some parts of the Continent regarded as the harbinger of death—a superstition frequently associated with several different species of beetles.

Blarney, vil., Ireland, co. of and 4 m. N.W. of Cork; contains an old castle, which stands on a limestone rock, and occupies the site of an older stronghold built in 1446 by Cormac M'Carthy. The famous Blarney stone, built into the castle some twenty feet from the top, is supposed to confer wonderful powers of persuasion on those who kiss it.

Blasewitz, vil., kingdom of Saxony, on the Elbe, near Dresden; has important shipbuilding yards. Pop. 7,700. Schiller lived here a short time in 1786.

Blashfield, EDWIN HOWLAND (1848), American painter, born at New York, and studied at Paris under Bonnat and Gérôme. On his return to America (1881) he became noted for decorative work, examples of which may be seen on the great central dome of the library of Congress, the ceiling of the Astoria ball-room, and the supper-room of Vanderbilt's New York house. Among his canvases the most memorable are perhaps *The Angel with the Flaming Sword* and *Christmas Bells*. He has also written, in conjunction with his wife, *Italian Cities* (1900), and ed. Vasari's *Lives* (1897).

Blasius, ST., bishop of Sebaste, Cappadocia, martyred 316. Having saved a boy from being choked with a bone, he became guardian saint against throat diseases, for relief from which his blessing is still invoked on his day (Feb. 3).

Blasphemy. In law there are two views, both supported by authority, as to what constitutes blasphemy. They are thus stated by Stephen in his *Digest of Criminal Law*:—(1.) Every publication is blasphemous which contains matter relating to God, Jesus Christ, the Bible, or the Book of Common Prayer, intended to wound the feelings of mankind, or to excite contempt and hatred against the Established Church, or to promote immorality; but not publications intended in good faith to propagate opinions on religious subjects which the writer regards as true. (2.) Every publication is blasphemous which contains (a) a denial of the truth of Christianity in general, or of the existence of God, whether the terms used are decent or not; (b) any contemptuous reviling or ludicrous matter relating to God,

Jesus Christ, or the Bible, or the formularies of the Established Church, whatever may be the occasion of the publication thereof, and whether the matter published is or is not intended in good faith as an argument against any doctrine or opinion, unless the publication is made under circumstances constituting a lawful excuse. Chief-justice Coleridge held the first view, and Mr. Justice Stephen thought the second view more accurately expressed the law. At the present day the first view would probably prevail. In Scotland, blasphemy is criminal both by common law and by statute; it consists in cursing, reviling, or throwing contempt on religion.

Blass, FRIEDRICH (1843-1907), German classical scholar, born at Osnabrück; became professor of classical philology at Kiel (1881) and at Halle (1892). He has published or revised the text of all the important Greek orators; his principal works are *Die Attische Beredsamkeit* (3 vols. 1868-80; new ed. 1887-92); *Die Griechische Beredsamkeit in dem Zeitraum von Alexander bis auf Augustus* (1865); the text of Aristotle's *The Republic of the Athenians* (1892); and *Die Interpolationen in der Odyssee* (1904).

Blasting. Improvements in blasting agents and drilling machinery have been one of the dominating factors in the development of mining science, and have facilitated engineering operations allied to mining, such as tunnel-driving, in a remarkable degree. The explosives now commonly used are nitro-glycerine, blasting gelatin, rack-a-rock, and gelignite, all belonging to a class of substances which can be disintegrated into gaseous products with sufficient rapidity to produce a shattering effect on confining objects. The energy of an explosive is greatly augmented

by the use of a 'detonator,' which causes more simultaneous combustion and liberation of the gases than is the case if the substance be merely ignited. In drilling the holes for blasting charges, the lie of the strata and the inclination and position of the holes relatively to one another have to be studied carefully to obtain the maximum efficiency, and to confine the effects of explosion to the desired area. When the holes have been sunk to the requisite depth, the charges, usually in cartridge form, are placed at the bottom of the holes, and above them are arranged fulminate of mercury detonators, from which safety fuses for lighting, or the wires of an electric circuit, run to and beyond the mouth of the hole. Clay or sand is tamped into the hole to confine the gases. Electric magneto ignition is now much used when several charges have to be fired simultaneously, all the wires of the electric fuses being led to a central operating station, which may be at any distance from the scene of the explosion. Great advances have been made in recent years with regard to the evolution of explosives which can be used safely in collieries.

Blasting Gelatin is an explosive made by dissolving about 10 per cent. of collodion-cotton, or soluble nitro-cellulose, in nitro-glycerin, at temperature of 40°-45° c., and well kneading the product. It is an elastic, pale yellow, jelly-like solid, from which nitro-glycerin does not exude even on immersion in water or with moderate heating. When set on fire it burns, but requires to be heated to about 200° c., or to have a powerful detonator fired in contact with it to explode it. It is extremely insensitive to pressure and shock unless frozen, especially if mixed with about 4 per cent. of camphor; and it is

about 25 per cent. more efficient than kieselguhr dynamite. A milder preparation, gelatin-dynamite, is obtained by adding a larger proportion of collodion-cotton, and mixing the syrupy liquid formed with about 20 per cent. of an absorbing powder, such as a mixture of wood pulp and sodium nitrate. A still greater proportion of the absorbent is used in 'gelignite.'

Blastoderm, the primitive layer of cells formed by the subdivision of the fertilized germ cell. See EMBRYOLOGY.

Blastoids, a class of Echinodermata comprising small calcareous fossils resembling a bud, whence their name. They are most abundant in the Carboniferous limestone. *Pentremites* is the commonest genus. Their chief features are the absence of the arms so characteristic of echinoderms, and the presence of hydrospires—five convoluted calcareous tubes communicating with the exterior, through which a current of water passes to aerate the blood. The rest of the skeleton consists of small, closely articulating calcareous plates. See K. von Zittel's *Palæontology* (1899); H. A. Nicholson's *Palæontology* (1889); Ray Lankester's *Zoology* (1900).

Blatchford, ROBERT ('Nunquam') (1851), English journalist, born at Maidstone; made a name by his articles on slum life in the *Sunday Chronicle* of Manchester, but his socialistic tendencies led to his severance from that journal in 1891. He was one of the founders of *The Clarion*. In the beginning of 1910 his articles in the *Daily Mail* on the German menace attracted much attention. His works include *Merrie England*, *A Son of the Forge*, *Tommy Atkins*, *The Story of a Man*, *Impressionist Sketches*, *Dismal England*, *A Bohemian Girl*, *Britain for the*

British (1902), *A Book about Books* (1902), *God and My Neighbour* (1903), *Not Guilty, a Plea for the Bottom Dog* (1905) and *Sorcery Shop* (1907).

Blatta, the name given to a genus of cockroaches, a group of insects which constitute the family Blattidæ. The common cockroaches of Britain were formerly included in this genus, but are now referred to the genera *Stilopyga* and *Periplaneta*.

Blavatsky, HELENA PETROVNA HAHN-HAHN (1831-91), commonly known as MADAME BLAVATSKY, theosophist, was born at Ekaterinoslav, Russia, and died in London. She travelled in Asia Minor, India, Central Asia, S. America, and Africa, and on her return in 1858 she asserted her initiation into esoteric Buddhism, and that through her astral agents she was in constant communication with the unseen world. With a number of 'adepts' or believers, the chief of whom was Colonel Olcott, she founded, in 1875, the Theosophic Society in America. Latterly she resorted to trickery and was exposed by the Society for Psychical Research in 1884. Her works include *Isis Unveiled* (1877) and *The Key to Theosophy* (1889). See Solovyoff's *Modern Priestess of Isis* (trans. by W. Leaf, 1895), and A. Lillie's *Madame Blavatsky* (1895).

Blavet, riv., France; rises in the w. of dep. Côtes-du-Nord, and falls into the Atlantic at Port Louis after a course of 87 m., partly canalized.

Blaydon, tn. (area, 9,349 ac.), Durham, England, on river Tyne, 5 m. w. of Gateshead, and connected with Newcastle by a bridge. It has manufactures of bricks, bottles, etc.; also collieries and iron foundries. Pop. 20,000.

Blaye (anc. *Blavia*), tn., dep. of Gironde, France, on r. bk. of Gironde, 22 m. N. of Bordeaux; trade in wine, brandy, oil. Pop. 5,000.

Blazon, BLAZONRY, BLAZONING, the art of describing a coat of arms by defining in technical language its component figures, their positions, and their tinctures. The rules of blazoning aim at securing complete explicitness, combined with terseness. Nothing is expressed which should, by the rules, be understood. Thus, in commencing a blazon, the first object referred to is the *field*. It is unnecessary, therefore, to say, for example, 'a field azure,' but simply 'azure.' If the field be divided by one of the partition lines, the blazon would begin thus: 'party per pale or and azure,' or, more simply, 'per fess argent and gules.' After the field, the ordinary, if there be one, is mentioned; if none, then the charge nearest the centre of the field, then any charges which may surround it, and, lastly, any charges on the ordinary or other charges. Unlike the other ordinaries, the chief is mentioned last, except any charges which may be placed upon itself. The names of the tinctures invariably follow those of the charges to which they refer; but where several charges, blazoned consecutively, are of the same tincture, it is mentioned only after the last. Again, where several charges of the same tincture cannot, from their positions, be named consecutively, and to avoid ambiguity the name of the tincture must be appended to each, periphrasis is resorted to, to avoid using the same word more than once. Other rules of blazoning will be found under HERALDRY.

Bleaching. Raw cotton contains, on an average, about 5 per cent. of natural impurities, consisting of fatty substances, two colouring matters, and a peculiar wax called 'cotton wax.' The complete removal of these is effected by bleaching operations. In cotton pieces, however, there are other impurities present in

addition to these, such as oil and grease from the looms, size, starch, tallow, soap, paraffin wax, etc.; the bleaching of cotton pieces is, therefore, much more complicated than that of cotton yarn. Cotton yarn loses about 5 per cent. during bleaching, while cloth loses from 20 to 30 per cent., or even more.

Singeing.—If after weaving the cloth is carefully examined, it will be found to be covered with loose hairs protruding from the surface; these are known as the 'nap,' and are partially or completely removed by singeing. The process is carried out in three ways—by gas, by plate, and by revolving rollers. Gas singeing is used principally for goods where the surface is of an uneven character. It consists in running the pieces, under tension, over rollers, so as to force out the nap as much as possible, and the cloth is at the same time brought into contact with the flames from a row of bunsen burners. In plate singeing, the pieces, stitched end to end, are drawn at a rapid rate over two arched red-hot copper plates. The disadvantage of this method is that the cloth is apt to be singed unevenly, owing to the cooling of the plates. This difficulty is now overcome by substituting for plates a hollow cast-iron cylinder, which, when heated to a uniform temperature, is made to revolve in an opposite direction to that in which the pieces travel.

Gray Wash.—After singeing, the goods are thoroughly washed in the washing-machine, and then allowed to steep or lie in a heap all night; here a fermentation sets in, which acts upon certain insoluble substances in them.

Lime-Boil.—This operation consists in submitting the goods in kiers to the action of lime-water, generally at a high temperature, and under pressure. The pieces are passed through lime-water of such a strength that the material

takes up about 5 per cent. of its weight of lime. They are then packed into the kiers, which, after the necessary amount of water has been run in, are closed, and the boiling is continued under pressure. Some kiers work at 35 lbs. pressure; other low-pressure kiers at only 8 to 10 lbs. After the lime-boil the goods are washed in water and submitted to the *gray sour*. This consists in running the goods through sulphuric or hydrochloric acid at 1° to 2° Tw. (Twaddell hydrometer), and then through water, in order to prevent them from being made tender by the acid.

First and Second Lye-Boil.—Here the goods are boiled under pressure from three to five hours, first with soda ash and resin, and then with soda ash alone. In the first lye-boil about 5 to 6 per cent. by weight of soda ash and 1 to 2 per cent. resin are used; in the second, about 1 to 2 per cent. soda ash. After the lye-boils the goods are again well washed in water, at which stage all impurities, other than the natural colouring matters of the cotton, are removed.

Bleaching, or 'chemicking,' consists in passing the goods through a clear solution of bleaching powder at $\frac{1}{2}$ ° to 2° Tw.

White Sour follows the chemicking, and decomposes completely the bleaching powder that remains on the fibre. It consists in running the material through either hydrochloric or sulphuric acid at 1° to 2° Tw.

The process of bleaching is thus completed, except for the final washing in the washing-machine to remove every trace of acid, and the opening out and drying over copper cylinders.

Theory of the Bleaching Process.—The object of the lime-boil is to decompose the fatty, resinous, and waxy impurities, by converting them into lime soaps, which, still being insoluble, stick

to the fibre, but are easily removed. Caustic alkalis would also bring about a similar reaction, and at the same time soluble decomposition products would be formed; but lime is cheaper, and attacks the resinous matter more vigorously. In the souring, the acid decomposes the lime soaps with the formation of the lime salt of the acid used, and of the free fatty acids, in an insoluble form. These fatty acids are converted into sodium soaps in the lye-boils, which, now being soluble in water, are easily removed in the washing operations. A special feature of this method of bleaching, called the 'madder bleach,' is the use of resin soap; but the part it plays has not been satisfactorily explained. Practical experience has shown that, better than any other substance, resin soap removes certain impurities which cause uneven results in dyeing. Scheurer has also proved that saponification takes place quicker with resin soap and alkali than with alkali alone.

Market Bleach.—This is used principally for goods which are to be sold in the white state; the essential difference between this and the madder bleach is the absence of resin soap in the lye-boil.

Turkey-red Bleach.—This is the simplest bleach, and consists usually of one or two lye-boils in caustic soda, then souring with weak sulphuric acid, and finally washing and drying.

Lunge's Improvement.—In this method, acetic acid, or any other organic acid, is mixed with the bleaching powder in order to increase its bleaching action. The free hypochlorous acid liberated splits up into oxygen and hydrochloric acid; and the latter, acting upon the calcium acetate, liberates the amount of acetic acid necessary to start the reaction, which thus becomes continuous.

Linen Bleaching.—Linen is

bleached in a similar way to cotton, but the process is slower. It is, however, assisted by the exposure of the moist fabric to light and air—fermentation and the formation of traces of hydrogen peroxide being probably the active agencies in this operation.

Bleaching of Wool.—The natural impurities of raw wool are much greater than those of cotton, and may amount to from 30 to 80 per cent. They are of two kinds—(1) fatty and waxlike bodies soluble in benzene, petroleum, ether, etc., to which the name 'yolk' or 'wool-fat' is given; (2) bodies soluble in water, known as 'suint.' The removal of these impurities takes place in the scouring; if this be neglected, the wool appears uneven or stripy when dyed. The choice of the scouring agent depends entirely upon the quality of the wool. For the finest qualities a good neutral soap is used; but for coarser and poorer qualities the soap is mixed with a small quantity of sodium carbonate or ammonia, though, owing to the ease with which wool is destroyed by alkalis, great care must be exercised in their use. The temperature of the scouring bath varies from 30° to 50° C. The waste scouring liquors are collected in some works and used for the manufacture of lanolin. In order to remove the faint yellow tint of the wool after scouring, it is bleached, the agent usually employed being sulphur dioxide. There are two methods of bleaching—gas and liquid bleaching. In the former, the wool, in the wet state, is placed in specially designed brick chambers and submitted to the action of sulphur dioxide, which is produced by burning the necessary amount of sulphur in an iron pot in one corner of the chamber. In liquid bleaching the material is steeped for several hours in a solution of sulphurous acid or a solution of

sodium bisulphite, to which the requisite amount of hydrochloric acid has been added. The best results, however, are obtained by the use of peroxide of hydrogen or sodium peroxide, but the high price of these prevents their general application.

Scouring with Volatile Liquids.—An immense number of experiments have been tried to avoid the use of soap in the washing of wool, substituting volatile liquids, which have a solvent action on the fatty and waxy bodies of the raw material. Of all substances carbon disulphide has been most successfully applied, but owing to mechanical difficulties, and the risk of fire and explosion, it has not been extensively used in the industry.

Bleaching of Silk.—Silk consists principally of two substances—fibroin, the fibre proper, and a gumlike body, sericin. The latter is removed in the scouring operation, which consists in working the silk in a solution of soap at 90° to 95° C., and afterwards in hot water which contains a small amount of sodium carbonate. The waste soapy liquors, containing large quantities of sericin, are collected and extensively used in dyeing, under the name of 'boiled-off liquor.' After scouring or 'boiling off,' the silk is bleached by means of sulphur dioxide in a manner similar to that described in the case of wool. Hydrogen peroxide is now almost exclusively used for bleaching silk, especially tussur or tussah silk, and, when used in alkaline solution, gives by far the most satisfactory result.

Bleaching Powder, a compound formed by passing chlorine gas over cold slaked lime. When freshly made it consists of an oxychloride of calcium, but by the absorption of moisture it is gradually converted into a mixture of chloride and hypochlorite of calcium. It is commonly known as

chloride of lime, and is used as a source of chlorine for bleaching purposes, also as a disinfectant.

Bleak, a Cyprinid fish allied to the bream. The common bleak (*Alburnus lucidus*) is a small silvery form common in fresh water in the more northern parts of Europe, usually about 5 to 6 in. in length, and with a protruding lower jaw. It is a gregarious fish, occurring in great shoals in, for example, the tributaries of the Rhine. The scales are used in the manufacture of artificial pearls.

Bleda, a 5th-century king of the Huns, brother of Attila.

Bleeders. See HÆMOPHILIA.

Bleeding, or BLOOD-LETTING, is commonly resorted to in surgical practice for the relief of congestion; and in this sense the term covers many different methods by which blood may be removed from the body—*e.g.* venesection or phlebotomy, cupping, and the use of leeches. Bleeding, after having been terribly misapplied for many generations and then practically abandoned, is now advocated in certain cases of acute inflammation in suitable subjects, or to relieve an overburdened heart. It is by no means the only example of an old practice in medicine or surgery which has been dropped and then taken up again with greater moderation. Practically any form of counter-irritation or depletion, even if it does not remove blood, or all the constituents of the blood, from the body, but merely withdraws some of them, or draws the blood away from a definite spot, may be considered as a modified form of bleeding. Hence dry-cupping, poulticing, blistering, and strong purges are modifications of the same principle. See HÆMORRHAGE, WOUNDS.

Bleek, FRIEDRICH (1793–1859), German Biblical scholar, born at Ahrensböck in Holstein. He became professor of theology at Ber-

lin (1823), and at Bonn (1829). His commentary on *Der Brief an die Hebräer* (1828-40) ranks among the foremost exegetical studies. His *Introduction to the Holy Scriptures* (1860-2), of numerous editions, has been done into English—the Old Testament by Venables (1869), the New Testament by Urwick (1869); as also has his *Lectures on the Apocalypse* (1875). His other works include *Synoptische Erklärung der drei ersten Evangelien* (1862), *Vorlesung über die Briefe an die Kolosser*, etc. (1865), and *Der Hebräerbrief erklärt* (1868).

Bleek, WILHELM HEINRICH IMMANUEL (1827-75), son of the preceding, S. African linguist, was born in Berlin. He took part (1854) in Baikie's Niger expedition, but his health prevented him from continuing, and he (1855-6) spent eighteen months in the interior of Natal. Keeper of the Grey Library in Cape Town, he wrote *Languages of Mozambique* (1856); *Handbook of African, Australian, and Polynesian Philology* (1858-63); the unfinished but important *Comparative Grammar of S. African Languages* (1862-9); *Origin of Language* (1869); and *Reynard the Fox in S. Africa* (1864).

Bleiberg, vil., Carinthia, Austria, 9 m. w. of Villach; valuable lead mines, the most extensive in Austria. Pop. 3,500.

Bleibtreu, GEORG (1828-92), German painter of battle scenes, born at Xanten, on the Rhine; was the pupil of Hildebrandt. In 1849 he attracted much attention by *The Battle of Bau, in Schleswig*. Afterwards he painted a series of pictures from the War of Independence (1813-15), of which the most celebrated are *The Attack on the Grimma Gate at Leipzig* and *The Battle at Waterloo* (1858). From 1864 he painted incidents of the Prusso-Danish and Austro-Prussian wars, the best being *The*

Passage of the Prussians to Alsen and *The Battle of Königgrätz*, both in the National Gallery at Berlin. Again he painted episodes of the Franco-German war, such as *The Capitulation of Sedan*, *The Bavarians under General von Hartmann before Paris*, *King Wilhelm after the Battle at Gravelotte*, etc. His *Napoleon retiring after Waterloo* is also worthy of notice. His paintings are vigorous and powerful, and his colouring brilliant.

Bleibtreu, KARL (1859), German man of letters, has written descriptions of battles in a somewhat turbulent vein (*Dies Irae . . . Sedan*, 5th ed. 1902; *Cromwell bei Marston Moor*, in 1889; *Waterloo*, in 1902), books about Napoleon (1888, 1891), Frederick the Great (1888, 1892), Byron (1886, 1897), English literature (1887-8), etc.

Blekinge, picturesque co. in S. Sweden with an area of 1,164 sq. m., 35 per cent. of which is forest. For practically eight centuries it belonged to Denmark, but was ceded to Sweden in 1658 by the peace of Roskilde. The salmon fishery, especially in the Morrum R., is considerable. Pop. 150,000. Chief town, Carlsrona.

Blench Holding. See BLANCH HOLDING.

Blende, a name given to sphalerite or zincblende by the early miners.

Bléneau, tn., dep. Yonne, France, on R. Loing, 29 m. s.w. of Auxerre. Here, in 1652, two battles were fought on successive days between the French under Turenne and the Spaniards under Condé, in which the latter were finally defeated. Pop. 2,000.

Blenheim, or BLINDHEIM. (1.) Village near l. bk. of Danube, Bavaria, Germany, 23 m. n.w. of Augsburg. Near here, at Höchstädt, on Aug. 13, 1704, the Duke of Marlborough and Prince Eugene, commanding the combined

armies of the allies (England, Germany, Holland, and Denmark), defeated the French and Bavarians under Tallard, Marsin, and the elector of Bavaria. The battle has been celebrated in verse by Southey (1798) and Dennis (1705). (2.) Chief tn. of Marlborough provincial dist., New Zealand, 18 m. s. of its port, Picton, with which it is connected by railway; rich agricultural and fruit-producing district. Pop. 3,300.

Blenheim Park, par. (2,253 ac.) near Woodstock, on the Glyme R., Oxfordshire, England. Henry II. and Fair Rosamond were connected with Woodstock palace. In romance it will always have a place as long as Sir Walter Scott's *Woodstock* is read. The name of the park (13 m. in circumference) was changed when Queen Anne granted it to John Churchill, Duke of Marlborough, as a reward for his famous victory at Blenheim in 1704. Parliament made a grant of almost £500,000 for the erection of a palace. This was designed by Sir John Vanbrugh, and when completed, in 1715, its walls were decorated with many valuable paintings, including several by Rubens. These, however, with the collections of gems, etc., were sold in 1885 and succeeding years.

Blenkinsop, JOHN (1783-1831), inventor of what may be considered the first commercially successful locomotive steam-engine, a cog-wheeled engine which was employed on Hunslet Moor, near Leeds, to draw coals up to a load of thirty tons (1812 *et seq.*). George Stephenson saw Blenkinsop's engine at work before building his famous *Rocket*.

Blennerhasset, CHARLOTTE, LADY (1843), German biographer and essayist, born Countess Leyden; married Sir Rowland Blennerhasset. Her most notable productions have been *lives of Frau von Staël* (1887-9) and *Talleyrand*

(1894; Eng. ed. 1894), and numerous essays, mostly in *Die Deutsche Rundschau*, on *George Eliot* (1885), *Queen Victoria* (1887), *Taine* (1886), *D'Annunzio* (1898), *Tennyson* (1899), *Chateaubriand* (1903), *Marie Antoinette* (1904), and *Cardinal Newman* (1904).

Blenny, a name given to the members of the family Blenniidae, which includes a large number of small littoral fishes, all having the ventral fin formed of less than five rays, and jugular in position, as in the cod family. In many cases these ventral fins are reduced to rods, which are used by the fish in travelling over the sea bottom.

Blériot, M., a brilliant French aviator who will live in history as the first man to fly across the English Channel on a monoplane. This remarkable feat he accomplished on June 25, 1909, starting from Baraques, near Calais, and landing safely in a meadow close to Dover Castle on the English coast. The duration of the flight was 38 minutes, the monoplane travelling over the Channel at a height of about 250 ft. See AEROPLANES.

Bles, HENDRIK (?1480-1550), Flemish painter, called *met de Bles* ('forelock') and *civetta* ('owl'), because he used an owl as signature. His pictures are found in the Uffizi, Florence (landscape), Venice Academy (*Tower of Babel*), Berlin (portrait), the Pinacoteca, Munich (*Adoration of the Magi*), and the National Gallery, London (*Christ on the Cross* and *The Reading Magdalen*). *The Good Samaritan* at Dinant is his only dated (1511) work. See Wilmot-Buxton and Poynter's *German, Flemish, and Dutch Painting* (1880).

Blessington, MARGUERITE, COUNTESS OF (1789-1849), Irish novelist and writer, was an intimate friend of Lord Byron; held a little court for many years at Gore House, Kensington; but

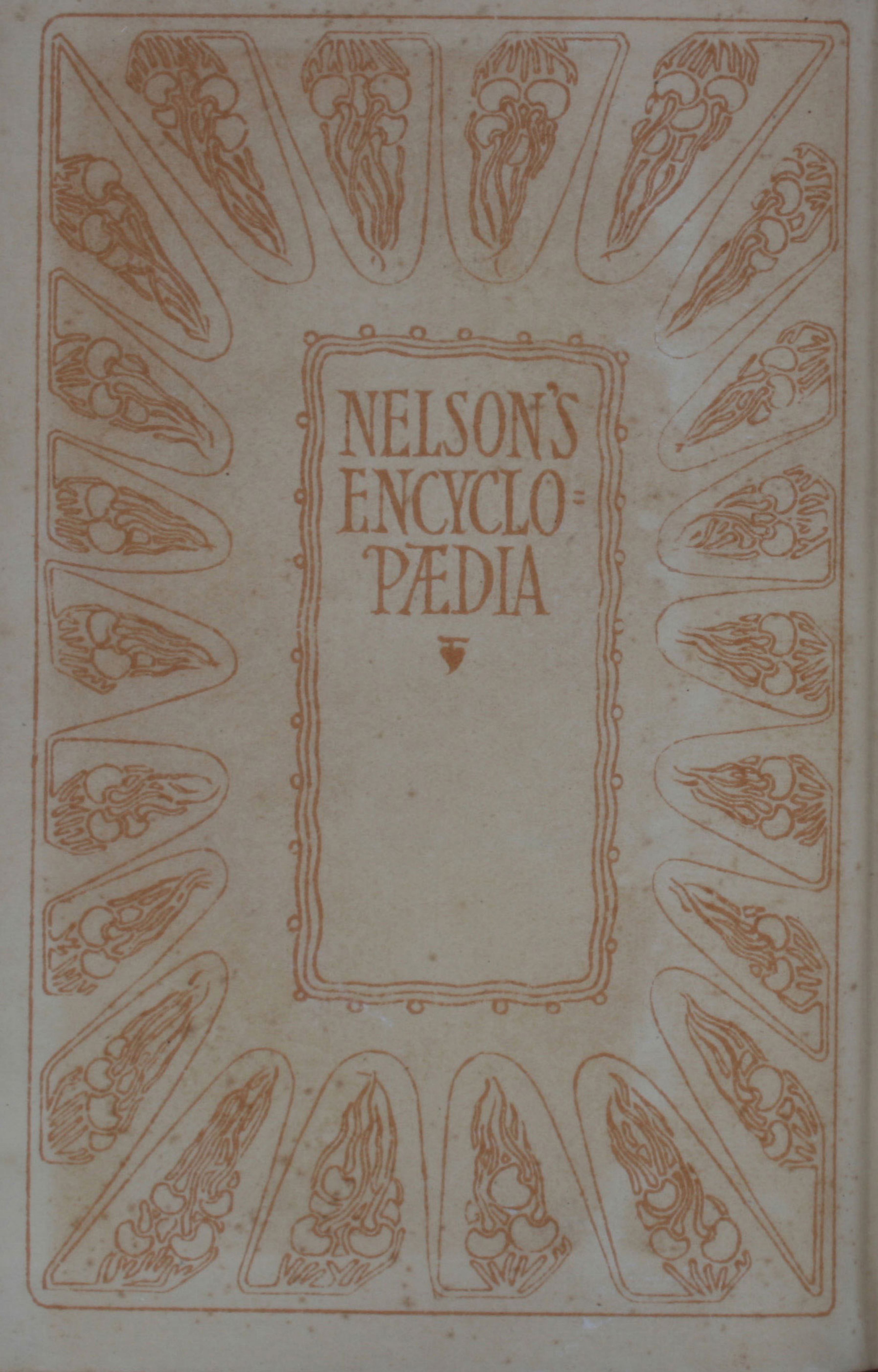
her equivocal connection with Count d'Orsay cut her off from society and overwhelmed her with debt. The couple were obliged to flee to Paris (1849), where Lady Blessington died in poverty in June 1849. She was the author of *The Idler in France* (1841), *The Idler in Italy* (1841), and *Conversations with Lord Byron* (1834). She also wrote a number of novels, the best known of which are *Grace Cassidy, or The Repealers* (1833), *The Victims of Society* (1837), *The Follies of Fashion* and *The Con-*

fessions of an Elderly Lady (1838). See her *Life and Correspondence*, by Madden (2nd ed. 1855); Chorley's *Life and Autobiography* (1874); and Willis's *Pencillings by the Way* (1835).

Bletchingley, par. and vil., Reigate div., S.E. Surrey, England, 4 m. E. of Reigate. Pop. 2,000.

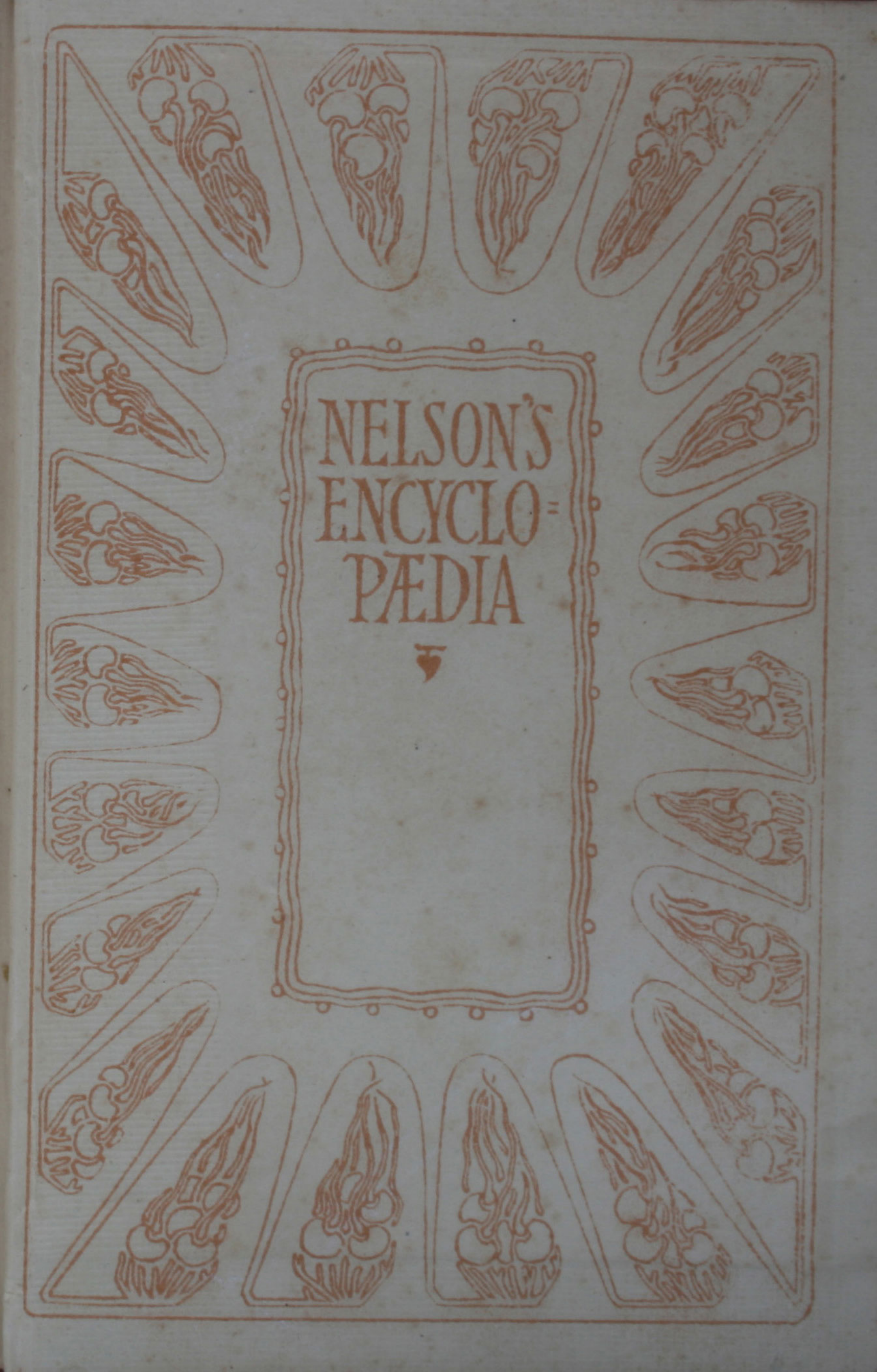
Bletchley, vil. and par., Buckinghamshire, England, 6 m. N.N.W. of Leighton Buzzard. Bletchley now forms part of Fenny Stratford. Pop. 500.

Blewfields. See BLUEFIELDS.



NELSON'S
ENCYCLO-
PÆDIA



The page is framed by a decorative border of anatomical diagrams. The diagrams are arranged in a grid-like pattern, with some rows containing four diagrams and others containing three. Each diagram depicts a cross-section of a biological structure, likely a developing embryo or a specific organ, showing internal cellular or tissue layers. The drawings are executed in a simple, line-art style.

NELSON'S
ENCYCLO-
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