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THE ENCYCLOPÆDIA BRITANNICA

A DICTIONARY OF ARTS, SCIENCES, LITERATURE AND GENERAL INFORMATION

ELEVENTH EDITION

VOLUME IV SLICE III

Borgia, Lucrezia to Bradford, John

Articles in This Slice

BORGIA, LUCREZIA (1480-1519), duchess of Ferrara, daughter of Cardinal Rodrigo Borgia,

afterwards Pope Alexander VI. (*q.v.*), by his mistress Vanozza dei Cattanei, was born at Rome in 1480. Her early years were spent at her mother's house near her father's splendid palace; but later she was given over to the care of Adriana de Mila, a relation of Cardinal Borgia and mother-in-law of Giulia Farnese, another of his mistresses. Lucrezia was educated according to the usual curriculum of Renaissance ladies of rank, and was taught languages, music, embroidery, painting, &c.; she was famed for her beauty and charm, but the corrupt court of Rome in which she was brought up was not conducive to a good moral education. Her father at first contemplated a Spanish marriage for her, and at the age of eleven she was betrothed to Don Cherubin de Centelles, a Spanish nobleman. But the engagement was broken off almost immediately, and Lucrezia was married by proxy to another Spaniard, Don Gasparo de Procida, son of the count of Aversa. On the death of Innocent VIII. (1492), Cardinal Borgia was elected pope as Alexander VI., and, contemplating a yet more ambitious marriage for his daughter, he annulled the union with Procida; in February 1493 Lucrezia was betrothed to Giovanni Sforza, lord of Pesaro, with whose family Alexander was now in close alliance. The wedding was celebrated in June; but when the pope's policy changed and he became friendly to the king of Naples, the enemy of the house of Sforza, he planned the subjugation of the vassal lords of Romagna, and Giovanni, feeling his position insecure, left Rome for Pesaro with his wife. By Christmas 1495 they were back in Rome; the pope had all his children around him, and celebrated the carnival with a series of magnificent festivities. But he decided that he had done with Sforza, and annulled the marriage on the ground of the husband's impotence (March 1497). In order to cement his alliance with Naples, he married Lucrezia to Alphonso of Aragon, duke of Bisceglie, a handsome youth of eighteen, related to the Neapolitan king. But he too realized the fickleness of the Borgias' favour when Alexander backed up Louis XII. of France in the latter's schemes for the conquest of Naples. Bisceglie fled from Rome, fearing for his life, and the pope sent Lucrezia to receive the homage of the city of Spoleto as governor. On her return to Rome in 1499, her husband, who really loved her, was induced to join her once more. A year later he was murdered by the order of her brother Cesare. After the death of Bisceglie, Lucrezia retired to Nepi, and then returned to Rome, where she acted for a time as regent during Alexander's absence. The latter now was anxious for a union between his daughter and Alphonso, son and heir to Ercole d'Este, duke of Ferrara. The negotiations were somewhat difficult, as neither Alphonso nor his father was anxious for a connexion with the house of Borgia, and Lucrezia's own reputation was not unblemished. However, by bribes and threats the opposition was overcome, and in September 1501 the marriage was celebrated by proxy with great magnificence in Rome. On Lucrezia's arrival at Ferrara she won over her reluctant husband by her youthful charm (she was only twenty-two), and from that time forth she led a peaceful life, about which there was hardly a breath of scandal. On the death of Ercole in 1505, her husband became duke, and she gathered many learned men, poets and artists at her court, among whom were Ariosto, Cardinal Bembo, Aldus Manutius the printer, and the painters Titian and Dosso Dossi. She devoted herself to the education of her children and to charitable works; the only tragedy connected with this period of her life is the murder of Ercole Strozzi, who is said to have admired her and fallen a victim to Alphonso's jealousy. She died on the 24th of June 1519, leaving three sons and a daughter by the duke of Ferrara, besides one son Rodrigo by the duke of Bisceglie, and possibly another of doubtful paternity. She seems to have been a woman of very mediocre talents, and only played a part in history because she was the daughter of Alexander VI. and the sister of Cesare Borgia. While she was in Rome she was probably no better and no worse than the women around her, but there is no serious evidence for the charges of incest with her father and brothers which were brought against her by the scandal-mongers of the time.

See the bibliographies for Alexander VI. and Borgia, Cesare; and especially F. Gregorovius's *Lucrezia Borgia* (Stuttgart, 1874), the standard work on the subject; also W. Gilbert's *Lucrezia Borgia, Duchess of Ferrara* (London, 1869), which, while containing much information, is quite without historic value; and G. Campori's "Una Vittima della Storia, Lucrezia Borgia," in the *Nuova Antologia* (August 31, 1866), which aims at the rehabilitation of Lucrezia.

(L. V.*)

BORGLUM, SOLON HANNIBAL (1868-), American sculptor, was born in Ogden, Utah, on the 22nd of December 1868, the son of a Danish wood-carver. He studied under Louis F. Rebisso in the Cincinnati art school in 1895-1897, and under Frémiet in Paris. He took as his chief subjects incidents of western life, cowboys and Indians, with which he was familiar from his years on the ranch; notably "Lassoing Wild Horses," "Stampeding Wild Horses," "Last Round-up," "On the Border of White Man's Land," and "Burial on the Plains." His elder brother, Gutzon Borglum (b. 1867), also showed himself an artist of some originality.

BORGOGNONE, AMBROGIO (fl. 1473-1524), Italian painter of the Milanese school, whose real name was Ambrogio Stefani da Fossano, was approximately contemporary with Leonardo da Vinci, but represented, at least during a great part of his career, the tendencies of Lombard art anterior to the

arrival of that master—the tendencies which he had adopted and perfected from the hands of his predecessors Foppa and Zenale. We are not precisely informed of the dates either of the death or the birth of Borgognone, who was born at Fossano in Piedmont, and whose appellation was due to his artistic affiliation to the Burgundian school. His fame is principally associated with that of one great building, the Certosa, or church and convent of the Carthusians at Pavia, for which he worked much and in many different ways. It is certain, indeed, that there is no truth in the tradition which represents him as having designed, in 1473, the celebrated façade of the Certosa itself. His residence there appears to have been of eight years' duration, from 1486, when he furnished the designs of the figures of the virgin, saints and apostles for the choir-stalls, executed in *tarsia* or inlaid wood work by Bartolommeo Pola, till 1494, when he returned to Milan. Only one known picture, an altar-piece at the church San Eustorgio, can with probability be assigned to a period of his career earlier than 1486. For two years after his return to Milan he worked at the church of San Satiro in that city. From 1497 he was engaged for some time in decorating with paintings the church of the Incoronata in the neighbouring town at Lodi. Our notices of him thenceforth are few and far between. In 1508 he painted for a church in Bergamo; in 1512 his signature appears in a public document of Milan; in 1524—and this is our last authentic record—he painted a series of frescoes illustrating the life of St Sisinius in the portico of San Simpliciano at Milan. Without having produced any works of signal power or beauty, Borgognone is a painter of marked individuality. He holds an interesting place in the most interesting period of Italian art. The National Gallery, London, has two fair examples of his work —the separate fragments of a silk banner painted for the Certosa, and containing the heads of two kneeling groups severally of men and women; and a large altar-piece of the marriage of St Catherine, painted for the chapel of Rebecchino near Pavia. But to judge of his real powers and peculiar ideals—his system of faint and clear colouring, whether in fresco, tempera or oil; his somewhat slender and pallid types, not without something that reminds us of northern art in their Teutonic sentimentality as well as their Teutonic fidelity of portraiture; the conflict of his instinctive love of placidity and calm with a somewhat forced and borrowed energy in figures where energy is demanded, his conservatism in the matter of storied and minutely diversified backgrounds—to judge of these qualities of the master as they are, it is necessary to study first the great series of his frescoes and altar-pieces at the Certosa, and next those remains of later frescoes and altar-pieces at Milan and Lodi, in which we find the influence of Leonardo and of the new time mingling with, but not expelling, his first predilections.

BORGO SAN DONNINO, a town and episcopal see of Emilia, Italy, in the province of Parma, 14 m. N.W. by rail from the town of Parma. Pop. (1901) town, 6251; commune, 12,109. It occupies the site of the ancient Fidentia, on the Via Aemilia; no doubt, as its name shows, of Roman origin. Here M. Lucullus defeated the democrats under Carbo in 82 B.C. It was independent under Vespasian, but seems soon to have become a village dependent on Parma. Its present name comes from the martyrdom of S. Domninus under Maximian in A.D. 304. The cathedral, erected in honour of this saint, is one of the finest and best-preserved Lombardo-Romanesque churches of the 11th-13th centuries in north Italy. The upper part of the façade is incomplete, but the lower, with its three portals and sculptures, is very fine; the interior is simple and well-proportioned, and has not been spoilt by restorations. For the *bénitier*, a work of the early 11th century, see *Rassegna d'Arte*, 1905, 180. Not far from the town is the small church of S. Antonio del Viennese, a 13th-century structure in brick (*ib.*, 1906, 22). The Palazzo Comunale, in the Gothic-Lombard style, is a work of the 14th century. Borgo S. Donnino is an important centre for the produce and cattle of Emilia.

(T. As.)

BORGU, or BARBA, an inland country of West Africa. The western part is included in the French colony of Dahomey (*q.v.*); the eastern division forms the Borgu province of the British protectorate of Nigeria. Borgu is bounded N.E. and E. by the Niger, S. by the Yoruba country, N.W. by Gurma. The country consists of an elevated plain traversed by rivers draining north or east to the Niger. The water-parting between the Niger basin and the coast streams of Dahomey and Lagos runs north-east and south-west near the western frontier. In about 10° N., below the town of Bussa, rapids block the course of the Niger, navigable up to that point from the sea. The soil is mostly fertile, and is fairly cultivated, producing in abundance millet, yams, plantains and limes. The acacia tree is common, and from it gum-arabic of good quality is obtained. From the nut of the horse-radish tree ben oil is expressed. Cattle are numerous and of excellent breed, and game is abundant. Borgu is inhabited by a number of pagan negro tribes, several of whom were dependent on the chief of Nikki, a town in the centre of the country, the chief being spoken of as sultan of Borgu. The king of Bussa was another more or less powerful potentate. In the early years of the 19th century Borgu was invaded by the Fula (*q.v.*), but the Bariba (as the people are called collectively) maintained their independence. In 1894 Borgu became the object of rivalry between France and England. The Royal Niger Company, which had already concluded a treaty of protection with the king of Bussa, sent out Captain (afterwards Sir) F.D. Lugard to negotiate

treaties with the king of Nikki and other chiefs, and Lugard succeeded in doing so a few days before the arrival of French expeditions from the west. Disregarding the British treaties, French officers concluded others with various chiefs, invaded Bussa and established themselves at various points on the Niger. To defend British interests, the West African Frontier Force was raised locally under Lugard's command, and a period of great tension ensued, British and French troops facing one another at several places. A conflict was, however, averted, and by the convention of June 1898 the western part of Borgu was declared French and the eastern British, the French withdrawing from all places on the lower Niger.

The British portion of Borgu has an area of about 12,000 sq. m. Up to the period of inclusion within the protectorate of Nigeria little or nothing was known of the country, though there were interesting legends of the antiquity of its history. The population was entirely independent, and resisted with success not only the Fula from the north but also the armies of Dahomey and Mossi from the south and west. Travellers who attempted to penetrate this country had never returned. Since 1898 the country has been opened, and from being the most lawless and truculent of people the Bariba have become singularly amenable and law-abiding. Provincial courts are established, but there is little crime in the province. The British garrisons have been replaced by civil police. The assessment of taxes under British administration was successfully carried out in 1904, and taxes are collected without trouble. In south Borgu the people are agricultural but not industrious or inclined for trade. In the north there are some pastoral settlements of Fula. The Bariba themselves remain agricultural. Cart-roads have been constructed between the town of Kiama and the Niger. The agricultural resources of Borgu are great, and as the population increases with the cessation of war and by immigration the country should show marked development. Shea trees are abundant. Elephants are still to be found in the fifty-mile strip of forest land which stretches between the Niger and the interior of the province. The forest contains valuable sylvan products, and there are great possibilities for the cultivation of rubber. There are also extensive areas of fine land suitable for cotton, with the waterway of the Niger close at hand. Labour might be brought from Yorubaland close by, and a Yoruba colony has been experimentally started. (See NIGERIA and BUSSA.)

BORIC ACID, or BORACIC ACID, H_3BO_3, an acid obtained by dissolving boron trioxide in water. It was first prepared by Wilhelm Homberg (1652-1715) from borax, by the action of mineral acids, and was given the name *sal sedativum Hombergi*. The presence of boric acid or its salts has been noted in sea-water, whilst it is also said to exist in plants and especially in almost all fruits (A.H. Allen, *Analyst*, 1904, 301). The free acid is found native in certain volcanic districts such as Tuscany, the Lipari Islands and Nevada, issuing mixed with steam from fissures in the ground; it is also found as a constituent of many minerals (borax, boracite, boronatrocalcite and colemanite).

The chief source of boric acid for commercial purposes is the Maremma of Tuscany, an extensive and desolate tract of country over which jets of vapour and heated gases (*soffioni*) and springs of boiling water spurt out from chasms and fissures. In some places the fissures open directly into the air, but in other parts of the district they are covered by small muddy lakes (*lagoni*). The soffioni contain a small quantity of boric acid (usually less than 0.1%), together with a certain amount of ammoniacal vapours. In order to obtain the acid, a series of basins is constructed over the vents, and so arranged as to permit of the passage of water through them by gravitation. Water is led into the highest basin and by the action of the heated gases is soon brought into a state of ebullition; after remaining in this basin for about a day, it is run off into the second one and is treated there in a similar manner. The operation is carried on through the entire series, until the liquor in the last basin contains about 2% of boric acid. It is then run into settling tanks, from which it next passes into the evaporating pans, which are shallow lead-lined pans heated by the gases of the soffioni. These pans are worked on a continuous system, the liquor in the first being concentrated and run off into a second, and so on, until it is sufficiently concentrated to crystallize. The crystals are purified by recrystallization from water. Artificial soffioni are sometimes prepared by boring through the rock until the fissures are reached, and the water so obtained is occasionally sufficiently impregnated with boric acid to be evaporated directly. Boric acid is also obtained from boronatrocalcite by treatment with sulphuric acid, followed by the evaporation of the solution so obtained. The residue is then heated in a current of superheated steam, in which the boric acid volatilizes and distils over. It may also be obtained by the decomposition of boracite with hot hydrochloric acid. In small quantities, it may be prepared by the addition of concentrated sulphuric acid to a cold saturated solution of borax.

$$Na_2B_4O_7 + H_2SO_4 + 5H_2O = Na_2SO_4 + 4H_3BO_3.$$

Boric acid crystallizes from water in white nacreous laminae belonging to the triclinic system; it is difficultly soluble in cold water, but dissolves readily in hot water. It is one of the "weak" acids, its dissociation constant being only 0.08169 (J. Walker, *Jour. of Chem. Soc.*, 1900, lxxvii. 5), and consequently its salts are appreciably hydrolysed in aqueous solution. The free acid turns blue litmus to a claret colour. Its action upon turmeric is characteristic; a turmeric paper moistened with a solution of boric acid turns brown, the colour becoming much darker as the paper dries; while the addition of sodium or potassium hydroxide turns it almost black. Boric acid is easily soluble in alcohol, and if the vapour of the solution be inflamed it burns with a characteristic vivid green colour. The acid on being heated to 100° C. loses water and is converted into *metaboric acid*, HBO_3; at 140° C., *pyroboric acid*,

$H_2B_4O_7$, is produced; at still higher temperatures, boron trioxide is formed. The salts of the normal or orthoboric acid in all probability do not exist; metaboric acid, however, forms several well-defined salts which are readily converted, even by carbon dioxide, into salts of pyroboric acid. That orthoboric acid is a tribasic acid is shown by the formation of ethyl orthoborate on esterification, the vapour density of which corresponds to the molecular formula $B(OC_2H_5)_3$; the molecular formula of the acid must consequently be $B(OH)_3$ or H_3BO_3. The metallic borates are generally obtained in the hydrated condition, and with the exception of those of the alkali metals, are insoluble in water. The most important of the borates is sodium pyroborate or borax (*q.v.*).

Borax and boracic acid are feeble but useful antiseptics. Hence they may be used to preserve food-substances, such as milk and butter (see ADULTERATION). In medicine boracic acid is used in solution to relieve itching, but its chief use is as a mild antiseptic to impregnate lint or cotton-wool. Recent work has shown it is too feeble to be relied upon alone, but where really efficient antiseptics, such as mercuric chloride and iodide, and carbolic acid, have been already employed, boracic acid (which, unlike these, is non-poisonous and non-irritant) may legitimately be used to maintain the aseptic or non-bacterial condition which they have obtained. Borax taken internally is of some value in irritability of the bladder, but as a urinary antiseptic it is now surpassed by several recently introduced drugs, such as urotropine.

BORING. The operations of deep boring are resorted to for ascertaining the nature, thickness and extent of the various geological formations underlying the surface of the earth. Among the purposes for which boring is specifically employed are: (1) prospecting or searching for mineral deposits; (2) sinking petroleum, natural gas, artesian or salt wells; (3) determining the depth below the surface of bed-rock or other firm substratum, together with the character of the overlying materials, preparatory to mining or civil engineering operations; (4) carrying on geological or other scientific explorations.

Prospecting by boring is practised most successfully in the case of mineral deposits of large area, which are nearly horizontal, or at least not highly inclined; *e.g.* deposits of coal, iron, lead and salt. Wide, flat beds of such minerals may be pierced at any desired number of points. The depth at which each hole enters the deposit and the thickness of the mineral itself are readily ascertained, so that a map may be constructed with some degree of accuracy. Samples of the mineral are also secured, furnishing data as to the value of the deposit. While boring is sometimes adopted for prospecting irregular and steeply inclined mineral deposits of small area, the results are obviously less trustworthy than under the conditions named above, and may be actually misleading unless a large number of holes are bored. Incidentally, bore-holes supply information as to the character and depth of the valueless depositions of earth or rock overlying the mineral deposit. Such data assist in deciding upon the appropriate method for, and in estimating the cost of, sinking shafts or driving tunnels for the development and exploitation of the deposit. In sinking petroleum wells, boring serves not only for discovering the oil-bearing strata but also for extracting the oil. This industry has become of great importance in many parts of the United States, in southern Russia and elsewhere. Rock salt deposits are sometimes worked through bore-holes, by introducing water and pumping out the solution of brine for further treatment. The sinking of artesian wells is another application of boring. They are often hundreds, and sometimes thousands, of feet in depth. A well in St Louis, Missouri, has a depth of 3843 ft.

Boring is useful in mines themselves for a variety of purposes, such as exploring the deposit ahead of the workings, searching for neighbouring veins, and sounding the ground on approaching dangerous inundated workings. In the coal regions of Pennsylvania, bore-holes are often sunk for carrying steam pipes and hoisting ropes underground at points remote from a shaft.

Several of the methods of boring in soft ground are employed in connexion with civil engineering operations; as for ascertaining the depth below the surface to solid rock, preparatory to excavating for and designing deep foundations for heavy structures, and for estimating the cost of large scale excavations in earth and rock.

Lastly, a number of deep holes have been bored for geological exploration or for observing the increase of temperature in depth in the earth's crust; for example, at Paruschowitz, Silesia, about 6700 ft. deep; at Leipzig, Germany, 6265 ft.; near Pittsburg, Pennsylvania, 5532 ft.; and at Wheeling, West Virginia, nearly 5000 ft. The two last mentioned were intended to obtain as complete a knowledge as possible of the bituminous coal and oil-bearing formations.

There are five methods of boring, viz.: by (1) earth augers, (2) drive pipes, (3) long, jointed rods and drop drill, (4) the rope system, in which the rods are replaced by rope, (5) rotary drills. The first two methods are adapted to soft or earthy soils only; the others are for rock.

1. *Earth augers* comprise spiral and pod augers. The ordinary spiral auger resembles the wood auger commonly used by carpenters. It is attached to the rod or stem by a socket joint, successive sections of rod being added as the hole is deepened. The auger is rotated by means of horizontal levers, clamped to the rod—by hand for holes of small diameter (2 to 6 in.), the larger sizes (8 to 16 in.) by horse power. Clayey, cohesive soils, containing few stones, are readily bored; stony ground with difficulty. The operation of the auger is intermittent. After a few revolutions it is raised and emptied, the soil clinging

between the spirals. Depths to 50 or 60 ft. are usually bored by hand; deeper holes by horse power. For sandy, non-cohesive soils, the auger may be encircled by a close-fitting sheet-iron cylinder to prevent the soil from falling out.

Pod augers generally vary in diameter from 8 to 20 in. A common form (fig. l) consists of two curved iron plates, one attached to the rod rigidly, the other by hinge and key. By being turned through a few revolutions the pod is filled, and is then raised and emptied. For boring in sandy soils, the open sides are closed by hinged plates. Fig. 2 shows another type of pod auger. For holes of large diameter earth augers are handled with the aid of a light derrick.

2. *Drive pipes* are widely used, both for testing the depth and character of soft material overlying solid rock and as a necessary preliminary to rock boring, when some thickness of surface soil must first be passed through. In its simplest form the drive pipe consists of one or more lengths of wrought iron pipe, open at both ends and from ½ in. to 6 in. diameter. When of small size the pipe is driven by a heavy hammer; for deep and large holes, a light pile-driver becomes necessary. The lower end of the pipe is provided with an annular steel shoe; the upper end has a drivehead for receiving the blows of the hammer. Successive lengths are screwed on as required. For shallow holes the pipe is cleaned out by a “bailer” or “sand-pump”—a cylinder 4 to 6 ft. long, with a valve in the lower end. It is lowered at intervals, filled by being dashed up and down, and then raised and emptied. If, after reaching some depth, the external frictional resistance prevents the pipe from sinking farther, another pipe of small diameter may be inserted and the driving continued. Drive pipes are often sunk by applying weights at the surface and slowly rotating by a lever. Two pipes are then used, one inside the other. Water is pumped down the inner pipe, thus loosening the soil, raising the debris and increasing the speed of driving. The “driven well” for water supply is an adaptation of the drive pipe and put down in the same way.

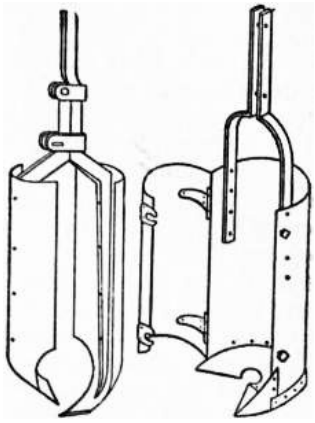


Fig. 1. Fig. 2.
Pod Auger.

3. *Drill and Rods.*—This method has long been used in Europe and elsewhere for deep boring. In the United States it is rarely employed for depths greater than 200 or 300 ft. The usual form of cutting tool or drill is shown in fig. 3. The iron rods are from 1 to 2 in. square, in long lengths with screw joints (fig. 4). Wooden rods are occasionally used. For shallow holes (50 to 75 ft.) the work is done by hand, one or two cross-bars being clamped to the rod. The men alternately raise and drop the drill, meanwhile slowly walking around and around to rotate the bit and so keep the hole true. The cuttings are cleaned out by a bailer, as for drive pipes.

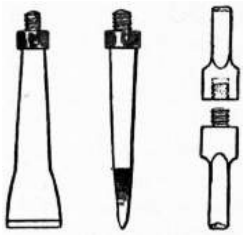


Fig. 3 Fig. 4.
Drill Bit. Rod Joint.

In boring by hand, the practical limit of depth is soon reached, on account of the increasing weight of the rods. For going deeper a “spring-pole” may be used. This is a tapering pole, say 30 ft. long and 5 or 6 in. diameter at the small end. It rests in an inclined position on a fulcrum set about 10 ft. from the butt, the latter being firmly fixed. The rods are suspended from the end of the pole, which extends at a height of several feet over the mouth of the hole. With the aid of the spring of the pole the strokes are produced by a slight effort on the part of the driller. Average speeds of 6 to 10 ft. per 10 hours are easily made, to depths of 200 to 250 ft.

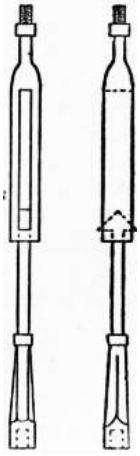


Fig. 5.
Sliding Link.

For deep boring the rod system requires a more elaborate plant. The rods are suspended from a heavy “walking beam” or lever, usually oscillated by a steam engine. By means of a screw-feed device, the rods, which are rotated slightly after every stroke, are gradually fed down as the hole is deepened, length after length being added. A tall derrick carries the sheaves and ropes by which the rods and tools are manipulated. The drill bit cannot be attached rigidly to the rods as in shallow boring, because the momentum of the heavy moving parts, transmitted directly to the bit as the blow is struck, would cause excessive vibration and breakage. It becomes necessary, therefore, to introduce a sliding-link joint between the rods and bit. One form of link is shown in fig. 5. On striking its blow, the bit comes to rest, while the rods continue to descend to the end of the stroke, the upper member of the link sliding down upon the lower. Then, on the up stroke the lower link, with the bit, is raised for delivering another blow. For large holes the striking weight is, say, 800 to 1000 lb., length of stroke 2½ to 5 ft., and speed from 20 to 30 strokes per minute.

By using the sliding link the cross-section and weight of the rods may be greatly reduced, the only strain being that of tension. To deliver a sharp, effective blow,

FIG. 6. Kind Free-Falling Tool.

however, the rods must drop with a quick stroke, which brings a heavy strain upon the operating machinery. For overcoming this difficulty, various “free-falling tools” have been devised. By these the bit is allowed to fall by gravity; the rod follows on its measured down stroke, and picks up the bit. Free-falling tools are of two classes: (1) those by which the bit is released automatically; (2) those operated by a sudden twist imparted to the rod by the drillman. One of the best known of the first class is the Kind free-fall (fig. 6). The shank of the bit is gripped and released by the jaws J, J, worked through a toggle joint by movements of the disk D. When the rod begins its downward stroke, the resistance of the water in the hole slightly raises D, thus opening the jaws and releasing the bit, which falls by gravity. On reaching the end of the stroke the jaws again catch the shank of the bit and raise it for delivering another blow. The Fabian free-fall may be noted as an example of the second class (see Köhler, *Lehrbuch der Bergbaukunde*, p. 57). Tools are sometimes used for cutting an annular groove in the bottom of the hole, and raising to the surface the core so formed, for observing the character of the rock.

4. *Rope and Drop Tools.*—This method was long ago used in China. Because of its extensive application in the oil-fields it is generally designated in the United States as the “oil-well system.” In its various modifications it is often employed also in general prospecting of mineral deposits and in sinking artesian, natural gas and salt wells. One of its forms is known in England as the Mather & Platt system.

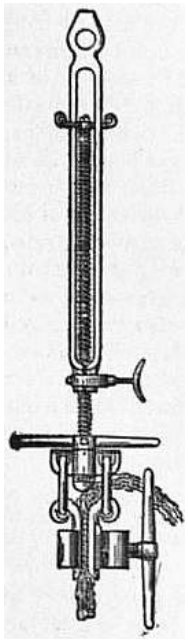


FIG. 7. Temper Screw.

The chief point of difference from rod-boring is the substitution of rope for the jointed rods. For deep boring it possesses the advantage of saving the large amount of time consumed in raising and lowering the rods, as required whenever the hole is to be cleaned out, or a dull bit replaced, since the tools are rapidly run up or down by means of the rope with which they are operated while drilling. The speed of rope-boring is therefore but little affected by increase of depth, while with rod-boring it falls off rapidly. In its simplest form the so-called “string of tools,” suspended from the rope, is composed of the bit or drill, jars and rope-socket. The jars are a pair of sliding links, similar to those used for rod-boring, but serving a different purpose, viz. to produce a sharp shock on the upward stroke, as the jars come together, for loosening the bit should it tend to stick fast in the hole. A heavy bar (auger stem) is generally inserted between the jars and bit, for increasing the force of the blow. The weight of another bar above the jars (sinker-bar) keeps the rope taut. The length of stroke and feed are regulated by the “temper-screw” (fig. 7), a feed device resembling that used for rod-boring. Clamped to it is the drill rope, which is let out at intervals, as the hole is deepened. The bits usually range from 3 to 8 in. diameter, the speed of boring being generally between 20 and 40 ft. per 24 hours, according to the kind of rock. A great variety of special “fishing tools” are made, for use in case of breakage of parts in the hole or other accident.

5. *Diamond Drill.*—The methods described above are capable of boring holes vertically downward only. By the diamond drill, holes can be bored in any direction, from vertically downward to vertically upward. It has the further advantage of making an annular hole from which is obtained a core, furnishing a practically complete cross-section of the strata penetrated; the thickness and character of each stratum are shown, together with its depth below the surface. Thus, the diamond drill is peculiarly well adapted for prospecting mineral deposits from which samples are desired. The first practical application of diamonds for drilling in rock was made in 1863 by Professor Rudolph Leschot, a civil engineer of Paris.

The apparatus consists essentially of a line of hollow rods, coupled by screw joints, an annular steel bit or crown, set with diamonds, being attached to the lower end. By means of a small engine on the surface the rods are rapidly rotated and fed down automatically as the hole deepened. The speed of rotation is from 300 to 800 revolutions per minute, depending on the character of the rock and diameter of the bit. While boring a stream of water is forced down the hollow rods by a pump, passing back to the surface through the annular space between the rods and the walls of the drill hole. The cuttings are thus carried to the surface, leaving the bottom of the hole clean and unobstructed. For recovering the core and inspecting the bit and diamonds, the rods are raised at every 3 to 8 ft. of depth. This is done by a small drum and rope, operated by the driving engine.

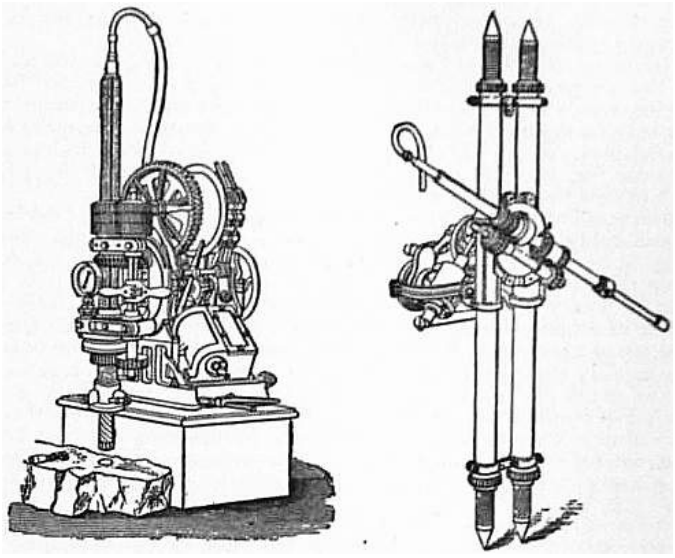


FIG. 8.—Little Champion Rock Drill.

FIG. 9.

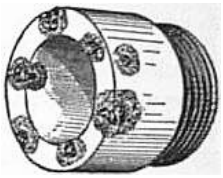


FIG. 10.
Diamond Drill Bit.

Diamond drills of standard designs (fig. 8) bore holes from 1$^{9}/_{16}$ to 2¾ in. diameter, yielding cores of 1 to 1$^{15}/_{16}$ in. diameter, and are capable of reaching depths of a few hundred to 4000 ft. or more. They require from 8 to 30 boiler horse-power. Large machines will bore shallower holes up to 6, 9 or even 12 in. diameter. For operating in underground workings of mines, small and compact machines are sometimes mounted on columns (fig. 9). They bore 1¼ to 1$^{9}/_{16}$ in. holes to depths of 300 to 400 ft., cores being $^{7}/_{8}$ to 1 in. diameter. Hand-power drills are also built. In the South African goldfields several diamond drill holes from 4500 to 5200 ft. deep have been successfully bored. Rates of advance for core-drilling to moderate depths range usually from 2 to 3 ft. per hour, including ordinary delays, though in favourable rock much higher speeds are often attained. In deep holes the speeds diminish, because of time consumed in raising and lowering the rods. If no core is desired a “solid bit” is used. The drilling then proceeds faster, as it is only necessary to raise the rods occasionally, for examining the condition of the bit.

The driving engine has two inclined cylinders, coupled to a crank-shaft, by which, through gearing, the drill-rod is rotated. The rods are wrought iron or steel tubes, in 5 to 10 ft. lengths. For producing the feed two devices are employed, the differential screw and hydraulic cylinder. For the *differential feed* (fig. 9) the engine has a hollow left-hand threaded screw-shaft, to which the rods are coupled. This shaft is driven by a spline and bevel gearing and is supported by a threaded feed-nut, carried in the lower bearing. Geared to the screw-shaft is a light counter-shaft. By properly proportioning the number of teeth in the system of gear-wheels, the feed-nut is caused to revolve a little faster than the screw-shaft, so that the drill-rod is fed downward a small fraction of an inch for each revolution. To vary the rate of feed, as suitable for different rocks, three pairs of gears with different ratios of teeth are provided. The screw-shaft and gearing are carried by a swivel-head, which can be rotated in a vertical plane, for boring holes at an angle.

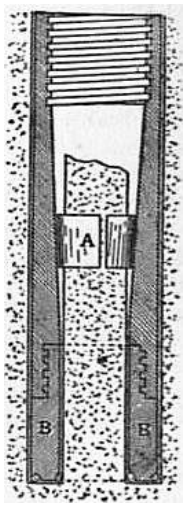


FIG. 11.
Core Lifter and Barrel

The *hydraulic feed* is an improvement on the above, in that the rate of feed is independent of the rotative speed of the rods and can be adjusted with the utmost nicety. There are either one or two feed cylinders, supplied with water from the pump. The rod, while rotating freely, is supported by the feed cylinder piston and caused to move slowly downward by allowing the water to pass from the lower to the upper part of the cylinder. A valve regulates the passage of the water and hence the rate of feed.

The bit (fig. 10 and fig. 11, B) is of soft steel, set with six to eight or more diamonds according to its diameter. The diamonds, usually from 1½ to 2½ carats in size, are carefully set in the bit, projecting but slightly from its surface. Two kinds of diamonds are used, “carbons” and “borts.” The carbons are opaque, dark in colour, tougher than the brilliant, and have no cleavage planes. They are therefore suitable for drilling in hard rock. Borts are rough, imperfect brilliants, and are best used for the softer rocks. As the bit wears, the stones must be reset from time to time. The wear of carbons in a well-set bit is small, though extremely variable. Above the bit are the core-lifter and core-barrel. The core-lifter (fig. 11, A) is a device for gripping and breaking off the core and raising it to the surface. The barrel, 3 to 10 ft. long, fits closely in the hole and is often spirally grooved for the passage of the water and debris. It serves partly as a guide, tending to keep the hole straight, partly for holding and protecting the core.

Diamond drills do not work satisfactorily in broken, fissured rock, as the carbons are liable to be injured, loosened or torn from their settings. In these circumstances, and for soft rocks, the diamond bit may be replaced by a steel toothed bit. Another apparatus for core-drilling is the Davis Calyx drill. For hard rock it has an annular bit, accompanied by a quantity of chilled steel shot; for soft rock, a toothed bit is used.

Diamond drill holes are rarely straight, and usually deviate considerably from the direction in which they are started. Very deep holes have been found to vary as much as 45° and even 60° from their true direction. This is due to the fact that the rods do not fit closely in the hole and therefore bend. It is also likely to occur in drilling through inclined strata, specially when of different degrees of hardness. By using a long and closely fitting core-barrel the liability to deviation is reduced, but cannot be wholly prevented. Holes which are nearly horizontal always deflect upward, because the sag of the rods tilts up the bit. Diamond drill holes should therefore always be surveyed. This is done by lowering into the hole instruments for observing at a number of successive points the direction and degree of deviation.[1] If accurately surveyed a crooked hole may be quite as useful as a straight one.

AUTHORITIES.—For further information on boring see *Trans. Amer. Inst. Mining Engs.* vol. ii. p. 241, vol. xxvii. p. 123; C. le Neve Foster, *Text-book of Ore and Stone Mining*, chap. iii.; *Glückauf*, 9th December 1899, 20th and 27th May 1905; *Scientific American*, 21st August 1886; *Engineering and Mining Jour.* vol. lviii. p. 268, vol. lxx. p. 699, vol. lxxx. p. 920; *Trans. Inst. Mining Engs.*, England, vol. xxiii. p. 685; *School of Mines Quarterly*, N. Y., vol. xvi. p. 1; *Zeitschr. für Berg- Hütten- und Salinenwesen*, vol. xxv. p. 29; Denny, "Diamond Drilling," *Mines and Minerals*, vol. xx., August 1899, p. 7, to January 1900, p. 241; *Mining Jour.*, 26th January 1901; *Mining and Scientific Press*, 28th November 1903, p. 353; *Öst. Zeitschr. für Berg- und Hüttenwesen*, 21st May, 4th June 1904; *Trans. Inst. Mining and Metallurgy*, vol. xii. p. 301; *Engineering Magazine*, March 1896, p. 1075.

(R. P.*)

1 Brough, *Mine Surveying*, pp. 276-278; Marriott, *Trans. Inst. Mining and Metallurgy*, vol. xiv. p. 255.

BORIS FEDOROVICH GODUNOV, tsar of Muscovy (*c.* 1551-1605), the most famous member of an ancient, now extinct, Russian family of Tatar origin, which migrated from the Horde to Muscovy in the 14th century. Boris' career of service began at the court of Ivan the Terrible. He is mentioned in 1570 as taking part in the Serpeisk campaign as one of the archers of the guard. In 1571 he strengthened his position at court by his marriage with Maria, the daughter of Ivan's abominable favourite Malyuta Skuratov. In 1580 the tsar chose Irene, the sister of Boris, to be the bride of the tsarevich Theodore, on which occasion Boris was promoted to the rank of *boyar*. On his deathbed Ivan appointed Boris one of the guardians of his son and successor; for Theodore, despite his seven-and-twenty years, was of somewhat weak intellect. The reign of Theodore began with a rebellion in favour of the infant tsarevich Demetrius, the son of Ivan's fifth wife Marie Nagaya, a rebellion resulting in the banishment of Demetrius, with his mother and her relations, to their appanage at Uglich. On the occasion of the tsar's coronation (May 31, 1584), Boris was loaded with honours and riches, yet he held but the second place in the regency during the lifetime of his co-guardian Nikita Romanovich, on whose death, in August, he was left without any serious rival. A conspiracy against him of all the other great boyars and the metropolitan Dionysy, which sought to break Boris' power by divorcing the tsar from Godunov's childless sister, only ended in the banishment or tonsuring of the malcontents. Henceforth Godunov was omnipotent. The direction of affairs passed entirely into his hands, and he corresponded with foreign princes as their equal. His policy was generally pacific, but always most prudent. In 1595 he recovered from Sweden the towns lost during the former reign. Five years previously he had defeated a Tatar raid upon Moscow, for which service he received the title of *sluga*, an obsolete dignity even higher than that of boyar. Towards Turkey he maintained an independent attitude, supporting an anti-Turkish faction in the Crimea, and furnishing the emperor with subsidies in his war against the sultan. Godunov encouraged English merchants to trade with Russia by exempting them from tolls. He civilized the north-eastern and south-eastern borders of Muscovy by building numerous towns and fortresses to keep the Tatar and Finnic tribes in order. Samara, Saratov, and Tsaritsyn and a whole series of lesser towns derive from him. He also re-colonized Siberia, which had been slipping from the grasp of Muscovy, and formed scores of new settlements, including Tobolsk and other large centres. It was during his government that the Muscovite church received its patriarchate, which placed it on an equality with the other Eastern churches and emancipated it from the influence of the metropolitan of Kiev. Boris' most important domestic reform was the *ukaz* (1587) forbidding the peasantry to transfer themselves from one landowner to another, thus binding them to the soil. The object of this ordinance was to secure revenue, but it led to the institution of serfdom in its most grinding form. The sudden death of the tsarevich Demetrius at Uglich (May 15, 1591) has commonly been attributed to Boris, because it cleared his way to the throne; but this is no clear proof that he was personally concerned in that tragedy. The same may be said of the many, often absurd, accusations subsequently brought against him by jealous rivals or ignorant contemporaries who hated Godunov's reforms as novelties.

On the death of the childless tsar Theodore (January 7, 1598), self-preservation quite as much as ambition constrained Boris to seize the throne. Had he not done so, lifelong seclusion in a monastery would have been his lightest fate. His election was proposed by the patriarch Job, who acted on the conviction that Boris was the one man capable of coping with the extraordinary difficulties of an unexampled situation. Boris, however, would only accept the throne from a *Zemsky Sobor*, or national assembly, which met on the 17th of February, and unanimously elected him on the 21st. On the 1st of September he was solemnly crowned tsar. During the first years of his reign he was both popular and prosperous, and ruled the people excellently well. Enlightened as he was, he fully recognized the intellectual inferiority of Russia as compared with the West, and did his utmost to bring about a better

state of things. He was the first tsar to import foreign teachers on a great scale, the first to send young Russians abroad to be educated, the first to allow Lutheran churches to be built in Russia. He also felt the necessity of a Baltic seaboard, and attempted to obtain Livonia by diplomatic means. He cultivated friendly relations with the Scandinavians, in order to intermarry if possible with foreign royal houses, so as to increase the dignity of his own dynasty. That Boris was one of the greatest of the Muscovite tsars there can be no doubt. But his great qualities were overbalanced by an incurable suspiciousness, which made it impossible for him to act cordially with those about him. His fear of possible pretenders induced him to go so far as to forbid the greatest of the boyars to marry. He also encouraged informers and persecuted suspects on their unsupported statements. The Romanov family in especial suffered severely from these delations. Boris died suddenly (April 13, 1605), leaving one son, Theodore II., who succeeded him for a few months and then was foully murdered by the enemies of the Godunovs.

See Platon Vasilievich Pavlov, *On the Historical Significance of the Reign of Boris Godunov* (Rus.) (Moscow, 1850); Sergyei Mikhailivich Solovev, *History of Russia* (Rus.) (2nd ed., vols. vii.-viii., St Petersburg, 1897).

(R. N. B.)

BORISOGLYEBSK, a town of Russia, in the government of Tambov, 100 m. S.S.E. of the city of that name, in 51° 22′ N. lat. and 43° 4′ E. long. It was founded in 1646 to defend the southern frontiers of Muscovy against the Crimean Tatars, and in 1696 was surrounded by wooden fortifications. The principal industries are the preparation of wool, iron-casting, soap-boiling, tallow-melting, and brick-making; and there is an active trade in grain, wool, cattle, and leather, and two important annual fairs. Pop. (1867) 12,254; (1897) 22,370.

BORKU, or Borgu, a region of Central Africa between 17° and 19° N. and 18° and 21° E., forming part of the transitional zone between the arid wastes of the Sahara and the fertile lands of the central Sudan. It is bounded N. by the Tibesti Mountains, and is in great measure occupied by lesser elevations belonging to the same system. These hills to the south and east merge into the plains of Wadai and Darfur. South-west, in the direction of Lake Chad, is the Bodele basin. The drainage of the country is to the lake, but the numerous khors with which its surface is scored are mostly dry or contain water for brief periods only. A considerable part of the soil is light sand drifted about by the wind. The irrigated and fertile portions consist mainly of a number of valleys separated from each other by low and irregular limestone rocks. They furnish excellent dates. Barley is also cultivated. The northern valleys are inhabited by a settled population of Tibbu stock, known as the Daza, and by colonies of negroes; the others are mainly visited by nomadic Berber and Arab tribes. The inhabitants own large numbers of goats and asses.

A caravan route from Barca and the Kufra oasis passes through Borku to Lake Chad. The country long remained unknown to Europeans. Gustav Nachtigal spent some time in it in the year 1871, and gave a valuable account of the region and its inhabitants in his book, *Sahara und Sudan* (Berlin, 1879-1889). In 1899 Borku, by agreement with Great Britain, was assigned to the French sphere of influence. The country, which had formerly been periodically raided by the Walad Sliman Arabs, was then governed by the Senussi (*q.v.*), who had placed garrisons in the chief centres of population. From it raids were made on French territory. In 1907 a French column from Kanem entered Borku, but after capturing Ain Galakka, the principal Senussi station, retired. Borku is also called Borgu, but must not be confounded with the Borgu (*q.v.*) west of the Niger.

A summary of Nachtigal's writing on Borku will be found in section 28 of *Gustav Nachtigal's Reisen in der Sahara und im Sudan* (1 vol.), arranged by Albert Fränkel (Leipzig, 1887). See also an article (with map) by Commdt. Bordeaux in *La Géographie*, Oct. 1908.

BORKUM, an island of Germany, in the North Sea, belonging to the Prussian province of Hanover, the westernmost of the East Frisian chain, lying between the east and west arms of the estuary of the Ems, and opposite to the Dollart. Pop. about 2500. The island is 5 m. long and 2½ m. broad, is a favourite summer resort, and is visited annually by about 20,000 persons. There is a daily steamboat service with Emden, Leer and Hamburg during the summer months. The island affords pasture for cattle, and a breeding-place for sea-birds.

BORLASE, WILLIAM (1695-1772), English antiquary and naturalist, was born at Pendeen in Cornwall, of an ancient family, on the 2nd of February 1695. He was educated at Exeter College, Oxford, and in 1719 was ordained. In 1722 he was presented to the rectory of Ludgvan, and in 1732 he obtained in addition the vicarage of St Just, his native parish. In the parish of Ludgvan were rich copper works, abounding with mineral and metallic fossils, of which he made a collection, and thus was led to study somewhat minutely the natural history of the county. In 1750 he was admitted a fellow of the Royal Society; and in 1754 he published, at Oxford, his *Antiquities of Cornwall* (2nd ed., London, 1769). His next publication was *Observations on the Ancient and Present State of the Islands of Scilly, and their Importance to the Trade of Great Britain* (Oxford, 1756). In 1758 appeared his *Natural History of Cornwall*. He presented to the Ashmolean museum, Oxford, a variety of fossils and antiquities, which he had described in his works, and received the thanks of the university and the degree of LL.D. He died on the 31st of August 1772. Borlase was well acquainted with most of the leading literary men of the time, particularly with Alexander Pope, with whom he kept up a long correspondence, and for whose grotto at Twickenham he furnished the greater part of the fossils and minerals.

Borlase's letters to Pope, St Aubyn and others, with answers, fill several volumes of MS. There are also MS. notes on Cornwall, and a complete unpublished treatise *Concerning the Creation and Deluge*. Some account of these MSS., with extracts from them, was given in the *Quarterly Review*, October 1875. Borlase's memoirs of his own life were published in Nichol's *Literary Anecdotes*, vol. v.

BORMIO (Ger. *Worms*), a town of Lombardy, Italy, in the province of Sondrio, 41½ m. N.E. of the town of Sondrio. Pop. (1901) 1814. It is situated in the Valtellina (the valley of the Adda), 4020 ft. above sea-level, at the foot of the Stelvio pass, and, owing to its position, was of some military importance in the middle ages. It contains interesting churches and picturesque towers. A cemetery of pre-Roman date was discovered at Bormio in 1820.

The baths of Bormio, 2 m. farther up the valley, are mentioned by Pliny and Cassiodorus, the secretary of Theodoric, and are much frequented.

BORN, IGNAZ, Edler von (1742-1791), Austrian mineralogist and metallurgist, was born of a noble family at Karlsburg, in Transylvania, on the 26th of December 1742. Educated in a Jesuit college in Vienna, he was for sixteen months a member of the order, but left it and studied law at Prague. Then he travelled extensively in Germany, Holland and France, studying mineralogy, and on his return to Prague in 1770 entered the department of mines and the mint. In 1776 he was appointed by Maria Theresa to arrange the imperial museum at Vienna, where he was nominated to the council of mines and the mint, and continued to reside until his death on the 24th of July 1791. He introduced a method of extracting metals by amalgamation (*Über das Anquicken der Erze*, 1786), and other improvements in mining and other technical processes. His publications also include *Lithophylacium Bornianum* (1772-1775) and *Bergbaukunde* (1789), besides several museum catalogues. Von Born attempted satire with no great success. *Die Staatsperücke*, a tale published without his knowledge in 1772, and an attack on Father Hell, the Jesuit, and king's astronomer at Vienna, are two of his satirical works. Part of a satire, entitled *Monachologia*, in which the monks are described in the technical language of natural history, is also ascribed to him. Von Born was well acquainted with Latin and the principal modern languages of Europe, and with many branches of science not immediately connected with metallurgy and mineralogy. He took an active part in the political changes in Hungary. After the death of the emperor Joseph II., the diet of the states of Hungary rescinded many innovations of that ruler, and conferred the rights of denizen on several persons who had been favourable to the cause of the Hungarians, and, amongst others, on von Born. At the time of his death in 1791, he was employed in writing a work entitled *Fasti Leopoldini*, probably relating to the prudent conduct of Leopold II., the successor of Joseph, towards the Hungarians.

BORNA, a town of Germany in the kingdom of Saxony, on the Wyhra at its junction with the Pleisse, 17 m. S. by E. of Leipzig by rail. Pop. (1905) 9176. The industries include peat-cutting, iron foundries, organ, pianoforte, felt and shoe factories.

BÖRNE, KARL LUDWIG (1786-1837), German political writer and satirist, was born on the 6th of May 1786 at Frankfort-On-Main, where his father, Jakob Baruch, carried on the business of a banker. He received his early education at Giessen, but as Jews were ineligible at that time for public appointments in Frankfort, young Baruch was sent to study medicine at Berlin under a physician, Markus Herz, in whose house he resided. Young Baruch became deeply enamoured of his patron's wife, the talented and beautiful Henriette Herz (1764-1847), and gave vent to his adoration in a series of remarkable letters. Tiring of medical science, which he had subsequently pursued at Halle, he studied constitutional law and political science at Heidelberg and Giessen, and in 1811 took his doctor's degree at the latter university. On his return to Frankfort, now constituted as a grand duchy under the sovereignty of the prince bishop Karl von Dalberg, he received (1811) the appointment of police actuary in that city. The old conditions, however, returned in 1814 and he was obliged to resign his office. Embittered by the oppression under which the Jews suffered in Germany, he engaged in journalism, and edited the Frankfort liberal newspapers, *Staatsristretto* and *Die Zeitschwingen*. In 1818 he became a convert to Lutheran protestantism, changing his name from Löb Baruch to Ludwig Börne. This step was taken less out of religious conviction than, as in the case of so many of his descent, in order to improve his social standing. From 1818 to 1821 he edited *Die Wage*, a paper distinguished by its lively political articles and its powerful but sarcastic theatrical criticisms. This paper was suppressed by the police authorities, and in 1821 Börne quitted for a while the field of publicist writing and led a retired life in Paris, Hamburg and Frankfort. After the July Revolution (1830), he hurried to Paris, expecting to find the newly-constituted state of society somewhat in accordance with his own ideas of freedom. Although to some extent disappointed in his hopes, he was not disposed to look any more kindly on the political condition of Germany; this lent additional zest to the brilliant satirical letters (*Briefe aus Paris*, 1830-1833, published Paris, 1834), which he began to publish in his last literary venture, *La Balance*, a revival under its French name of *Die Wage*. The *Briefe aus Paris* was Börne's most important publication, and a landmark in the history of German journalism. Its appearance led him to be regarded as one of the leaders of the new literary party of "Young Germany." He died at Paris on the 12th of February 1837.

Börne's works are remarkable for brilliancy of style and for a thorough French vein of satire. His best criticism is to be found in his *Denkrede auf Jean Paul* (1826), a writer for whom he had warm sympathy and admiration, in his *Dramaturgische Blätter* (1829-1834), and the witty satire, *Menzel der Franzosenfresser* (1837). He also wrote a number of short stories and sketches, of which the best known are the *Monographie der deutschen Postschnecke* (1829) and *Der Esskünstler* (1822).

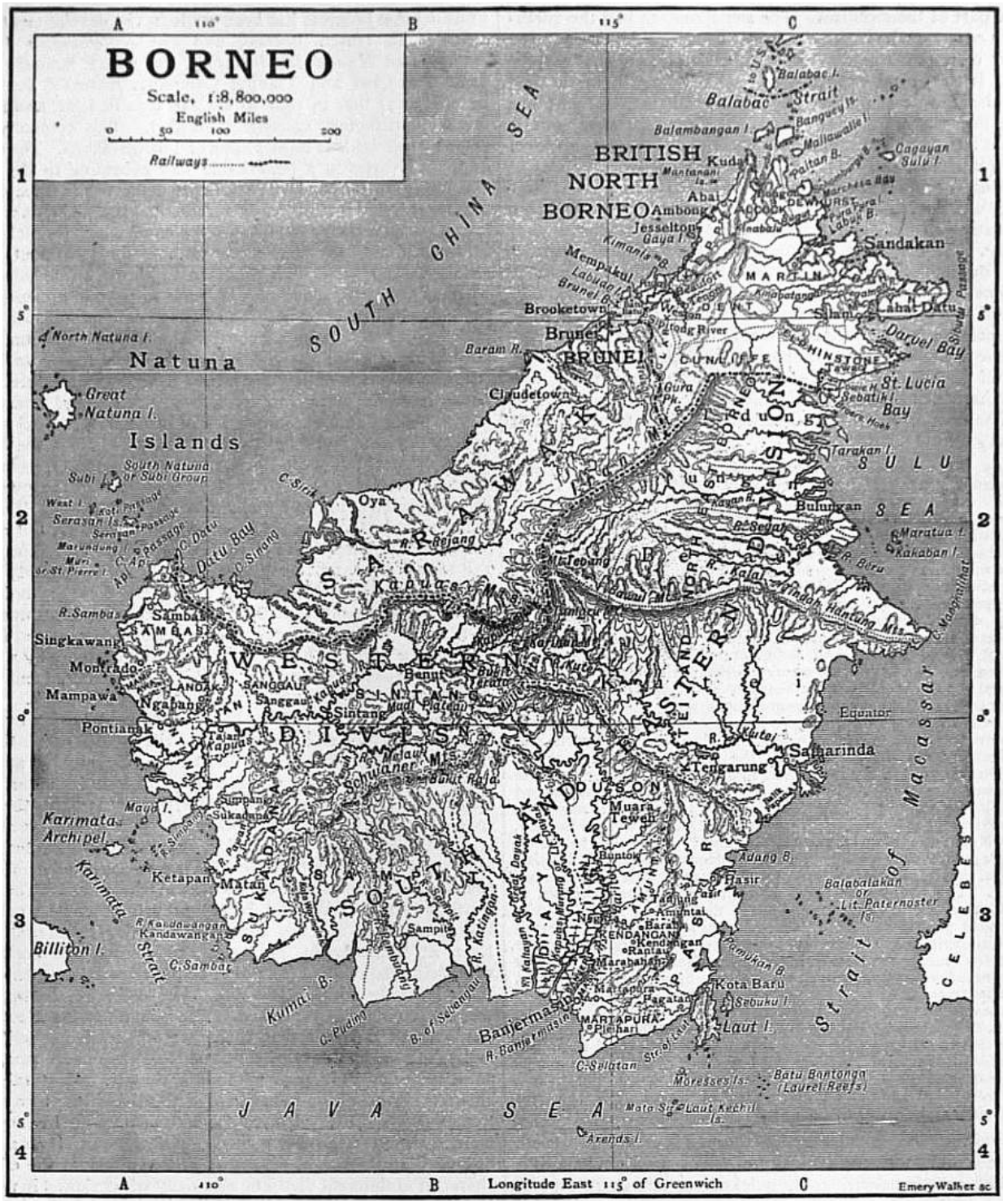
The first edition of his *Gesammelte Schriften* appeared at Hamburg (1829-1834) in 14 volumes, followed by 6 volumes of *Nachgelassene Schriften* (Mannheim, 1844-1850); more complete is the edition in 12 volumes (Hamburg, 1862-1863), reprinted in 1868 and subsequently. The latest complete edition is that edited by A. Klaar (8 vols., Leipzig, 1900). For further biographical matter see K. Gutzkow, *Börnes Leben* (Hamburg, 1840), and M. Holzmann, *L. Börne, sein Leben und sein Wirken* (Berlin, 1888). *Börnes Briefe an Henriette Herz* (1802-1807), first published in 1861, have been re-edited by L. Geiger (Oldenburg, 1905), who has also published Börne's *Berliner Briefe* (1828) (Berlin, 1905). See also Heine's witty attack on Börne (*Werke*, ed. Elster, vii.), G. Gervinus' essay in his *Historiche Schriften* (Darmstadt, 1838), and the chapters in G. Brandes, *Hovedströmninger i det 19 de Aarhundredes Litteratur* vol. vi. (Copenhagen, 1890, German trans. 1891; English trans. 1905), and in J. Proelss, *Das junge Deutschland* (Stuttgart, 1892).

BORNEO, a great island of the Malay Archipelago, extending from 7° N. to 4° 20′ S., and from 108° 53′ to 119° 22′ E. It is 830 m. long from N.E. to S.W., by 600 m. in maximum breadth. Its area according to the calculations of the Topographical Bureau of Batavia (1894) comprises 293,496 sq. m. These figures are admittedly approximate, and Meyer, who is generally accurate, gives the area of Borneo at 289,860 sq. m. It is roughly, however, five times as large as England and Wales. Politically Borneo is divided into four portions: (1) British North Borneo, the territory exploited and administered by the Chartered British North Borneo Company, to which a separate section of this article is devoted; (2) Brunei (*q.v.*), a Malayan sultanate under British protection; (3) Sarawak (*q.v.*), the large territory ruled by raja Brooke, and under British protection in so far as its foreign relations are concerned; and (4) Dutch Borneo, which comprises the remainder and by far the largest and most valuable portion of the island.

Physical Features.—The general character of the country is mountainous, though none of the ranges attains to any great elevation, and Kinabalu, the highest peak in the island, which is situated near its north-western extremity, is only 13,698 ft. above sea-level. There is no proper nucleus of mountains whence chains ramify in different directions. The central and west central parts of the island, however, are occupied by three mountain chains and a plateau. These chains are: (1) the folded chain of the upper Kapuas, which divides the western division of Dutch Borneo from Sarawak, extends west to east, and attains near the sources of the Kapuas river a height of 5000 to 6000 ft.; (2) the Schwaner chain, south of the Kapuas, whose summits range from 3000 to 7500 ft., the latter being the height of Bukit Raja, a plateau which divides the waters of the Kapuas from the rivers of southern Borneo; and (3) the Müller chain, between the eastern parts of the Madi plateau (presently to be mentioned) and the Kapuas chain, a volcanic region presenting heights, such as Bukit Terata (4700 ft.), which were once

active but are now long extinct volcanos. The Madi plateau lies between the Kapuas and the Schwaner chains. Its height is from 3000 to 4000 ft., and it is clothed with tropical high fens. These mountain systems are homologous in structure with those, not of Celebes or of Halmahera, but of Malacca, Banka and Billiton. From the eastern end of the Kapuas mountains there are further to be observed: (1) A chain running north-north-east, which forms the boundary between Sarawak and Dutch Borneo, the highest peak of which, Gunong Tebang, approaches 10,000 ft. This chain can hardly be said to extend continuously to the extreme north of the island, but it carries on the line of elevation towards the mountains of Sarawak to the west, and those of British North Borneo to the north, of which latter Kinabalu is the most remarkable. The mountains of North Borneo are more particularly referred to in the portion of this article which deals with that territory. (2) A chain which runs eastward from the central mountains and terminates in the great promontory of the east coast, known variously as Cape Kanior or Kaniungan. (3) A well-marked chain running in a south-easterly direction among the congeries of hills that extend south-eastward from the central mountains, and attaining, near the southern part of the east coast, heights up to and exceeding 6000 ft.

Coasts.—Resting on a submarine plateau of no great depth, the coasts of Borneo are for the most part rimmed round by low alluvial lands, of a marshy, sandy and sometimes swampy character. In places the sands are fringed by long lines of *Casuarina*, trees; in others, and more especially in the neighbourhood of some of the river mouths, there are deep banks of black mud covered with mangroves; in others the coast presents to the sea bold headlands, cliffs, mostly of a reddish hue, sparsely clad with greenery, or rolling hills covered by a growth of rank grass. The depth of the sea around the shore rarely exceeds a maximum depth of 1 to 3 fathoms, and the coast as a whole offers few accessible ports. The towns and seaports are to be found as a rule at or near the mouths of those rivers which are not barricaded too efficiently by bars formed of mud or sand. All round the long coast-line of Dutch Borneo there are only seven ports of call, which are habitually made use of by the ships of the Dutch Packet Company. They are Pontianak, Banjermasin, Kota Bharu, Pasir, Samarinda, Beru and Bulungan. The islands off the coast are not numerous. Excluding some of alluvial formation at the mouths of many of the rivers, and others along the shore which owe their existence to volcanic upheaval, the principal islands are Banguey and Balambangan at the northern extremity, Labuan (*q.v.*), a British colony off the west coast of the territory of North Borneo, and the Karimata Islands off the south-west coast. On Great Karimata is situated the village of Palembang with a population of about 500 souls employed in fishing, mining for iron, and trading in forest produce.



Rivers.—The rivers play a very important part in the economy of Borneo, both as highways and as lines along which run the main arteries of population. Hydrographically the island may be divided into five principal versants. Of these the shortest embraces the north-western slope, north of the Kapuas range, and discharges its waters into the China Sea. The most important of its rivers are the Sarawak, the Batang-Lupar, the Sarebas, the Rejang (navigable for more than 100 m.), the Baram, the Limbang or Brunei river, and the Padas. The rivers of British North Borneo to the north of the Padas are of no importance and of scant practical utility, owing to the fact that the mountain range here approaches very closely to the coast with which it runs parallel. In the south-western versant the largest river is the Kapuas, which, rising near the centre of the island, falls into the sea between Mampawa and Sukadana after a long and winding course. This river, of volume varying with the tide and the amount of rainfall, is normally navigable by small steamers and native prahus, of a draught of 4 to 5 ft., for 300 to 400 m., that is to say, from Pontianak up to Sintang, and thence as far as Benut. The middle part of this river, wider and more shallow than the lower reaches, gives rise to a region of inundation and lakes which extend as far as the northern mountain chain. Among its considerable tributaries may be mentioned the southern Melawi with its affluent the Penuh. It reaches the sea through several channels in a wide marshy delta. The Sambas, north of the Kapuas, is navigable in its lower course for vessels drawing 25 ft. Rivers lying to the south of the Kapuas, but of less importance in the way of size, commerce and navigation, are the Simpang, Pawanand Kandawangan, in the neighbourhood of whose mouths, or upon the adjacent coast, the principal native villages are situated in each case. The Barito, which is the principal river of the southern versant, takes its rise in the Kuti Lama Lake, and falls into the Java Sea in 114° 30′ E. Its upper reaches are greatly impeded by rocks, rapids and waterfalls, but the lower part

of its course is wide, and traverses a rich, alluvial district, much of which is marshy. Cross branches unite it with two rivers of considerable size towards the west, the Kapuas Murung or Little Dyak, and the Kahayan or Great Dyak. The Katingan or Mendawei, the Sampit, Pembuang or Surian and the Kota Waringin are rivers that fall into the sea farther to the west. The rivers of the southern versant are waters of capacious drainage, the basin of the Kahayan having, for instance, an area of 16,000 sq. m., and the Barito one of 38,000 sq. m. These rivers are navigable for two-thirds of their course by steamers of a fair size, but in many cases the bars at their mouths present considerable difficulties to ships drawing anything over 8 or 9 ft. Most of the larger affluents of the Barito are also navigable throughout the greater part of their courses. The south-eastern like the north-western corner of the island is watered by a considerable number of short mountain streams. The one great river of the eastern versant is the Kutei or Mahakan, which, rising in the central mountains, flows east with a sinuous course and falls by numerous mounts into the Straits of Madassar. At a great distance from its mouth it has still a depth of three fathoms, and in all its physical features it is comparable to the Kapuas and Barito. The Kayan or Bulungan river is the only other in the eastern versant that calls for mention. Most of the rivers of the northern versant are comparatively small, as the island narrows into a kind of promontory. Of these the Kinabatangan in the territory of British North Borneo is the most important. Lakes are neither numerous nor very large. In most cases they are more fittingly described as swamps. In the flood area of the upper Kapuas, of which mention has already been made, there occurs Lake Luar, and there are several lake expanses of a similar character in the basins of the Barito and Kutei rivers. The only really fine natural harbour in the island of which any use has been made is that of Sandakan, the principal settlement of the North Borneo Company on the north coast.

Geology.—The geology of Borneo is very imperfectly known. The mountain range which lies between Sarawak and the Dutch possessions, and may be looked upon as the backbone of the island, consists chiefly of crystalline schists, together with slates, sandstones and limestones. All these beds are much disturbed and folded. The sedimentary deposits were formerly believed to be Palaeozoic, but Jurassic fossils have since been found in them, and it is probable that several different formations are represented. Somewhat similar rocks appear to form the axis of the range in south-east Borneo, and possibly of the Tampatung Mountains. But the Müller range, the Madi plateau, and the Schwaner Mountains of west Borneo, consist chiefly of almost undisturbed sedimentary and volcanic rocks of Tertiary age. The low-lying country between the mountain ranges is covered for the most part by Tertiary and Quaternary deposits, but Cretaceous beds occur at several localities. Some of the older rocks of the mountain regions have been referred to the Devonian, but the evidence cannot be considered conclusive. *Vertebraria* and *Phyllotheca*, plants characteristic of the Indian Gondwana series, have been recorded in Sarawak; and marine forms, similar to those of the lower part of the Australian Carboniferous system, are stated to occur in the limestone of north Borneo. *Pseudomonotis salinaria*, a Triassic form, has been noted from the schists of the west of Borneo. In the Kapoewas district radiolarian cherts supposed to be of Jurassic age are met with. Undoubted Jurassic fossils, belonging to several horizons, have been described from west Borneo and Sarawak. The Cretaceous beds, which have long been known in west Borneo, are comparatively little disturbed. They consist for the most part of marls with *Orbitolina concava*, and are referred to the Cenomanian. Cretaceous beds of somewhat later date are found in the Marpapura district in south-east Borneo. The Tertiary system includes conglomerates, sandstones, limestones and marls, which appear to be of Eocene, Oligocene and Miocene age. They contain numerous seams of coal. The Tertiary beds generally lie nearly horizontal and form the lower hills, but in the Madi plateau and the Schwaner range they rise to a height of several thousand feet. Volcanic rocks of Tertiary and late Cretaceous age are extensively developed, especially in the Müller Mountains. The whole of this consists of tuffs and lavas, andesites prevailing in the west and rhyolites and dacites in the east.

Minerals.—The mineral wealth of Borneo is great and varied. It includes diamonds, the majority of which, however, are of a somewhat yellow colour, gold, quicksilver, cinnabar, copper, iron, tin, antimony, mineral oils, sulphur, rock-salt, marble and coal. The exploitation of the mines suffers in many cases from the difficulties and expense of transport, the high duties payable in Dutch Borneo to the native princes, the competition among the rival companies, and often the limited quantities of the minerals found in the mines. The districts of Sambas and Landak in the west, the Kahayan river, the mountain valleys of the extreme south-east and parts of Sarawak furnish the largest quantities of gold, which is obtained for the most part from alluvial washings. The Borneo Company is engaged in working gold-mines in the upper part of the Sarawak valley, and the prospects of the enterprise, which is conducted on a fairly extensive scale, are known to be encouraging. Diamonds are also found widely distributed and mainly in the same regions as the gold. The Kapuas valley has so far yielded the largest quantity, and Pontianak is, for diamonds, the principal port of export. Considerable progress has been made in the development of the oil-fields in Dutch Borneo, and the *Nederlandsch Indische Industrie en Handel Maatschappij*, the Dutch business of the Shell Transport and Trading Company, increased its output from 123,592 tons in 1901 to 285,720 tons in 1904, and showed further satisfactory increase thereafter. This company owns extensive oil-fields at Balik Papan and Sanga-Sanga. The quality of the oil varies in a remarkable way according to the depth. The upper stratum is struck at a depth of 600 to 700 ft., and yields a natural liquid fuel of heavy specific gravity. The next source is met with at about 1200 ft., yielding an oil which is much lighter in weight and, as such, more suitable for treatment in the refinery. The former oil is almost invariably of an asphalte basis, whereas the latter sometimes is found to contain a considerable percentage of paraffin wax. The average daily production is very high, owing to a large number of the wells flowing under the natural pressure of the gas. There is every reason to believe that the oil-fields of Dutch Borneo have a great future. Coal mines have, in many instances, been opened and abandoned, failure being due to the difficulty of production. Coal of good quality has been found in Pengaron and elsewhere in the Banjermasin district, but most Borneo coal is considerably

below this average of excellence. It has also been found in fair quantities at various places in the Kutei valley and in Sarawak. The coalmines of Labuan have been worked spasmodically, but success has never attended the venture. Sadong yields something under 130 tons a day, and the Brooketown mine, the property of the raja of Sarawak, yields some 50 tons a day of rather indifferent coal. The discovery that Borneo produced antimony was made in 1825 by John Crawfurd, the orientalist, who learned in that year that a quantity had been brought to Singapore by a native trader as ballast. The supply is practically unlimited and widely distributed. The principal mine is at Bidi in Sarawak.

Climate and Health.—As is to be anticipated, having regard to its insular position and to the fact that the equator passes through the very middle of the island, the climate is at once hot and very damp. In the hills and in the interior regions are found which may almost be described as temperate, but on the coasts the atmosphere is dense, humid and oppressive. Throughout the average temperature is from 78° to 80° F., but the thermometer rarely falls below 70°, except in the hills, and occasionally on exceptional days mounts as high as 96° in the shade. The rainy westerly winds (S.W. and N.W.) prevail at all the meteorological stations, not the comparatively dry south-east wind. Even at Banjermasin, near the south coast, the north-west wind brings annually a rainfall of 60 in., as against 33 in. of rain carried by the south-east wind. The difference between the seasons is not rigidly marked. The climate is practically unchanging all the year round, the atmosphere being uniformly moist, and though days of continuous downpour are rare, comparatively few days pass without a shower. Most rain falls between November and May, and at this season the torrents are tremendous while they last, and squalls of wind are frequent and violent, almost invariably preceding a downpour. Over such an extensive area there is, of course, great variety in the climatic character of different districts, especially when viewed in relation to health. Some places, such as Bidi in Sarawak, for instance, are notoriously unhealthy; but from the statistics of the Dutch government, and the records of Sarawak and British North Borneo, it would appear that the European in Borneo has in general not appreciably more to fear than his fellow in Java, or in the Federated Malay States of the Malayan Peninsula. Among the native races the prevailing diseases, apart from those of a malarial origin, are chiefly such as arise from bad and insufficient food, from intemperance, and from want of cleanliness. The habit of allowing their meat to putrefy before regarding it as fit for food, and of encouraging children of tender age to drink to intoxication, accounts for absence of old folk and the heavy mortality which are to be observed among the Muruts of British North Borneo and some of the other more debased tribes of the interior of the island. Scrofula and various forms of lupus are common among the natives throughout the country and especially in the interior; elephantiasis is frequently met with on the coast. Smallpox, dysentery and fevers, frequently of a bilious character, are endemic and occasionally epidemic. Cholera breaks out from time to time and works great havoc, as was the case in 1903 when one of the raja of Sarawak’s punitive expeditions was stricken while ascending the Limbang river by boat, and lost many hundreds of its numbers before the coast could be regained. Ophthalmia is common and sometimes will attack whole tribes. About one sixth of the native population of the interior, and a smaller proportion of those living on the coast, suffer from a kind of ringworm called *kurap*, which also prevails almost universally among the Sakai and Semang, the aboriginal hill tribes of the Malayan Peninsula. The disease is believed to be aggravated by chronic anaemia. Consumption is not uncommon.

Fauna.—The fauna of Borneo comprises a large variety of species, many of which are numerically of great importance. Among the quadrupeds the most remarkable is the orang-utan (Malay, *ôrang ûtan*, *i.e.* jungle man), as the huge ape, called *mias* or *mâyas* by the natives, is named by Europeans. Numerous species of monkey are found in Borneo, including the wahwah, a kind of gibbon, a creature far more human in appearance and habits than the orang-utan, and several *Semnopitheci*, such as the long-nosed ape and the golden-black or *chrysomelas*. The large-eyed *Stenops tardigradus* also deserves mention. The larger beasts of prey are not met with, and little check is therefore put on the natural fecundity of the graminivorous species. A small panther and the clouded tiger (so called)—*Felis macroscelis*—are the largest animals of the cat kind that occur in Borneo. The Bengal tiger is not found. The Malay or honey-bear is very common. The rhinoceros and the elephant both occur in the northern part of the island, though both are somewhat rare, and in this connexion it should be noted that the distribution of quadrupeds as between Borneo, Sumatra and the Malayan Peninsula is somewhat peculiar and seemingly somewhat capricious. Many quadrupeds, such as the honey-bear and the rhinoceros, are common to all, but while the tiger is common both in the Malayan Peninsula and in Sumatra, it does not occur in Borneo; the elephant, so common in the peninsula, and found in Borneo, is unknown in Sumatra; and the orang-utan, so plentiful in parts of Borneo and parts of Sumatra, has never been discovered in the Malay Peninsula. It has been suggested, but with very scant measure of probability, that the existence of elephants in Borneo, whose confinement to a single district is remarkable and unexplained, is due to importation; and the fact is on record that when Magellan’s ships visited Brunei in 1522 tame elephants were in use at the court of the sultan of Brunei. Wild oxen of the Sunda race, not to be in any way confounded with the Malayan *seladang* or gaur, are rare, but the whole country swarms with wild swine, and the *babirusa*, a pig with curious horn-like tusks, is not uncommon. Alligators are found in most of the rivers, and the gavial is less frequently met with. Three or four species of deer are common, including the mouse-deer, or *plandok*, an animal of remarkable grace and beauty, about the size of a hare but considerably less heavy. Squirrels, flying-squirrels, porcupines, civet-cats, rats, bats, flying-foxes and lizards are found in great variety; snakes of various kinds, from the boa-constrictor downward, are abundant, while the forests swarm with tree-leeches, and the marshes with horse-leeches and frogs. A remarkable flying-frog was discovered by Professor A.R. Wallace. Birds are somewhat rare in some quarters. The most important are eagles, kites, vultures, falcons, owls, horn-bills, cranes, pheasants (notably the argus, fire-back and peacock-pheasants), partridges, ravens, crows, parrots, pigeons, woodpeckers, doves, snipe, quail and swallows. Of most of

these birds several varieties are met with. The *Cypselus esculentus*, or edible-nest swift, is very common, and the nests, which are built mostly in limestone caves, are esteemed the best in the archipelago. Mosquitoes and sand-flies are the chief insect pests, and in some districts are very troublesome. Several kinds of parasitic jungle ticks cause much annoyance to men and to beasts. There are also two kinds of ants, the sĕmut âpi ("fire ant") and the *sĕmut lâda* ("pepper ant"), whose bites are peculiarly painful. Hornets, bees and wasps of many varieties abound. The honey and the wax of the wild bee are collected by the natives. Butterflies and moths are remarkable for their number, size, variety and beauty. Beetles are no less numerously represented, as is to be expected in a country so richly wooded as Borneo. The swamps and rivers, as well as the surrounding seas, swarm with fish. The *siawan* is a species of fish found in the rivers and valued for its spawn, which is salted. The natives are expert and ingenious fishermen. Turtles, trepang and pearl-shell are of some commercial importance.

The dog, the cat, the pig, the domestic fowl (which is not very obviously related to the bantam of the woods), the buffalo, a smaller breed than that met with in the Malayan Peninsula, and in some districts bullocks of the Brahmin breed and small horses, are the principal domestic animals. The character of the country and the nomadic habits of many of the natives of the interior, who rarely occupy their villages for more than a few years in succession, have not proved favourable to pastoral modes of life. The buffaloes are used not only in agriculture, but also as beasts of burden, as draught-animals and for the saddle. Horses, introduced by Europeans and owned only by the wealthier classes, are found in Banjermasin and in Sarawak. In British North Borneo, and especially in the district of Tempasuk on the north-west coast, Borneo ponies, bred originally, it is supposed, from the stock which is indigenous to the Sulu archipelago, are common.

Flora.—The flora of Borneo is very rich, the greater portion of the surface of the island being clothed in luxuriant vegetation. The king of the forest is the *tapan*, which, rising to a great height without fork or branch, culminates in a splendid dome of foliage. The official seats of some of the chiefs are constructed from the wood of this tree. Iron-wood, remarkable for the durability of its timber, is abundant; it is used by the natives for the pillars of their homes and forms an article of export, chiefly to Hong-Kong. It is rivalled in hardness by the *kâyu tĕmbĕsu*. In all, about sixty kinds of timber of marketable quality are furnished in more or less profusion, but the difficulty of extraction, even in the regions situated in close proximity to the large waterways, renders it improbable that the timber trade of Borneo will attain to any very great dimensions until other and easier sources of supply have become exhausted. Palm-trees are abundant in great variety, including the *nîpah*, which is much used for thatching, the cabbage, fan, sugar, coco and sago palms. The last two furnish large supplies of food to the natives, some copra is exported, and sago factories, mostly in the hands of Chinese, prepare sago for the Dutch and British markets. Gutta-percha (*gĕtah pĕrcha* in the vernacular), camphor, cinnamon, cloves, nutmegs, gambir and betel, or areca-nuts, are all produced in the island; most of the tropical fruits flourish, including the much-admired but, to the uninitiated, most evil-smelling durian, a large fruit with an exceedingly strong outer covering composed of stout pyramidal spikes, which grows upon the branches of a tall tree and occasionally in falling inflicts considerable injuries upon passers-by. Yams, several kinds of sweet potatoes, melons, pumpkins, cucumbers, pineapples, bananas and mangosteens are cultivated, as also are a large number of other fruits. Rice is grown in irrigated lands near the rivers and in the swamps, and also in rude clearings in the interior; sugar-cane of superior quality in Sambas and Montrado; cotton, sometimes exported in small quantities, on the banks of the Negara, a tributary of the Barito; tobacco, used very largely now in the production of cigars, in various parts of northern Borneo; and tobacco for native consumption, which is of small commercial importance, is cultivated in most parts of the island. Indigo, coffee and pepper have been cultivated since 1855 in the western division of Dutch Borneo. Among the more beautiful of the flowering plants are rhododendrons, orchids and pitcher-plants—the latter reaching extraordinary development, especially in the northern districts about Kinabalu. Epiphytous plants are very common, many that are usually independent assuming here the parasitic character; the *Vanda lowii*, for example, grows on the 260
lower branches of trees, and its strange pendent flower-stalks often hang down so as almost to reach the ground. Ferns are abundant, but not so varied as in Java.

Population.—The population of Borneo is not known with any approach to accuracy, but according to the political divisions of the island it is estimated as follows:—

Dutch Borneo	1,130,000
British North Borneo	200,000
Sarawak	500,000
Brunei	20,000

No effective census of the population has ever been taken, and vast areas in Dutch Borneo and in British North Borneo remain unexplored, and free from any practical authority or control. In Sarawak, owing to the high administrative genius of the first raja and his successor, the natives have been brought far more completely under control, but the raja has never found occasion to utilize the machinery of his government for the accurate enumeration of his subjects.

Dutch Borneo is divided for administrative purposes into two divisions, the western and the south and eastern respectively. Of the two, the former is under the more complete and effective control. The estimated population in the western division is 413,000 and in the south and eastern 717,000. Europeans number barely 1000; Arabs about 3000, and Chinese, mainly in the western division, over 40,000. In both divisions there is an average density of little more than 1 to every 2 sq. m. The sparseness of the population throughout the Dutch territory is due to a variety of causes—to the physical character of the country, which for the most part restricts the area of population to the near

neighbourhood of the rivers; to the low standard of civilization to which the majority of the natives have attained and the consequent disregard of sanitation and hygiene; to wars, piracy and head-hunting, the last of which has not even yet been effectually checked among some of the tribes of the interior; and to the aggression and oppressions in earlier times of Malayan, Arab and Bugis settlers. Among the natives, more especially of the interior, an innate restlessness which leads to a life of spasmodic nomadism, poverty, insufficient nourishment, an incredible improvidence which induces them to convert into intoxicating liquor a large portion of their annual crops, feasts of a semi-religious character which are invariably accompanied by prolonged drunken orgies, and certain superstitions which necessitate the frequent procuration of abortion, have contributed to check the growth of population. In Sambas, Montrado and some parts of Pontianak, the greater density of the population is due to the greater fertility of the soil, the opening of mines, the navigation and trade plied on the larger rivers, and the concentration of the population at the junctions of rivers, the mouths of rivers and the seats of government. Of the chief place in the western division, Pontianak has about 9000 inhabitants; Sambas about 8000; Montrado, Mampawa and Landak between 2000 and 4000 each; and in the south and eastern division there are Banjermasin with nearly 50,000 inhabitants; Marabahan, Amuntai, Negara, Samarinda and Tengarung with populations of from 5000 to 10,000 inhabitants each. In Amuntai and Martapura early Hindu colonization, of which the traces and the influence still are manifest, the fertile soil, trade and industry aided by navigable rivers, have co-operated towards the growth of population to a degree which presents a marked contrast to the conditions in the interior parts of the Upper Barito and of the more westerly rivers. Only a very small proportion of the Europeans in Dutch Borneo live by agriculture and industry, the great majority of them being officials. The Arabs and Chinese are engaged in trading, mining, fishing and agriculture. Of the natives fully 90% live by agriculture, which, however, is for the most part of a somewhat primitive description. The industries of the natives are confined to such crafts as spinning and weaving and dyeing, the manufacture of iron weapons and implements, boat- and shipbuilding, &c. More particularly in the south-eastern division, and especially in the districts of Negara, Banjermasin, Amuntai and Martapura, shipbuilding, iron forging, gold- and silversmith’s work, and the polishing of diamonds, are industries of high development in the larger centres of population.

Races.—The peoples of Borneo belong to a considerable variety of races, of different origin and degrees of civilization. The most important numerically are the Dyaks, the Dusuns and Muruts of the interior, the Malays, among whom must be counted such Malayan tribes as the Bajaus, Ilanuns, &c., the Bugis, who were originally immigrants from Celebes, and the Chinese. The Dutch, and to a minor extent the Arabs, are of importance on account of their political influence in Dutch Borneo, while the British communities have a similar importance in Sarawak and in British North Borneo. Accounts of the Malays, Dyaks and Bugis are given under their several headings, and some information concerning the Dusuns and Muruts will be found in the section below, which deals with British North Borneo. The connexion of the Chinese with Borneo calls for notice here. They seem to have been the first civilized people who had dealings with Borneo, if the colonization of a portion of the south-eastern corner of the island by Hindus be excepted. The Chinese annals speak of tribute paid to the empire by Pha-la on the north-east coast of the island as early as the 7th century, and later documents mention a Chinese colonization in the 15th century. The traditions of the Malays and Dyaks seem to confirm the statements, and many of the leading families of Brunei in north-west Borneo claim to have Chinese blood in their veins, while the annals of Sulu record an extensive Chinese immigration about 1575. However this may be, it is certain that the flourishing condition of Borneo in the 16th and 17th centuries was largely due to the energy of Chinese settlers and to trade with China. In the 18th century there was a considerable Chinese population settled in Brunei, engaged for the most part in planting and exporting pepper, but the consistent oppression of the native rajas destroyed their industry and led eventually to the practical extirpation of the Chinese. The Malay chiefs of other districts encouraged immigration from China with a view to developing the mineral resources of their territories, and before long Chinese settlers were to be found in considerable numbers in Sambas, Montrado, Pontianak and elsewhere. They were at first forbidden to engage in commerce or agriculture, to carry firearms, to possess or manufacture gunpowder. About 1779 the Dutch acquired immediate authority over all strangers, and thus assumed responsibility for the control of the Chinese, who presently proved themselves somewhat troublesome. Their numbers constantly increased and were reinforced by new immigrants, and pushing inland in search of fresh mineral-bearing areas, they contracted frequent intermarriages with the Dyaks and other non-Mahommedan natives. They brought with them from China their aptitude for the organization of secret societies which, almost from the first, assumed the guise of political associations. These secret societies furnished them with a machinery whereby collective action was rendered easy, and under astute leaders they offered a formidable opposition to the Dutch government. Later, when driven into the interior and eventually out of Dutch territory, they cost the first raja of Sarawak some severe contests before they were at last reduced to obedience. Serious disturbances among the Chinese are now in Borneo matters of ancient history, and to-day the Chinaman forms perhaps the most valuable element in the civilization and development of the island, just as does his fellow in the mining states of the Malayan Peninsula. They are industrious, frugal and intelligent; the richer among them are excellent men of business and are peculiarly equitable in their dealings; the majority of all classes can read and write their own script, and the second generation acquires an education of an European type with great facility. The bulk of the shopkeeping, trading and mining industries, so long as the mining is of an alluvial character, is in Chinese hands. The greater part of the Chinese on the west coast are originally drawn from the boundaries of Kwang-tung and Kwang-si. They are called Kehs by the Malays, and are of the same tribes as those which furnish the bulk of the workers to the tin mines of the Malay Peninsula. They are a rough and hardy people, and are apt at times to be turbulent. The shopkeeping class comes mostly from Fuh-kien and the coast districts of

Amoy. They are known to the Borneans as Ollohs.

History.—As far as is known, Borneo never formed a political unity, and even its geographical unity as an island is a fact unappreciated by the vast majority of its native inhabitants. The name of Kalamantan has been given by some Europeans (on what original authority it is not possible now to ascertain) as the native name for the island of Borneo considered as a whole; but it is safe to aver that among the natives of the island itself Borneo has never borne any general designation. To this day, among the natives of the Malayan Archipelago, men speak of going to Pontianak, to Sambas or to Brunei, as the case may be, but make use of no term which recognizes that these localities are part of a single whole. The only archaeological remains are a few Hindu temples, and it is probable that the early settlement of the south-eastern portion of the island by Hindus dates from some time during the first six centuries of our era. There exist, however, no data, not even any trustworthy tradition, from which to reconstruct the early history of Borneo. Borneo began to be known to Europeans after the fall of Malacca in 1511, when Alphonso d'Albuquerque despatched Antonio d'Abreu with three ships in search of the Molucca or Spice Islands with instructions to establish friendly relations with all the native states that he might encounter on his way. D'Abreu, sailing in a south-easterly direction from the Straits of Malacca, skirted the southern coast of Borneo and laid up his ships at Amboyna, a small island near the south-western extremity of Ceram. He returned to Malacca in 1514, leaving one of his captains, Francisco Serrano, at Ternate, where Magellan's followers found him in 1521. After Magellan's death, his comrades sailed from the Moluccas across the Celebes into the Sulu Sea, and were the first white men who are known to have visited Brunei on the north-west coast of Borneo, where they arrived in 1522. Pigafetta gives an interesting account of the place and of the reception of the adventurers by the sultan. The Molucca Islands being, at that time, the principal objective of European traders, and the route followed by Magellan's ships being frequently used, Borneo was often touched at during the remainder of the 16th century, and trade relations with Brunei were successfully established by the Portuguese. In 1573 the Spaniards tried somewhat unsuccessfully to obtain a share of this commerce, but it was not until 1580, when a dethroned sultan appealed to them for assistance and by their agency was restored to his own, that they attained their object. Thereafter the Spaniards maintained a fitful intercourse with Brunei, varied by not infrequent hostilities, and in 1645 a punitive expedition on a larger scale than heretofore was sent to chastise Brunei for persistent acts of piracy. No attempt at annexation followed upon this action, commerce rather than territory being at this period the prime object of both the Spaniards and the Portuguese, whose influence upon the natives was accordingly proportionately small. The only effort at proselytizing of which we have record came to an untimely end in the death of the Theatine monk, Antonio Ventimiglia, who had been its originator. Meanwhile the Dutch and British East India Companies had been formed, had destroyed the monopoly so long enjoyed by the Portuguese, and to a less extent the Spaniards, in the trade of the Malayan Archipelago, and had gained a footing in Borneo. The establishment of Dutch trading-posts on the west coast of Borneo dates from 1604, nine years after the first Dutch fleet, under Houtman, sailed from the Texel to dispute with the Portuguese the possession of the Eastern trade, and in 1608 Samuel Blommaert was appointed Dutch resident, or head factor, in Landak and Sukedana. The first appearance of the British in Borneo dates from 1609, and by 1698 they had an important settlement at Banjermasin, whence they were subsequently expelled by the influence of the Dutch, who about 1733 obtained from the sultan a trading monopoly. The Dutch, in fact, speedily became the predominant European race throughout the Malay Archipelago, defeating the British by superior energy and enterprise, and the trading-posts all along the western and southern coasts of Borneo were presently their exclusive possessions, the sultan of Bantam, who was the overlord of these districts, ceding his rights to the Dutch. The British meanwhile had turned their attention to the north of the island, over which the sultan of Sulu exercised the rights of suzerain, and from him, in 1759, Alexander Dalrymple obtained possession of the island of Balambangan, and the whole of the north-eastern promontory. A military post was established, but it was destroyed in 1775 by the natives under the *dâto'*, or vassal chiefs, who resented the cession of their territory. This mishap rendered a treaty, which had been concluded in 1774 with the sultan of Brunei, practically a dead letter, and by the end of the century British influence in Borneo was to all intents and purposes at an end. The Dutch also mismanaged their affairs in Borneo and suffered from a series of misfortunes which led Marshal Daendels in 1809 to order the abandonment of all their posts. The natives of the coasts of Borneo, assisted and stimulated by immigrants from the neighbouring islands to the north, devoted themselves more and more to organized piracy, and putting to sea in great fleets manned by two and three thousand men on cruises that lasted for two and even three years, they terrorized the neighbouring seas and rendered the trade of civilized nations almost impossible for a prolonged period. During the occupation of Java by the British an embassy was despatched to Sir Stamford Raffles by the sultan of Banjermasin asking for assistance, and in 1811 Alexander Hare was despatched thither as commissioner and resident. He not only obtained for his government an advantageous treaty, but secured for himself a grant of a district which he proceeded to colonize and cultivate. About the same time a British expedition was also sent against Sambas and a post established at Pontianak. On the restoration of Java to the Dutch in 1816, all these arrangements were cancelled, and the Dutch government was left in undisputed possession of the field. An energetic policy was soon after adopted, and about half the kingdom of Banjermasin was surrendered to the Dutch by its sultan in 1823, further concessions being made two years later. Meanwhile, George Müller, while exploring the east coast, obtained from the sultan of Kutei an acknowledgment of Dutch authority, a concession speedily repented by its donor, since the enterprising traveller was shortly afterwards killed. The outbreak of war in Java caused Borneo to be more or less neglected by the Dutch for a considerable period, and no effective check was imposed upon the natives with a view to stopping piracy, which was annually becoming more and more unendurable. On the rise of Singapore direct trade had been established with Sarawak and Brunei, and it became a matter of moment to British merchants that this traffic should be

safe. In 1838 Sir James Brooke, an Englishman, whose attention had been turned to the state of affairs in the Eastern Archipelago, set out for Borneo, determined, if possible, to remedy the evil. By 1841 he had obtained from the sultan of Brunei the grant of supreme authority over Sarawak, in which state, on the sultan's behalf, he had waged a successful war, and before many years had elapsed he had, with the aid of the British government, succeeded in suppressing piracy (see Brooke, Sir James; and Sarawak). In 1847 the sultan of Brunei agreed to make no cession of territory to any nation or individual without the consent of Great Britain. Since then more and more territory has been ceded by the sultans of Brunei to the raja of Sarawak and to British North Borneo, and to-day the merest remnant of his once extensive state is left within the jurisdiction of the sultan. The treaty in 1847 put an end once for all to the hopes which the Dutch had cherished of including the whole island in their dominions, but it served also to stimulate their efforts to consolidate their power within the sphere already subjected to their influence. Gunong Tebur, Tanjong, and Bulungan had made nominal submission to them in 1834, and in 1844 the sultan of Kutei acknowledged their protectorate, a treaty of a similar character being concluded about the same time with Pasir. The boundaries of British and Dutch Borneo were finally defined by a treaty concluded on the 20th of June 1891. In spite of this, however, large areas in the interior, both in Dutch Borneo and in the territory owned by the British North Borneo Company, are still only nominally under European control, and have experienced few direct effects of European administration.

British North Borneo or Sabah

Sabah is the name applied by the natives to certain portions of the territory situated on the north-western coast of the island, and originally in no way included the remainder of the country now owned by the British North Borneo Company. It has become customary, however, for the name to be used by Europeans in Borneo to denote the whole of the company's territory, and little by little the more educated natives are insensibly adopting the practice.

History.—As has been seen, the British connexion with northern and north-western Borneo terminated with the 18th century, nor was it resumed until 1838, when Raja Brooke set out for Brunei and Sarawak. The island of Labuan (*q.v.*) was occupied by the British as a crown colony in 1848, and this may be taken as the starting-point of renewed British relations with that portion of northern Borneo which is situated to the north of Brunei. In 1872 the Labuan Trading Company was established in Sandakan, the fine harbour on the northern coast which was subsequently the capital of the North Borneo Company's territory. In 1878, through the instrumentality of Mr (afterwards Sir) Alfred Dent, the sultan of Sulu was induced to transfer to a syndicate, formed by Baron Overbeck and Mr Dent, all his rights in North Borneo, of which, as has been seen, he had been from time immemorial the overlord. The chief promoters of this syndicate were Sir Rutherford Alcock, Admiral the Hon. Sir Harry Keppel, who at an earlier stage of his career had rendered great assistance to the first raja of Sarawak in the suppression of piracy, and Mr Richard B. Martin. Early in 1881 the British North Borneo Provisional Association, Limited, was formed to take over the concession which had been obtained from the sultan of Sulu, and in November of that year a petition was addressed to Queen Victoria praying for a royal charter. This was granted, and subsequently the British North Borneo Company, which was formed in May 1882, took over, in spite of some diplomatic protests on the part of the Dutch and Spanish governments, all the sovereign and territorial rights ceded by the original grants, and proceeded under its charter to organize the administration of the territory. The company subsequently acquired further sovereign and territorial rights from the sultan of Brunei and his chiefs in addition to some which had already been obtained at the time of the formation of the company. The Putatan river was ceded in May 1884, the Padas district, including the Padas and Kalias rivers, in November of the same year, the Kawang river in February 1885, and the Mantanani islands in April 1885. In 1888, by an agreement with the "State of North Borneo," the territory of the company was made a British protectorate, but its administration remained entirely in the hands of the company, the crown reserving only control of its foreign relations, and the appointment of its governors being required to receive the formal sanction of the secretary of state for the colonies. In 1890 the British government placed the colony of Labuan under the administration of the company, the governor of the state of North Borneo thereafter holding a royal commission as governor of Labuan in addition to his commission from the company. This arrangement held good until 1905, when, in answer to the frequently and strongly expressed desire of the colonists, Labuan was removed from the jurisdiction of the company and attached to the colony of the Straits Settlements. In March 1898 arrangements were made whereby the sultan of Brunei ceded to the company all his sovereign and territorial rights to the districts situated to the north of the Padas river which up to that time had been retained by him. This had the effect of rounding off the company's territories, and had the additional advantage of doing away with the various no-man's lands which had long been used by the discontented among the natives as so many Caves of Adullam. The company's acquisition of territory was viewed with considerable dissatisfaction by many of the natives, and this found expression in frequent acts of violence. The most noted and the most successful of the native leaders was a Bajau named Mat Saleh (Mahomet Saleh), who for many years defied the company, whose policy in his regard was marked by considerable weakness and vacillation. In 1898 a composition was made with him, the terms of which were unfortunately not defined with sufficient clearness, and he retired into the Tambunan country, to the east of the range which runs parallel with the west coast, where for a period he lorded it unchecked over the Dusun tribes of the valley. In 1899 it was found necessary to expel him, since his acts of aggression and defiance were no longer endurable. A short, and this time a successful campaign followed, resulting, on the 31st of January 1900, in the death of Mat Saleh, and the destruction of his defences. Some of his followers who escaped raided the town of Kudat on Marudu Bay in April of the same year, but caused more panic than damage, and little by little

during the next years the last smouldering embers of rebellion were extinguished. At the present time, though effective administration of the more inaccessible districts of the interior cannot be said to have been established even yet, the pacification of the native population is to all intents and purposes complete. The Tambunan district, the last stronghold of Mat Saleh, is now thoroughly settled. It is some 500 sq. m. in extent, and carries a population of perhaps 12,000.

Geography.—The state of North Borneo may roughly be said to form a pentagon of which three sides, the north-west, north-east and east are washed by the sea, while the remaining two sides, the south-west and the south, are bordered respectively by the Malayan sultanate of Brunei, and by the territories of the raja of Sarawak and of the Dutch government. The boundary between the company's territory and the Dutch government is defined by the treaty concluded in June 1891, of which mention has already been made.

The total area of the company's territory is estimated at about 31,000 sq. m., with a coast-line of over 900 m. The greater portion is exceedingly hilly and in parts mountainous, and the interior consists almost entirely of highlands with here and there open valleys and plateaus of 50 to 60 sq. m. in extent. On the west coast the mountain range, as already noted, runs parallel with the seashore at a distance from it of about 15 m. Of this range the central feature is the mountain of Kinabalu, which is composed of porphyritic granite and igneous rocks and attains to a height of 13,698 ft. Mount Madalon, some 15 or 20 m. to the north, is 5000 ft. in height, and inland across the valley of the Pagalan river, which runs through the Tambunan country and falls into the Padas, rises the peak of Trus Madi, estimated to be 11,000 ft. above sea-level. The valley of the Pagalan is itself for the most part from 1000 to 2000 ft. above the sea, forming a string of small plateaus marking the sites of former lakes. From the base of Trus Madi to the eastern coast the country consists of huddled hills broken here and there by regions of a more mountainous character. The principal plateaus are in the Tambunan and Kaningau valleys, in the basin of the Pagalan, and the Ranau plain to the eastward of the base of Kinabalu. Similar plateaus of minor importance are to be found dotted about the interior. The proximity of the mountain range to the seashore causes the rivers of the west coast, with the single exception of the Padas, to be rapid, boulder-obstructed, shallow streams of little value as means of communication for a distance of more than half a dozen miles from their mouths. The Padas is navigable for light-draught steam-launches and native boats for a distance of nearly 50 m. from its mouth, and smaller craft can be punted up as far as Rayoh, some 15 m. farther, but at this point its bed is obstructed by impassable falls and rapids, which are of such a character that nothing can even be brought down them. Even below Rayoh navigation is rendered difficult and occasionally dangerous by similar obstructions. The other principal rivers of the west coast are the Kalias, Kimanis, Benoneh, Papar, Kinarut, Putatan, Inaman, Mengkabong, Tampasuk and Pandasan, none of which, however, is of any great importance as a means of communication. There is a stout breed of pony raised along the Tampasuk, which is also noted for the Kalupis waterfall (1500 ft.), one of the highest in the world, though the volume of water is not great. Here also are the principal Bajau settlements. Throughout the Malayan Archipelago the words *Bâjau* and *pĕrômpak* (pirate) are still used as synonymous terms. At the northern extremity of the island Marudu Bay receives the waters of the Marudu which rises on the western side of Mount Madalon. On the east coast the principal rivers are the Sugut, which rises in the hills to the east of Kinabalu and forms its delta near Torongohok or Pura-Pura Island; the Labuk, which has its sources 70 m. inland and debouches into Labuk Bay; and the Kinabatangan, the largest and most important river in the territory, which is believed to have its rise eastward of the range of which Trus Madi is the principal feature, and is navigable by steamer for a considerable distance and by native boats for a distance of over 100 m. from its mouth. Some valuable tobacco land, which, however, is somewhat liable to flood, and some remarkable burial-caves are found in the valley of the Kinabatangan. The remaining rivers of the east coast are the Segamah, which rises west of Darvel Bay, the Kumpong, and the Kalabakang, which debouches into Cowie Harbour. Taking it as a whole, the company's territory is much less generously watered than are other parts of Borneo, which again compares unfavourably in this respect with the Malayan states of the peninsula. Many of the rivers, especially those of the west coast, are obstructed by bars at their mouths that render them difficult of access. Several of the natural harbours of North Borneo, on the other hand, are accessible, safe and commodious. Sandakan Harbour, on the north-east coast (5° 40′ N., 118° 10′ E.), runs inland for some 17 m. with a very irregular outline broken by the mouths of numerous creeks and streams. The mouth, only 2 m. across, is split into two channels by the little, high, bluff-like island of Barhala. The depth in the main entrance varies from 10 to 17 fathoms, and vessels drawing 20 ft. can advance half-way up the bay. The principal town in the territory, and the seat of government (though an attempt has been unsuccessfully made to transfer this to Jesselton on the west coast), is Sandakan, situated just inside the mouth of the Sarwaka inlet. At Silam, on Darvel Bay, there is good anchorage; and Kudat in Marudu Bay, first surveyed by Commander Johnstone of H.M.S. "Nigeria" in 1881, is a small but useful harbour.

Climate and Population.—The climate of North Borneo is tropical, hot, damp and enervating. The rainfall is steady and not usually excessive. The shade temperature at Sandakan ordinarily ranges from 72° to 94° F. The population of the company's territory is not known with any approach to accuracy, but is estimated, somewhat liberally, to amount to 175,000, including 16,000 Chinese. Of this total about three-fourths are found in the districts of the west coast. The seashore and the country bordering closely on the west coast are inhabited chiefly by Dusuns, by Kadayans, by Bajaus and Ilanuns—both Malayan tribes—and by Brunei Malays. The east coast is very sparsely populated and its inhabitants are mostly Bajaus and settlers from the neighbouring Sulu archipelago. The interior is dotted with infrequent villages inhabited by Dusuns or by Muruts, a village ordinarily consisting of a single long hut divided up into cubicles, one for the use of each family, opening out on to a common verandah along which the skulls captured by the tribe are festooned. It has been customary to speak of these tribes as

belonging to the Dyak group, but the Muruts would certainly seem to be the representatives of the aboriginal inhabitants of the island, and there is much reason to think that the Dusuns also must be classed as distinct from the Dyaks. The Dusun language, it is interesting to note, presents very curious grammatical complications and refinements such as are not to be found among the tongues spoken by any of the other peoples of the Malayan Archipelago or the mainland of south-eastern Asia. Dusuns and Muruts alike are in a very low state of civilization, and both indulge inordinately in the use of intoxicating liquors of their own manufacture.

Settlements and Communication.—The company possesses a number of small stations along the coast, of which Sandakan, with a population of 9 500, is the most important. The remainder which call for separate mention are Lahat Datu on Darvel Bay on the east coast; Kudat on Marudu Bay and Jesselton on Gaya Bay on the west coast. A railway of indifferent construction runs along the west coast from Jesselton to Weston on Brunei Bay, with a branch along the banks of the Padas to Tenom above the rapids. It was originally intended that this should eventually be extended across the territory to Cowie Harbour (Sabuko Bay) on the east coast, but the extraordinary engineering difficulties which oppose themselves to such an extension, the sparse population of the territory, and the failure of the existing line to justify the expectations entertained by its designers, combine to render the prosecution of any such project highly improbable. Sandakan is connected by telegraph with Mempakul on the west coast whence a cable runs to Labuan and so gives telegraphic communication with Singapore. The overland line from Mempakul to Sandakan, however, passes through forest-clad and very difficult country, and telegraphic communication is therefore subject to very frequent interruption. Telegraphic communication between Mempakul and Kudat, via Jesselton, has also been established and is more regularly and successfully maintained. The only roads in the territory are bridle-paths in the immediate vicinity of the company's principal stations. The Sabah Steamship Company, subsidized by the Chartered Company, runs steamers along the coast, calling at all the company's stations at which native produce is accumulated. A German firm runs vessels at approximately bi-monthly intervals from Singapore to Labuan and thence to Sandakan, calling in on occasion at Jesselton and Kudat *en route*. There is also fairly frequent communication between Sandakan and Hong-Kong, a journey of four days' steaming.

Products and Trade.—The capabilities of the company's territory are only dimly known. Coal has been found in the neighbourhood of Cowie Harbour and elsewhere, but though its quality is believed to be as good as that exported from Dutch Borneo, it is not yet known whether it exists in payable quantities. Gold has been found in alluvial deposits on the banks of some of the rivers of the east coast, but here again the quantity available is still in serious doubt. The territory as a whole has been very imperfectly examined by geologists, and no opinion can at present be hazarded as to the mineral wealth or poverty of the company's property. Traces of mineral oil, iron ores, copper, zinc and antimony have been found, but the wealth of North Borneo still lies mainly in its jungle produce. It possesses a great profusion of excellent timber, but the difficulty of extraction has so far restricted the lumber industry within somewhat modest limits. Gutta, rubber, rattans, mangrove-bark, edible nuts, guano, edible birds'-nests, &c., are all valuable articles of export. The principal cultivated produce is tobacco, sago, cocoanuts, coffee, pepper, gambier and sugar-canes. Of these the tobacco and the sago are the most important. Between 1886 and 1900 the value of the tobacco crop increased from £471 to £200,000.

As is common throughout Malayan lands, the trade of North Borneo is largely in the hands of Chinese shopkeepers who send their agents inland to attend the *Tamus* (Malay, *tĕmu*, to meet) or fairs, which are the recognized scenes of barter between the natives of the interior and those of the coast. At Sandakan there is a Chinese population of over 2000.

Administration.—For administrative purposes the territory is divided into nine provinces: Alcock and Dewhurst in the north; Keppel on the west; Martin in the centre; Myburgh, Mayne and Elphinstone on the east coast; and Dent and Cunliffe in the south. The boundaries of these provinces, however, are purely arbitrary and not accurately defined. The form of government is modelled roughly upon the system adopted in the Malay States of the peninsula during the early days of their administration by British residents. The government is vested primarily in the court of directors appointed under the company's charter, which may be compared to the colonial office in its relation to a British colony, though the court of directors interests itself far more closely than does the colonial department in the smaller details of local administration. The supreme authority on the spot is represented by the governor, under whom are the residents of Kudat, Darvel Bay and Keppel, officers who occupy much the same position as that usually known by the title of magistrate and collector. The less important districts are administered by district magistrates, who also collect the taxes. The principal departments, whose chiefs reside at the capital, are the treasury, the land and survey, the public works, the constabulary, the medical and the judicial. The secretariat is under the charge of a government secretary who ranks next in precedence to the governor. Legislation is by the proclamation of the governor, but there is a council, meeting at irregular intervals, upon which the principal heads of departments and one unofficial member have seats. The public service is recruited by nomination by the court of directors. The governor is the chief judge of the court of appeal, but a judge who is subordinate to him takes all ordinary supreme court cases. The laws are the Indian Penal and Civil Procedure Codes and Evidence Acts, supplemented by a few local laws promulgated by proclamation. There is an Imam's court for the trial of cases affecting Mahommedan law of marriage, succession, &c. The native chiefs are responsible to the government for the preservation of law and order in their districts. They have restricted judicial powers. The constabulary numbers some 600 men and consists of a mixed force of Sikhs, Pathans, Punjabi Mahommedans, Dyaks and Malays, officered by a few Europeans. There is a Protestant mission which supports a church—the only stone building in the territory—and a school at

Sandakan, with branches at Kudat, Kaningau and Tambunan. The Roman Catholic mission maintains an orphanage, a church and school at Sandakan, and has missions among the Dusuns at several points on the west coast and in the Tambunan country. Its headquarters are at Kuching in Sarawak. The Chinese have their joss-houses and the Mahommedans a few small mosques, but the vast majority of the native inhabitants are pagans who have no buildings set apart for religious purposes.

Finance and Money.—The principal sources of revenue are the licences granted for the importation and retailing of opium, wine and spirits, which are in the hands of Chinese; a customs duty of 5% on imports; an export tax of 5% on jungle produce; a poll-tax sanctioned by ancient native custom; and a stamp duty. A land revenue is derived from the sale of government lands, from quit rents and fees of transfer, &c. Judicial fees bring in a small amount, and the issue and sale of postage and revenue stamps have proved a fruitful source of income. The people of the country are by no means heavily taxed, a large number of the natives of the interior escaping all payment of dues to the company, the revenue being for the most part contributed by the more civilized members of the community residing in the neighbourhood of the company's stations. There are bank agencies in Sandakan, and the company does banking business when required. The state, which has adopted the penny postage, is in the Postal Union, and money orders on North Borneo are issued in the United Kingdom and in most British colonies and vice versa. Notes issued by the principal banks in Singapore were made current in North Borneo in 1900. There is also a government note issue issued by the company for use within the territory only. The currency is the Mexican and British dollar, the company issuing its own copper coin —viz. cents and half cents. It is proposed to adopt the coinage of the Straits Settlements, and measures have been taken with a view to the accomplishment of this. In the interior the principal medium of exchange among the natives is the large earthenware jars, imported originally, it is believed, from China, which form the chief wealth both of tribes and individuals.

(H. Cl.)

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BORNHOLM, an island in the Baltic Sea, 22 m. S.E. of the Swedish coast, belonging to Denmark, lying on 15° E., and between 55° and 55° 18′ N., and measuring 24 m. from S.E. to N.W. and 19 (extreme) from E. to W. Pop. (1901) 40,889. The surface is generally hilly; the scenery is fine in the north, where the cliffs reach a height of 135 ft., and the granite hill of Helligdomsklipper dominates the island. Besides freestone, exported for building, limestone, blue marble, and porcelain-clay are worked. A little coal is found and used locally, but it is not of good quality. Oats, flax and hemp are cultivated. The inhabitants are employed in agriculture, fishing, brewing, distillation and the manufacture of earthenware. Weaving and clock-making are also carried on to some extent. The capital is Rönne (115 m. by sea from Copenhagen), and there are five other small towns on the island—Svanike, Neksö, Hasle, Allinge, and Sandvig. A railway connects Rönne with Neksö (22 m. E. by S.), where a bust commemorates J.N. Madvig, the philologist, who was born there in 1804 (d. 1886). Blanch's Hotel, 10 m. N. of Rönne, is the most favoured resort on the island, which attracts many visitors. On the north-west coast are the ruins of the castle of Hammershus, which was built in 1158, and long served as a state prison; while another old castle, erected by Christian V. in 1684, and important as commanding the entrance to the Baltic, is situated on Christiansö, one of a small group of islands 15 m. E. by N. The island of Bornholm has had an eventful history. In early times it was long the independent seat of marauding Vikings. In the 12th century it became a fief of the archbishop of Lund. In 1510 it was captured by the Hanseatic League, in 1522 it came under Danish sway, and in 1526 it was made directly subject to the city of Lübeck. In 1645 the Swedes took it by storm, and their possession of it was confirmed by the peace of Roskilde in 1658; but the sympathies of the people were with Denmark, and a popular insurrection succeeded in expelling the Swedish forces, the island coming finally into the

possession of Denmark in 1660.

BORNIER, HENRI, Vicomte de (1825-1901) French poet and dramatist, was born at Lunel (Hérault) on the 25th of December 1825. He came to Paris in 1845 With the object of studying law, but in that year he published a volume of verse, *Les Premières Feuilles*, and the Comédie Francaise accepted a play of his entitled *Le Mariage de Luther*. He was given a post in the library of the Arsenal, where he served for half a century, becoming director in 1889. In 1875 was produced at the Théâtre Français his heroic drama in verse, *La Fille de Roland*. The action of the play turns on the love of Gérald, son of the traitor Ganelon, for the daughter of Roland. The patriotic subject and the nobility of the character of Gérald, who renounces Berthe when he learns his real origin, procured for the piece a great success. The conflict between honour and love and the grandiose sentiment of the play inevitably provoked comparison with Corneille. The piece would indeed be a masterpiece if, as its critics were not slow to point out, the verse had been quite equal to the subject. Among the numerous other works of M. de Bornier should be mentioned: *Dimitri* (1876), libretto of an opera by M.V. de Joncières; and the dramas, *Les Noces d'Allila* (1880) and *Mahomet* (1888). The production of this last piece was forbidden in deference to the representations of the Turkish ambassador. Henri de Bornier was critic of the *Nouvelle Revue* from 1879 to 1887. His *Poésies complètes* were published in 1894. He died in January 1901.

BORNU, a country in the Central Sudan, lying W. and S. of Lake Chad. It is bounded W. and S. by the Hausa states and N. by the Sahara. Formerly an independent Mahommedan sultanate it has been divided between Great Britain, Germany and France. To France has fallen a portion of northern Bornu and also Zinder (*q.v.*), a tributary state to the north-west, while the south-west part is incorporated in the German colony of Cameroon. Three-fourths of Bornu proper, some 50,000 sq. m., forms part of the British protectorate of Nigeria.

Bornu is for the most part an alluvial plain, the country sloping gradually to Lake Chad, which formerly spread over a much larger area than it now occupies. The Komadugu (*i.e.* river) Waube—generally known as the Yo—and its tributaries rise in the highlands which, beyond the western border of Bornu, form the watershed between the Niger and Chad systems, and flow north and east across the plains to Lake Chad, the Yo in its last few miles marking the frontier between the French and British possessions. In the south-west a part of Bornu drains to the Benue. The rivers are intermittent, and water in southern Bornu is obtained only from wells, which are sunk to a great depth. The vast plain of Bornu is stoneless, except for rare outcrops of ironstone, and consists of the porous fissured black earth called "cotton soil" in India, alternating with, or more probably overlaid by, sand. Throughout the flat country water is apparently found everywhere at a depth of 54 ft., corresponding to the level of Chad. Towards Damjiri in the north-west the country becomes more broken, hilly and timbered. In the south limestone is found near Gujba and also along the Gongola tributary of the Benue. A forest of red and green barked acacia, yielding the species of gum most valuable in the market, extends from the Gongola to Gujba. Immense baobabs (*Adansonia digitata*), fine tamarinds and a few trees of the genus *Ficus* are met with in the south. North of Maifoni (latitude 12° N.) the baobab ceases, except at Kuka, where extensive plantations have been made, and its place is taken by the *Kigelia* and also by a very handsome species of *Diospyros*. North of Kuka is a dense belt of *Hyphaene* palm with fine tamarinds and figs. Cotton and indigo grow wild, and afford the materials for the cloths, finely dyed with blue stripes, which form the staple fabric of the country. On the shores of Lake Chad the cotton grown is of a peculiarly fine quality. Rice and wheat of excellent quality are raised, but in small quantities, the staple food being a species of millet called *gussub*, which is made into a kind of paste and eaten with butter or honey. Ground-nuts, yams, sweet potatoes, several sorts of beans and grains, peppers, onions, water-melons and tomatoes are grown. Of fruit trees the country possesses the lime and fig.

Wild animals, in great numbers, find both food and cover in the extensive districts of wood and marsh. Lions, giraffes, elephants, hyenas, crocodiles, hippopotami, antelopes, gazelles and ostriches are found. The horse, the camel and the ox are the chief domestic animals; all are used as beasts of burden. The country abounds with bees, and honey forms one of the chief Bornuese delicacies.

The climate, especially from March to the end of June, is oppressively hot, rising sometimes to 105° and 107°, and even during most of the night not falling much below 100°. In May the wet season begins, with violent storms of thunder and lightning. In the end of June the rivers and lakes begin to overflow, and for several months the rains, accompanied with sultry weather, are almost incessant. The inhabitants at this season suffer greatly from fevers. In October the rains abate; cool, fresh winds blow from the west and north-west; and for several months the climate is healthy and agreeable.

Inhabitants.—The inhabitants, of whom the great majority profess Mahommedanism, are divided into Negroes and those of mixed blood, *i.e.* Negro and Berber, Arab or other crossing. The total population of British Bornu is estimated at 500,000. The dominant tribe, called Bornuese, Berberi or Kanuri, a

Negro race with an infusion of Berber blood, have black skins, large mouths, thick lips and broad noses, but good teeth and high foreheads. The females add to their want of beauty by extensive tattooing; they also stain their faces with indigo, and dye their front teeth black and their canine teeth red. The law allows polygamy, but the richest men have seldom more than two or three wives. The marriage ceremonies last for a whole week, the first three days being spent in feasting on the favourite national dishes, and the others appropriated to certain symbolical rites. A favourite amusement is the watching of wrestling matches. A game bearing some resemblance to chess, played with beans and holes in the sand, is also a favourite occupation.

The pastoral districts of the country are occupied by the Shuwas, who are of Arab origin, and speak a well-preserved dialect of Arabic. Of the date of their immigration from the East there is no record; but they were in the country as early as the middle of the 17th century. They are divided into numerous distinct clans. Their villages in general consist of rudely constructed huts, of an exaggerated conical form. Another tribe, called La Salas, inhabits a number of low fertile islands in Lake Chad, separated from the mainland by fordable channels.

The Bornuese are noted horsemen, and in times of war the horses, as well as the riders, used to be cased in light iron mail. The Shuwas, however, are clad only in a light shirt, and the Kanembu spearmen go almost naked, and fight with shield and spear. It is indispensable to a chief of rank that he should possess a huge belly, and when high feeding cannot produce this, padding gives the appearance of it. Notwithstanding the heat of the climate, the body is enveloped in successive robes, the number indicating the rank of the wearer. The head likewise is enclosed in numerous turbans. The prevailing language in Bornu is the Kanuri. It has no affinity, according to Heinrich Barth, with the great Berber family. A grammar was published in 1854 by S.W. Koelle, as well as a volume of tales and fables, with a translation and vocabulary.

The towns in Bornu, which have populations varying from 10,000 to 50,000 or more, are surrounded with walls 35 or 40 ft. in height and 20 ft. in thickness, having at each of the four corners a triple gate, composed of strong planks of wood, with bars of iron. The abodes of the principal inhabitants form an enclosed square, in which are separate houses for each of the wives; the chief’s palace consists of turrets connected together by terraces. These are well built of a reddish clay, highly polished, so as to resemble stucco; the interior roof, though composed only of branches, is tastefully constructed. Maidugari, which in 1908 became the seat of the native government, is a thriving commercial town some 70 m. south-west of Lake Chad. The former capital, Kuka (*q.v.*), and Ngornu (the town of “blessing”), are near the shores of Lake Chad. On the Yo are still to be seen extensive remains of Old Bornu or Birni and Gambarou or Ghambaru, which were destroyed by the Fula about 1809. Dikwa, the capital chosen by Rabah (see below), lies in the German part of Bornu.

History.—The history of Bornu goes back to the 9th century A.D., but its early portions are very fragmentary and dubious. The first dynasty known is that of the Sefuwa or descendants of Sef, which came to the throne in the person of Dugu or Duku, and had its capital at Njimiye (Jima) in Kanem on the north-east shores of Lake Chad. The Sefuwa are of Berber origin, the descent from Sef, the Himyaritic ruler, being mythical. From this Berber strain comes the name Berberi or Ba-Berberche, applied by the Hausa to the inhabitants of Bornu. Mahommedanism was adopted towards the end of the 11th century, and has since continued the religion of the country. From 1194 to 1220 reigned Selma II., under whom the power of the kingdom was greatly extended; and Dunama II., his successor was also a powerful and warlike prince. In the following reigns the prosperity of the country began to diminish, and about 1386 the dynasty was expelled from Njimiye, and forced to seek refuge in the western part of its territory by the invasion of the Bulala. Mai Ali (I.) Ghajideni, who founded the city of Birni, rendered his country once more redoubtable and strong. His successor, Idris II., completely vanquished the Bulala and subjugated Kanem; and under Mahommed V., the next monarch, Bornu reached its highest pitch of greatness. At this period Zinder became a tributary state. A series of for the most part peaceful reigns succeeded till about the middle of the 18th century, when Ali (IV.) Omarmi entered upon a violent struggle with the Tuareg or Imoshagh. Under his son Ahmed (about 1808) the kingdom began to be harassed by the Fula, who had already conquered the Hausa country. Expelled from his capital by the invaders, Ahmed was only restored by the assistance of the fakir Mahommed al-Amin al-Kanemi, who, pretending to a celestial mission, hoisted the green flag of the Prophet, and undertook the deliverance of his country. The Fula appear to have been taken by surprise, and were in ten months driven completely out of Bornu. The conqueror invested the nearest heir of the ancient kings with all the appearance of sovereignty—reserving for himself, however, under the title of sheik, all its reality. The court of the sultan (*shehu*) was established at New Bornu, or Birni, which was made the capital, the old city having been destroyed during the Fula invasion; while the sheik, in military state, took up his residence at the new city of Kuka. Fairly established, he ruled the country with a rod of iron, and at the same time inspired his subjects with a superstitious notion of his sanctity. His zeal was peculiarly directed against moral or religious offences. The most frivolous faults of women, as talking too loud, and walking in the street unveiled, rendered the offender liable to public indictment, while graver errors were visited with the most ignominious punishments, and often with death itself. Kanemi died in 1835, and was succeeded by his son, Sheik Omar, who altogether abolished the nominal kingship of the Sefuwa.

During Omar’s reign, which lasted about fifty years, Bornu was visited by many Europeans, who reached it via Tripoli and the Sahara. The first to enter the country were Walter Oudney, Hugh Clapperton and Dixon Denham (1823). They were followed in 1851-1855 by Heinrich Barth. Later travellers included Gerhard Rohlfs (1866) and Gustav Nachtigal. All these travellers were well received by the Kanuri, whose power from the middle of the 19th century began to decay. This was foreseen by

Barth; and Nachtigal, who in 1870 conveyed presents sent by King William of Prussia, in acknowledgment of the sheik's kindness to many German explorers, writes thus in December 1872:

> "The rapid declension of Bornu is an undeniable and lamentable fact. It is taking place with increasing rapidity, and the boundless weakness of Sheik Omar—otherwise so worthy and brave a man—must bear almost all the blame. His sons and ministers plunder the provinces in an almost unheard-of manner; trade and intercourse are almost at a standstill; good faith and confidence exist no more. The indolence of the court avoids military expeditions, and anarchy and a lack of security on the routes are the consequences.... Thus the sheik and the land grow poorer and poorer, and public morality sinks lower and lower."

After the visit of Nachtigal the country was visited by no European traveller until 1892, when Colonel P.L. Monteil resided for a time at Kuka during his great journey from the Senegal to Tripoli. The French traveller noticed many signs of decadence, the energy of the people being sapped by luxury, while a virtual anarchy prevailed owing to rivalries and intrigues among members of the royal family. The chief of Zinder had ceased to pay tribute, and the sultan was not strong enough to exact it by force. At the same time a danger was threatening from the south-east, where the negro adventurer Rabah, once a slave of Zobeir Pasha, was menacing the kingdom of Bagirmi. After making himself master of the fortified town of Manifa, Rabah proceeded against Bornu, defeating the army of the sultan Ahsem in two pitched battles. In December 1893 Ahsem fled from Kuka, which was entered by Rabah and soon afterwards destroyed, the capital being transferred to Dikwa in the south-east of the kingdom. These events ruined for many years the trade between Tripoli and Kuka by the long-established route via Bilma. Rabah had raised a large, well-drilled army, and proved a formidable opponent to the French in their advance on Lake Chad from the south. However in 1900 he was killed at Kussuri near the lower Shari, by the combined forces of three French expeditions which had been converging from the Congo, the Sahara and the Niger.

By an Anglo-French agreement of 1898 the tributary state of Zinder in the north had been included in the French sphere, and after the defeat of Rabah French military expeditions occupied both the German and British portions of Bornu, but in 1902 on the appearance of British and German expeditions the French withdrew to their own country east of the Shari. The British placed on the throne of Bornu Shehu Garbai, a descendant of the ancient sultans, and Kuka was again chosen as the capital of the state. From that date British Bornu has been under administrative control. It has been divided into East and West Bornu, the line of division being fixed approximately at longitude 12°, and placed under the administration of a resident. Maifoni and Kuka were selected for British stations in the east, and Damjiri and Gujba in the west. Garrisons are quartered at these points. The province has been mapped, and a network of tracks available for wheeled transport has been made through it. Water communication with the Benue and Niger has been opened through the Gongola river. The *shehu*, who took the oath of allegiance to the British crown on the occasion of his formal installation in November 1904, is maintained in all local dignity as a native chief, and co-operates loyally with the British administration. Peace has prevailed in Bornu since the British occupation, and it is estimated that the population has increased by immigration to about 50% more than it was in 1902. The people are industrious. Extensive areas are being brought under cultivation, and taxes are collected without difficulty. Owing to its increasing commercial importance, the native capital was in 1908 transferred to Maidugari (see also NIGERIA: *History;* and RABAH).

AUTHORITIES.—Heinrich Barth's *Travels in North and Central Africa* (1857, new ed., London, 1890) contains an exact picture of the state in the period (*c.* 1850) preceding its decay. The earlier *Travels* of Denham and Clapperton (London, 1828) may also be consulted, as well as Rohlfs, *Land und Volk in Afrika* (Bremen, 1870); Nachtigal, *Sahara und Sudan*, vol. i. (Berlin, 1879); and Monteil, *de St.-Louis à Tripoli par le lac Tchad* (Paris, 1895). For later information consult Lady Lugard's *A Tropical Dependency* (London, 1905), and the *Annual Reports*, from 1900 onward, on Northern Nigeria, issued by the Colonial Office, London.

(F. L. L.)

BORODIN, ALEXANDER PORFYRIEVICH (1834-1887), Russian musical composer, natural son of a Russian prince, was born in St Petersburg on the 12th of November 1834. He was brought up to the medical profession, and in 1862 was appointed assistant professor of chemistry at the St Petersburg academy of medicine. He wrote several works on chemistry, and took a leading part in advocating women's education, helping to found the school of medicine for women, and lecturing there from 1872 till his death. But he is best known as a musician. His interest in music was indeed stimulated from 1862 onwards by his friendship with Balakirev, and from 1863 by his marriage with a lady who was an accomplished pianist; but in his earlier years he had been proficient both in playing the piano, violin, 'cello and other instruments, and also in composing; and during life he did his best to pursue his studies in both music and chemistry with equal enthusiasm. Like other Russian composers he owed much to the influence of Liszt at Weimar. His first symphony was written in 1862-1867; his opera *Prince Igor*, begun in 1869, was left unfinished at his death, and was completed by Rimsky-Korsakov and Glazounov (1889); his symphonic sketch, "In the Steppes" (1880) is, however, his best-known work. Borodin also wrote a second symphony (1871-1877), part of a third (orchestrated after his death by Glazounov), and a few string quartets and some fine songs. His music is characteristically Russian, and of an advanced modern

type. He died suddenly at St Petersburg, on the 28th of February 1887.

BORODINO, a village of Russia, 70 m. W. by S. of Moscow, on the Kolotscha, an affluent of the river Moskva, famous as the scene of a great battle between the army of Napoleon and the Russians under Kutusov on the 7th of September 1812. Though the battle is remembered chiefly for the terrible losses incurred by both sides, in many respects it is an excellent example of Napoleon's tactical methods. After preliminary fighting on the 5th of September both sides prepared for battle on the 6th, Napoleon holding back in the hope of confirming the enemy in his resolution to fight a decisive battle. For the same reason the French right wing, which could have manoeuvred the Russians from their position, was designedly weakened. The Russian right, bent back at an angle and strongly posted, was also neglected, for Napoleon intended to make a direct frontal attack. The enemy's right centre near the village of Borodino was to be attacked by the viceroy of Italy, Eugene, who was afterwards to roll up the Russian line towards its centre, the so-called "great redoubt," which was to be attacked directly from the front by Ney and Junot. Farther to the French right, Davout was to attack frontally a group of field works on which the Russian left centre was formed; and the extreme right of the French army was composed of the weak corps of Poniatowski. The cavalry corps were assigned to the various leaders named, and the Guard was held in reserve. The whole line was not more than about 2 m. long, giving an average of over 20 men per yard. When the Russians closed on their centre they were even more densely massed, and their reserves were subjected to an effective fire from the French field guns. At 6 A.M. on the 7th of September the French attack began. By 8 A.M. the Russian centre was driven in, and though a furious counter-attack enabled Prince Bagration's troops to win back their original line, fresh French troops under Davout and Ney drove them back again. But the Russians, though they lost ground elsewhere, still clung to the great redoubt, and for a time the advance of the French was suspended by Napoleon's order, owing to a cavalry attack by the Russians on Eugene's extreme left. When this alarm was ended the advance was resumed. Napoleon had now collected a sufficient target for his guns. A terrific bombardment by the artillery was followed by the decisive charge of the battle, made by great masses of cavalry. The horsemen, followed by the infantry, charged at speed, broke the Russian line in two, and the French squadrons entered the gorge of the great redoubt just as Eugene's infantry climbed up its faces. In a fearful *mêlée* the Russian garrison of the redoubt was almost annihilated. The defenders were now dislodged from their main line and the battle was practically at an end. Napoleon has been criticized for not using the Guard, which was intact, to complete the victory. There is, however, no evidence that any further expenditure of men would have had good results. Napoleon had imposed his will on the enemy so far that they ceded possession of Moscow without further resistance. That the defeat and losses of the Russian field army did not end the war was due to the national spirit of the Russians, not to military miscalculations of Napoleon. Had it not been for this spirit, Borodino would have been decisive of the war without'the final blow of the Guard. As it was, the Russians lost about 42,000 men out of 121,000; Napoleon's army (of which one-half consisted of the contingents of subject allies-Germany, Poland, Switzerland, Holland, &c.) 32,000 out of 130,000 (Berndt, *Zahl im Kriege*). On the side of the French 31 general officers were killed, wounded or taken, and amongst the killed were General Montbrun, who fell at the head of his cavalry corps, and Auguste Caulaincourt, who took Montbrun's place and fell in the *mêlée* in the redoubt. The Russians lost 22 generals, amongst them Prince Bagration, who died of his wounds after the battle, and to whose memory a monument was erected on the battle-field by the tsar Nicholas I.

BOROLANITE, one of the most remarkable rocks of the British Isles, found on the shores of Loch Borolan in Sutherlandshire, after which it has been named. In this locality there is a considerable area of granite rich in red alkali felspar, and passing, by diminution in the amount of its quartz, into quartz-syenites (nordmarkites) and syenites. At the margins of the outcrop patches of nepheline-syenite occur; usually the nepheline is decomposed, but occasionally it is well-preserved; the other ingredients of the rock are brown garnet (melanite) and aegirine. The abundance of melanite is very unusual in igneous rocks, though some syenites, leucitophyres, and aegirine-felsites resemble borolanite in this respect. In places the nepheline-syenite assumes the form of a dark rock with large rounded white spots. These last consist of an intermixture of nepheline or sodalite and alkali-felspar. From the analogy of certain leucite-syenites which are known in Arkansas, it is very probable that these spots represent original leucites which have been changed into aggregates of the above-named minerals. They resemble leucite in their shape, but have not yet been proved to have its crystalline outlines. The "pseudo-leucites," as they have been called, measure one-quarter to three-quarters of an inch across. The dark matrix consists of biotite, aegirine-augite and melanite. Connected with the borolanite there are other types of nepheline-syenite and pegmatite. In Finland, melanite-bearing nepheline rocks have been found and described as Ijolite, but the only other locality for melanite-leucite-syenite is Magnet Cove in Arkansas.

(J. S. F.)

BORON (symbol B, atomic weight 11), one of the non-metallic elements, occurring in nature in the form of boracic (boric) acid, and in various borates such as borax, tincal, boronatrocalcite and boracite. It was isolated by J. Gay Lussac and L. Thénard in 1808 by heating boron trioxide with potassium, in an iron tube. It was also isolated at about the same time by Sir H. Davy, from boracic acid. It may be obtained as a dark brown amorphous powder by placing a mixture of 10 parts of the roughly powdered oxide with 6 parts of metallic sodium in a red-hot crucible, and covering the mixture with a layer of well-dried common salt. After the vigorous reaction has ceased and all the sodium has been used up, the mass is thrown into dilute hydrochloric acid, when the soluble sodium salts go into solution, and the insoluble boron remains as a brown powder, which may by filtered off and dried. H. Moissan (*Ann. Chim. Phys.*, 1895, 6, p. 296) heats three parts of the oxide with one part of magnesium powder. The dark product obtained is washed with water, hydrochloric acid and hydrofluoric acid, and finally calcined again with the oxide or with borax, being protected from air during the operation by a layer of charcoal. Pure amorphous boron is a chestnut-coloured powder of specific gravity 2.45; it sublimes in the electric arc, is totally unaffected by air at ordinary temperatures, and burns on strong ignition with production of the oxide B_2O_3 and the nitride BN. It combines directly with fluorine at ordinary temperature, and with chlorine, bromine and sulphur on heating. It does not react with the alkali metals, but combines with magnesium at a low red heat to form a boride, and with other metals at more or less elevated temperatures. It reduces many metallic oxides, such as lead monoxide and cupric oxide, and decomposes water at a red heat. Heated with sulphuric acid and with nitric acid it is oxidized to boric acid, whilst on fusion with alkaline carbonates and hydroxides it gives a borate of the alkali metal. Like silicon and carbon, very varying values had been given for its specific heat, until H.F. Weber showed that the specific heat increases rapidly with increasing temperature. By strongly heating a mixture of boron trioxide and aluminium, protected from the air by a layer of charcoal, F. Wöhler and H. Sainte-Claire Deville obtained a grey product, from which, on dissolving out the aluminium with sodium hydroxide, they obtained a crystalline product, which they thought to be a modification of boron, but which was shown later to be a mixture of aluminium borides with more or less carbon. Boron dissolves in molten aluminium, and on cooling, transparent, almost colourless crystals are obtained, possessing a lustre, hardness and refractivity near that of the diamond. In 1904 K.A. Kühne (D.R.P. 147,871) described a process in which external heating is not necessary, a mixture of aluminium turnings, sulphur and boric acid being ignited by a hot iron rod, the resulting aluminium sulphide, formed as a by-product, being decomposed by water.

Boron hydride has probably never been isolated in the pure condition; on heating boron trioxide with magnesium filings, a magnesium boride Mg_3B_2 is obtained, and if this be decomposed with dilute hydrochloric acid a very evil-smelling gas, consisting of a mixture of hydrogen and boron hydride, is obtained. This mixture burns with a green flame forming boron trioxide; whilst boron is deposited on passing the gas mixture through a hot tube, or on depressing a cold surface in the gas flame. By cooling it with liquid air Sir W. Ramsay and H.S. Hatfield obtained from it a gas of composition B3H3. The mixture probably contained also some BH_3 (W. Ramsay and H.S. Hatfield, *Proc. Chem. Soc.*, 17, p. 152). Boron fluoride BF_3 was first prepared in 1808 by Gay Lussac and L. Thénard and is best obtained by heating a mixture of the trioxide and fluorspar with concentrated sulphuric acid. It is a colourless pungent gas which is exceedingly soluble in water. It fumes strongly in air, and does not attack glass. It rapidly absorbs the elements of water wherever possible, so that a strip of paper plunged into the gas is rapidly charred. It does not burn, neither does it support combustion. A saturated solution of the gas, in water, is a colourless, oily, strongly fuming liquid which after a time decomposes, with separation of metaboric acid, leaving hydrofluoboric acid $HF{\cdot}BF_3$ in solution. This acid cannot be isolated in the free condition, but many of its salts are known. Boron fluoride also combines with ammonia gas, equal volumes of the two gases giving a white crystalline solid of composition $BF_3{\cdot}NH_3$; with excess of ammonia gas, colourless liquids $BF_3{\cdot}2NH_3$ and $BF_3{\cdot}3NH_3$ are produced, which on heating lose ammonia and are converted into the solid form.

Boron chloride BCl_3 results when amorphous boron is heated in chlorine gas, or more readily, on passing a stream of chlorine over a heated mixture of boron trioxide and charcoal, the volatile product being condensed in a tube surrounded by a freezing mixture. It is a colourless fuming liquid boiling at 17-18° C, and is readily decomposed by water with formation of boric and hydrochloric acids. It unites readily with ammonia gas forming a white crystalline solid of composition $2BCl_3{\cdot}3NH_3$.

Boron bromide BBr_3 can be formed by direct union of the two elements, but is best obtained by the method used for the preparation of the chloride. It is a colourless fuming liquid boiling at 90.5° C. With water and with ammonia it undergoes the same reactions as the chloride. Boron and iodine do not combine directly, but gaseous hydriodic acid reacts with amorphous boron to form the iodide, BI_3, which can also be obtained by passing boron chloride and hydriodic acid through a red-hot porcelain tube. It is a white crystalline solid of melting point 43 C.; it boils at 210° C., and it can be distilled without decomposition. It is decomposed by water, and with a solution of yellow phosphorus in carbon bisulphide it gives a red powder of composition PBI_2, which sublimes *in vacuo* at 210° C. to red crystals, and when heated in a current of hydrogen loses its iodine and leaves a residue of boron phosphide PB.

Boron nitride BN is formed when boron is burned either in air or in nitrogen, but can be obtained more readily by heating to redness in a platinum crucible a mixture of one part of anhydrous borax with two parts of dry ammonium chloride. After fusion, the melt is well washed with dilute hydrochloric acid and then with water, the nitride remaining as a white powder. It can also be prepared by heating borimide $B_2(NH)_3$; or by heating boron trioxide with a metallic cyanide. It is insoluble in water and unaffected by most reagents, but when heated in a current of steam or boiled for some time with a caustic alkali, slowly decomposes with evolution of ammonia and the formation of boron trioxide or an alkaline borate; it dissolves slowly in hydrofluoric acid.

Borimide $B_2(NH)_3$ is obtained on long heating of the compound $B_2S_3{\cdot}6NH_2$ in a stream of hydrogen, or ammonia gas at 115-120° C. It is a white solid which decomposes on heating into boron nitride and ammonia. Long-continued heating with water also decomposes it slowly.

Boron sulphide B_2S_3 can be obtained by the direct union of the two elements at a white heat or from the tri-iodide and sulphur at 440° C., but is most conveniently prepared by heating a mixture of the trioxide and carbon in a stream of carbon bisulphide vapour. It forms slightly coloured small crystals possessing a strong disagreeable smell, and is rapidly decomposed by water with the formation of boric acid and sulphuretted hydrogen. A pentasulphide B_2S_5 is prepared, in an impure condition, by heating a solution of sulphur in carbon bisulphide with boron iodide, and forms a white crystalline powder which decomposes under the influence of water into sulphur, sulphuretted hydrogen and boric acid.

Boron trioxide B_2O_3 is the only known oxide of boron; and may be prepared by heating amorphous boron in oxygen, or better, by strongly igniting boric acid. After fusion the mass solidifies to a transparent vitreous solid which dissolves readily in water to form boric acid (*q.v.*); it is exceedingly hygroscopic and even on standing in moist air becomes opaque through absorption of water and formation of boric acid. Its specific gravity is 1.83 (J. Dumas). It is not volatile below a white heat, and consequently, if heated with salts of more volatile acids, it expels the acid forming oxide from such salts; for example, if potassium sulphate be heated with boron trioxide, sulphur trioxide is liberated and potassium borate formed. It also possesses the power of combining with most metallic oxides at high temperatures, forming borates, which in many cases show characteristic colours. Many organic compounds of boron are known; thus, from the action of the trichloride on ethyl alcohol or on methyl alcohol, ethyl borate $B(OC_2H_5)_3$ and methyl borate $B(OCH_3)_3$ are obtained. These are colourless liquids boiling at 119° C. and 72° C. respectively, and both are readily decomposed by water. By the action of zinc methyl on ethyl borate, in the requisite proportions, boron trimethyl is obtained, thus:—$2B(OC_2H_5)_2 + 6Zn(CH_3)_2 = 2B(CH_3)_3 + 6Zn < \{ CH_3 / OC_2H_5 \}$ as a colourless spontaneously inflammable gas of unbearable smell. Boron triethyl $B(C_2H_5)_3$ is obtained in the same manner, by using zinc ethyl. It is a colourless spontaneously inflammable liquid of boiling point 95° C. By the action of one molecule of ethyl borate on two molecules of zinc ethyl, the compound $B(C_2H_5)_2{\cdot}OC_2H_5$ diethylboron ethoxide is obtained as a colourless liquid boiling at 102° C. By the action of water it is converted into $B(C_2H_5)_2{\cdot}OH$, and this latter compound on exposure to air takes up oxygen slowly, forming the compound $B{\cdot}C_2H_5{\cdot}OC_2H_5{\cdot}OH$, which, with water, gives $B(C_2H_5){\cdot}(OH)_2$. From the condensation of two molecules of ethyl borate with one molecule of zinc ethyl the compound $B_2{\cdot}C_2H_5{\cdot}(OC_2H_5)_5$ is obtained as a colourless liquid of boiling point. 112° C. Boron triethyl and boron trimethyl both combine with ammonia.

The atomic weight of boron has been determined by estimating the water content of pure borax (J. Berzelius), also by conversion of anhydrous borax into sodium chloride (W. Ramsay and E. Aston) and from analysis of the bromide and chloride (Sainte-Claire Deville); the values obtained ranging from 10.73 to 11.04. Boron can be estimated by precipitation as potassium fluoborate, which is insoluble in a mixture of potassium acetate and alcohol. For this purpose only boric acid or its potassium salt must be present; and to ensure this, the borate can be distilled with sulphuric acid and methyl alcohol and the volatile ester absorbed in potash.

BOROUGH [Burrough, Burrowe, Borrows], **STEVEN** (1525-1584), English navigator, was born at Northam in Devonshire on the 25th of September 1525. In 1553 he took part in the expedition which was despatched from the Thames under Sir Hugh Willoughby to look for a northern passage to Cathay and India, serving as master of the “Edward Bonaventure,” on which Richard Chancellor sailed as pilot in chief. Separated by a storm from the “Bona Esperanza” and the “Bona Confidentia,” the other two ships of the expedition, Borough proceeded on his voyage alone, and sailing into the White Sea, in the words of his epitaph, “discouered Moscouia by the Northerne sea passage to St Nicholas” (Archangel). In a second expedition, made in the “Serchthrift” in 1556, he discovered Kara Strait, between Novaya Zemlya and Vaygach island. In 1560 he was in charge of another expedition to Russia, and, probably in 1558, he also made a voyage to Spain. At the beginning of 1563 he was appointed chief pilot and one of the four masters of the queen’s ships in the Medway, and in this office he spent the rest of his life. He died on the 12th of July 1584, and was buried at Chatham. His son, Christopher Borough, wrote a description of a trading expedition made in 1579-1581 from the White Sea to the Caspian and back.

His younger brother, William Borough, born in 1536, also at Northam, served as an ordinary seaman in the “Edward Bonaventure” on her voyage to Russia in 1553, and subsequently made many voyages to St Nicholas. Later he transferred his services from the merchant adventurers to the crown. As commander of the “Lion” he accompanied Sir Francis Drake in his Cadiz expedition of 1587, but he got himself into trouble by presuming to disagree with his chief concerning the wisdom of the attack on Lagos. He died in 1599. He was the author of *A Discourse of the Variation of the Compas, or Magneticall Needle* (1581), and some of the charts he made are preserved at the British Museum and Hatfield.

BOROUGH (A.S. nominative *burh*, dative *byrig*, which produces some of the place-names ending in *bury*, a sheltered or fortified place, the camp of refuge of a tribe, the stronghold of a chieftain; of. Ger. *Burg*, Fr. *bor*, *borc*, *bourg*), the term for a town, considered as a unit of local government.

History of the English Borough.—After the early English settlement, when Roman fortifications ceased to shelter hostile nations, their colonies and camps were used by the Anglo-Saxon invaders to form tribal strongholds; nevertheless burhs on the sites of Roman colonies show no continuity with Roman municipal organization. The resettlement of the Roman Durovernum as the burh of the men of (East) Kent, under a changed name, the name "burh of the men of Kent," Cant-wara-byrig (Canterbury), illustrates this point. The burh of the men of West Kent was Hrofesceaster (Durobrivae), Rochester, and many other *ceasters* mark the existence of a Roman camp occupied by an early English burh. The tribal burh was protected by an earthen wall, and a general obligation to build and maintain burhs at the royal command was enforced by Anglo-Saxon law. Offences in disturbance of the peace of the burh were punished by higher fines than breaches of the peace of the "ham" or ordinary dwelling. The burh was the home of the king as well as the asylum of the tribe, and there is reason to think that the boundary of the borough was annually sanctified by a religious ceremony, and hence the long retention of a processional perambulation. Possibly the "hedge" or "wall" of the borough gave it, besides safety, a sanctity analogous to that enjoyed by the Germanic assembly while gathered within its "hedge," which the priests solemnly set up when the assembly gathered, and removed when it was over. While the "peace" of the Germanic assembly was essentially temporary, the "peace" of the burh was sacred all the year round. Its "hedge" was never removed. The sanctity of the burh was enjoyed by all the dwellings of the king, at first perhaps only during his term of residence. Neither in the early English language nor in the contemporary Latin was there any fixed usage differentiating the various words descriptive of the several forms of human settlement, and the tribal refuges cannot accordingly be clearly distinguished from villages or the strongholds of individuals by any purely nomenclative test. It is not till after the Danish invasions that it becomes easier to draw a distinction between the burhs that served as military strongholds for national defence and the royal vills which served no such purpose. Some of the royal vills eventually entered the class of boroughs, but by another route, and for the present the private stronghold and the royal dwelling may be neglected. It was the public stronghold and the administrative centre of a dependent district which was the source of the main features peculiar to the borough.

Many causes tended to create peculiar conditions in the boroughs built for national defence. They were placed where artificial defence was most needed, at the junction of roads, in the plains, on the rivers, at the centres naturally marked out for trade, seldom where hills or marshes formed a sufficient natural defence. The burhs drew commerce by every channel; the camp and the palace, the administrative centre, the ecclesiastical centre (for the mother-church of the state was placed in its chief burh), all looked to the market for their maintenance. The burh was provided by law with a mint and royal moneyers and exchangers, with an authorized scale for weights and measures. Mercantile transactions in the burhs or *ports*, as they were called when their commercial rather than their military importance was accentuated, were placed by law under special legal privileges in order no doubt to secure the king's hold upon his toll. Over the burh or port was set a reeve, a royal officer answerable to the king for his dues from the burh, his rents for lands and houses, his customs on commerce, his share of the profits from judicial fines. At least from the 10th century the burh had a "moot" or court, the relation of which to the other courts is matter of speculation. A law of Edgar, about 960, required that it should meet three times a year, these being in all likelihood assemblies at which attendance was compulsory on all tenants of the burghal district, when pleas concerning life and liberty and land were held, and men were compelled to find pledges answerable for their good conduct. At these great meetings the borough reeve (*gerefa*) presided, declaring the law and guiding the judgments given by the suitors of the court. The reeve was supported by a group of assistants, called in Devon the "witan," in the boroughs of the Danelaw by a group of (generally twelve) "lawmen," in other towns probably by a group of aldermen, senior burgesses, with military and police authority, whose office was in some cases hereditary. These persons assisted the reeve at the great meetings of the full court, and sat with him as judges at the subordinate meetings which were held to settle the unfinished causes and minor causes. There was no compulsion on those not specially summoned to attend these extra meetings. At these subordinate jurisdictional assemblies, held in public, and acting by the same authority as the annual gathering of all the *burh-wara*, other business concerning borough administration was decided, at least in later days, and it is to these assemblies that the origin of the town council may in many cases be ascribed. In the larger towns the division into wards, with a separate police system, can be traced at an early time, appearing as a unit of military organization, answerable for the defence of a gate of the town. The police system of London is described in detail in a record of 930-940. Here the free people were grouped in associations of ten, each under the superintendence of a headman. The bishops and reeves who belonged to the "court of London" appear as the directors of the system, and in them we may see the aldermen of the wards of a later time. The use of the word *bertha* for ward at Canterbury, and the fact that the London wardmoot at a later time was used for the frankpledge system as well as for the organization of the muster, point to a connexion between the military and the police systems in the towns. At the end of the 9th and beginning of the 10th century there is evidence of a systematic "timbering" of new burhs, with the object of providing strongholds for the defence of Wessex against the Danes, and it appears that the surrounding districts were charged with their maintenance. In charters of this period a "haw," or enclosed area within a burh, was often conveyed by charter as if it were an apanage of the lands in the neighbourhood with which it was conveyed; the Norman settlers who succeeded to lands in the county succeeded therewith to houses in the burhs, for a close association existed between the "thegns" of the shire and the shirestow, an association partly perhaps of duty and also of privilege. The king granted borough "haws" as places of refuge in Kent, and in

London he gave them with commercial privileges to his bishops. What has been called the "heterogeneous" tenure of the shirestow, one of the most conspicuous characteristics of that particular type of borough, was further increased by the liberty which some burgesses enjoyed to "commend" themselves to a lord of their own choosing, promising to that lord suit and service and perhaps rent in return for protection. Over these burgesses the lords could claim jurisdictional rights, and these were in some cases increased by royal grants of special rights within certain "sokes." The great boroughs were honeycombed with sokes, or areas of seignorial jurisdiction, within which the royal reeve's authority was greatly restricted while that of the lord's reeve took precedence. Even the haws, being "burhs" or strongholds within a stronghold, enjoyed a local "peace" which protected from official intrusion. Besides heterogeneity of tenure and jurisdiction in the borough, there was also heterogeneity of status; there were burh-thegns and cnihts, mercatores, burgesses of various kinds, the three groups representing perhaps military, commercial and agricultural elements. The burh generally shows signs of having been originally a village settlement, surrounded by open fields, of which the borough boundary before 1835 will suggest the outline. This area was as a rule eventually the area of borough jurisdiction. There is some evidence pointing to the fact that the restriction of the borough authority to this area is not ancient, but due to the Norman settlement. The wide districts over which the boroughs had had authority were placed under the control of the Norman castle which was itself built by means of the old English levy of "burh-work." The borough court was allowed to continue its work only within its own immediate territory, and, to prevent conflict, the castle was placed outside the borough. Losing their place in the national scheme of defence, the burgess "cnihts" made commerce their principal object under the encouragement of the old privileges of the walled place.

Besides the great co-operative strongholds in which many lords had burgesses, there were small boroughs held by a single lord. In many cases boroughs of this "seignorial" type were created upon the royal estates. Out of the king's vill, as a rule the jurisdictional centre of a hundred, there was sometimes created a borough. The lines of division before Domesday Book are obscure, but it is probable that in 270
some cases, by a royal grant of jurisdiction, the inhabitants of a populous royal vill, where a hundred court for the district was already held, were authorized to establish a permanent court, for the settlement of their disputes, distinct from the hundred court of the district. Boroughs of this type with a uniform tenure were created not only on the king's estates but also on those of his tenants-in-chief, and in 1086 they were probably already numerous. A borough was usually, though perhaps not invariably, the companion of a Norman castle. In some cases a French "bourg" was created by the side of an English borough, and the two remained for many generations distinct in their laws and customs: in other cases a French "bourg" was settled by the side of an English village. A large number of the followers of the Norman lords had been almost certainly town-dwellers in their own country, and lost none of their burghal privileges by the migration. Every castle needed for its maintenance a group of skilled artisans, and the lords wished to draw to the castle gates all kinds of commodities for the castle's provision. The strength of the garrison made the neighbourhood of the castle a place of danger to men unprotected by legal privilege; and in order to invite to its neighbourhood desirable settlers, legal privileges similar to those enjoyed in Norman or English boroughs were guaranteed to those who would build on the plots which were offered to colonists. A low fixed rental, release from the renders required of villeins, release from the jurisdiction of the castle, and the creation of a separate borough jurisdiction, with or without the right to choose their own officers, rules fixing the maximum of fees and fines, or promising assessment of the fines by the burgesses themselves, the cancelling of all the castellan's rights, especially the right to take a forced levy of food for the castle from all within the area of his jurisdiction, freedom from arbitrary tallage, freedom of movement, the right to alienate property and devise land, these and many other privileges named in the early seignorial charters were what constituted the Norman *liber burgus* of the seignorial type. Not all these privileges were enjoyed by all boroughs; some very meagre releases of seignorial rights accompanied the lord's charter which created a borough and made burgesses out of villeins. However liberal the grant, the lord or his reeve still remained in close personal relation with the burgesses of such places, and this character, together with the uniformity of their tenure, continued to hold them apart from the boroughs of the old English type, where all varieties of personal relationship between the lords and their groups of tenants might subsist. The royal charters granting the right to retain old customs prevented the systematic introduction into the old boroughs of some of the incidents of feudalism. Rights of the king took precedence of those of the lord, and devise with the king's consent was legal. By these means the lords' position was weakened, and other seignorial claims were later evaded or contested. The rights which the lords failed to keep were divided between the king and the municipality; in London, for instance, the king obtained all escheats, while the borough court secured the right of wardship of burgess orphans.

From Norman times the yearly profit of the royal boroughs was as a rule included in the general "farm" rendered for the county by the sheriff; sometimes it was rendered by a royal farmer apart from the county-farm. The king generally accepted a composition for all the various items due from the borough. The burgesses were united in their efforts to keep that composition unchanged in amount, and to secure the provision of the right amount at the right time for fear that it should be increased by way of punishment. The levy of fines on rent arrear, and the distraints for debt due, which were obtained through the borough court, were a matter of interest to the burgesses of the court, and first taught the burgesses co-operative action. Money was raised, possibly by order of the borough court, to buy a charter from the king giving the right to choose officers who should answer directly to the exchequer and not through the sheriff of the county. The sheriff was in many cases also the constable of the castle, set by the Normans to overawe the English boroughs; his powers were great and dangerous enough to make him an officer specially obnoxious to the boroughs. Henry I. about 1131 gave the London citizens the right to choose their own sheriffs and a justiciar answerable for keeping the pleas of the crown. In

1130 the Lincoln citizens paid to hold their city in chief of the king. By the end of the 12th century many towns paid by the hand of their own reeves, and John's charters began to make rules as to the freedom of choice to be allowed in the nomination of borough officers and as to the royal power of dismissal. In Richard I.'s reign London imitated the French communes in styling the chief officer a mayor; in 1208 Winchester also had a mayor, and the title soon became no rarity. The chartered right to choose two or more citizens to keep the pleas of the crown gave to many boroughs the control of their coroners, who occupied the position of the London justiciar of earlier days, subject to those considerable modifications which Henry II.'s systematization of the criminal law had introduced. Burgesses who had gone for criminal and civil justice to their own court in disputes between themselves, or between themselves and strangers who were in their town, secured confirmation of this right by charter, not to exclude the justices in eyre, but to exempt themselves from the necessity of pleading in a distant court. The burgess, whether plaintiff or defendant, was a privileged person, and could claim in this respect a "benefit" somewhat similar to the benefit of clergy. In permitting the boroughs to answer through their own officers for his dues, the king handed over to the boroughs the farming of his rents and a large number of rights which would eventually prove to be sources of great profit.

No records exist showing the nature of municipal proceedings at the time of the first purchase of charters. Certain it is that the communities in the 12th century became alive to the possibilities of their new position, that trade received a new impulse, and the vague constitutional powers of the borough court acquired a new need for definition. At first the selection of officers who were to treat with the exchequer and to keep the royal pleas was almost certainly restricted to a few rich persons who could find the necessary securities. Nominated probably in one of the smaller judicial assemblies, the choice was announced at the great Michaelmas assembly of the whole community, and it is not till the next century that we hear of any attempt of the "vulgus" to make a different selection from that of the magnates. The "vulgus" were able to take effective action by means of the several craft organizations, and first found the necessity to do so when taxation was heavy or when questions of trade legislation were mooted (see Gilds). The taxation of the boroughs in the reign of Henry II. was assessed by the king's justices, who fixed the sums due *per capita*; but if the borough made an offer of a gift, the assessment was made by the burgesses. In the first case the taxation fell on the magnates. In the levy *per communam* the assessment was made through the wardmoots (in London) and the burden fell on the poorer class. In Henry II.'s reign London was taxed by both methods, the *barones majores* by head, the *barones minores* through the wardmoot. The pressure of taxation led in the 13th century to a closer definition of the burghal constitutions; the commons sought to get an audit of accounts, and (in London) not only to hear but to treat of municipal affairs. By the end of the century London had definitely established two councils, that of the mayor and aldermen, representing the old borough court, and a common council, representing the voice of the commonalty, as expressed through the city wards. The choice of councillors in the wards rested probably with the aldermen and the ward jury summoned by them to make the presentments. In some cases juries were summoned not to represent different areas but different classes; thus at Lincoln there were in 1272 juries of the rich, the middling and the poor, chosen presumably by authority from groups divided by means of the tax roll. Elsewhere the several groups of traders and artisans made of their gilds all-powerful agencies for organizing joint action among classes of commons united by a trade interest, and the history of the towns becomes the history of the struggle between the gilds which captured control of the council and the gilds which were excluded therefrom. Many municipal revolutions took place, and a large number of constitutional experiments were tried all over the country from the 13th century onward. Schemes which directed a gradual co-optation, two to choose four, these six to choose more, and so in widening circles from a centre of officialdom, found much favour throughout the middle ages. A plan, like the London plan, of two companies, alderman and council, was widely favoured in the 14th century, perhaps in imitation of the Houses of Lords and Commons. The mayor was sometimes styled the "sovereign" and was given many prerogatives. Great respect was paid to the "ancients," those, namely, who had already held municipal office. Not till the 15th century were orderly arrangements for counting "voices" arrived at in a few of the most highly developed towns, and these were used only in the small assemblies of the governing body, not in the large electoral assemblies of the people.

In London in the 13th century there was a regular system for the admission of new members to the borough "franchise," which was at first regarded not as conferring any form of suffrage but as a means to secure a privileged position in the borough court and in the trade of the borough. Admission could be obtained by inheritance, by purchase or gift, in some places by marriage, and in London, at least from 1275, by a municipal register of apprenticeship. The new freeman in return for his privileges was bound to share with the other burgesses all the burdens of taxation, control, &c., which fell upon burgesses. Personal service was not always necessary, and in some towns there were many non-resident burgesses. When in later times admission to this freedom came to be used as means to secure the parliamentary franchise, the freedom of the borough was freely sold and given. The elections in which the commons of the boroughs first took interest were those of the borough magistrates. Where the commons succeeded for a time in asserting their right to take part in borough elections they were rarely able to keep it, not in all cases perhaps because their power was feared, but sometimes because of the riotous proceedings which ensued. These led to government interference, which no party in the borough desired. The possibility of a forfeiture of their enfranchised position made the burgesses on the whole fairly submissive. In the 13th century London repeatedly was "taken into the king's hand," subjected to heavy fines and put under the constable of the Tower. In the 15th century disturbances in the boroughs led to the issue of new constitutions, some of which were the outcome of royal charters, others the result of parliamentary legislation. The development of the law of corporations also at this time compelled the boroughs to seek new charters which should satisfy the now exacting demands of

the law. The charters of incorporation were issued at a time when the state was looking more and more to the borough authorities as part of its executive and judicial staff, and thus the government was closely interested in the manner of their selection. The new charters were drafted in such a way as to narrow the popular control. The corporations were placed under a council and in a number of cases popular control was excluded altogether, the whole system being made one of co-optation. The absence of popular protest may be ascribed in part to the fact that the old popular control had been more nominal than real, and the new charter gave as a rule two councils of considerable size. These councils bore a heavy burden of taxation in meeting royal loans and benevolences, paying *per capita* like the magnates of the 12th century, and for a time there is on the whole little evidence of friction between the governors and the governed. Throughout, popular opinion in the closest of corporations had a means of expression, though none of execution, in the presentments of the leet juries and sessions juries. By means of their “verdicts” they could use threats against the governing body, express their resentment against acts of the council which benefited the governing body rather than the town, and call in the aid of the justices of assize where the members of the governing body were suspected of fraud. Elizabeth repeatedly declared her dislike of incorporations “because of the abuses committed by their head rulers,” but in her reign they were fairly easily controlled by the privy council, which directed their choice of members of parliament and secured supporters of the government policy to fill vacancies on the borough bench. The practice in Tudor and Stuart charters of specifying by name the members of the governing body and holders of special offices opened the way to a “purging” of the hostile spirits when new charters were required. There were also rather vaguely worded clauses authorizing the dismissal of officers for misconduct, though as a rule the appointments were for life. When under the Stuarts and under the Commonwealth political and religious feeling ran high in the boroughs, use was made of these clauses both by the majority on the council and by the central government to mould the character of the council by a drastic “purging.” Another means of control first used under the Commonwealth was afforded by the various acts of parliament, which subjected all holders of municipal office to the test of an oath. Under the Commonwealth there was no improvement in the methods used by the central government to control the boroughs. All opponents of the ruling policy were disfranchised and disqualified for office by act of parliament in 1652. Cases arising out of the act were to be tried by commissioners, and the commissions of the major-generals gave them opportunity to control the borough policy. Few Commonwealth charters have been preserved, though several were issued in response to the requests of the corporations.

In some cases the charters used words which appeared to point to an opportunity for popular elections in boroughs where a usage of election by the town council had been established. In 1598 the judges gave an opinion that the town councils could by by-law determine laws for the government of the town regardless of the terms of the charter. In the 18th century the judges decided to the contrary. But even where a usage of popular election was established, there were means of controlling the result of a parliamentary election. The close corporations, though their right to choose a member of parliament might be doubtful, had the sole right to admit new burgesses, and in order to determine parliamentary elections they enfranchised non-residents. Where conflicts arose over the choice of a member, and two selections were made, the matter came before the House of Commons. On various occasions the House decided in favour of the popularly elected candidate against the nominee of the town council, on the general principle that neither the royal charter nor a by-law could curtail this particular franchise. But as each case was separately determined by a body swayed by the dominant political party, no one principle was steadily adhered to in the trial of election petitions. The royal right to create boroughs was freely used by Elizabeth and James I. as a means of securing a submissive parliament. The later Stuarts abandoned this method, and the few new boroughs made by the Georges were not made for political reasons. The object of the later Stuarts was to control the corporations already in existence, not to make new ones. Charles II. from the time of his restoration decided to exercise a strict control of the close corporations in order to secure not only submissive parliaments, but also a pliant executive among the borough justices, and pliant juries, which were impanelled at the selection of the borough officers. In 1660 it was made a rule that all future charters should reserve expressly to the crown the first nomination of the aldermen, recorder and town-clerk, and a proviso should be entered placing with the common council the return of the member of parliament. The Corporation Act of 1661 gave power to royal commissioners to settle the composition of the town councils, and to remove all who refused the sacraments of the Church of England or were suspected of disaffection, even though they offered to take the necessary oaths. Even so the difficulty of securing submissive juries was again so great in 1682 that a general attack on the borough franchises was begun by the crown. A London jury having returned a verdict hostile to the crown, after various attempts to bend the city to his will, Charles II. issued a *quo warranto* against the mayor and commonalty in order to charge the citizens with illegal encroachments upon their chartered rights. The want of a sound philosophical principle in the laws which were intended to regulate the actions of organized groups of men made it easy for the crown judges to find flaws in the legality of the actions of the boroughs, and also made it possible for the Londoners to argue that no execution could be taken against the mayor, commonalty and citizens, a “body politic invisible”; that the indictment lay only against every particular member of the governing body; and that the corporation as a corporation was incapable of suffering a forfeiture or of making a surrender. The judges gave a judgment for the king, the charters were forfeited and the government placed with a court of aldermen of the king’s own choosing. Until James II. yielded, there was no common council in London. The novelty of the proceedings of Charles II. and James II. lay in using the weapon of the *quo warranto* systematically to ensure a general revocation of charters. The new charters which were then granted required the king’s consent for the more important appointments, and gave him power to remove officers without reason given. Under James II. in 1687 six commissioners were appointed to “regulate” the corporations and remove from them all persons who were opposed to the

abolition of the penal laws against Catholics. The new appointments were made under a writ which ran, "We will and require you to elect" (a named person). When James II. sought to withdraw from his disastrous policy, he issued a proclamation (October 17, 1688) restoring to the boroughs their ancient charters. The governing charter thenceforth in many boroughs, though not in all, was the charter which had established a close corporation, and from this time on to 1835 the boroughs made no progress in constitutional growth. The tendency for the close corporation to treat the members of the governing body as the only corporators, and to repudiate the idea that the corporation was answerable to the inhabitants of the borough if the corporate property was squandered, became more and more manifest as the history of the past slipped into oblivion. The corporators came to regard themselves as members of a club, legally warranted in dividing the lands and goods of the same among themselves whensoever such a division should seem profitable. Even where the constitution of the corporation was not close by charter, the franchise tended to become restricted to an ever-dwindling electorate, as the old methods for the extension of the municipal franchise by other means than inheritance died out of use. At Ipswich in 1833 the "freemen" numbered only one fifty-fifth of the population. If the electorate was increased, it was increased by the wholesale admission to the freedom of voters willing to vote as directed by the corporation at parliamentary elections. The growth of corruption in the boroughs continued unchecked until the era of the Reform Bill. Several boroughs had by that time become insolvent, and some had recourse to their member of parliament to eke out their revenues. In Buckingham the mayor received the whole town revenue without rendering account; sometimes, however, heavy charges fell upon the officers. Before the Reform era dissatisfaction with the corporations was mainly shown by the number of local acts of parliament which placed under the authority of special commissioners a variety of administrative details, which if the corporation had not been suspected would certainly have been assigned to its care. The trust offered another convenient means of escape from difficulty, and in some towns out of the trust was developed a system of municipal administration where there was no recognized corporation. Thus at Peterborough the feoffees who had succeeded to the control of certain ancient charities constituted a form of town council with very restricted powers. In the 17th century Sheffield was brought under the act "to redress the misemployment of lands given to charitable uses," and the municipal administration of what had been a borough passed into the hands of the trustees of the Burgery or town trust.

The many special authorities created under act of parliament led to much confusion, conflict and overlapping, and increased the need for a general reform. The reform of the boroughs was treated as part of the question of parliamentary reform. In 1832 the exclusive privileges of the corporations in parliamentary elections having been abolished and male occupiers enfranchised, the question of the municipal franchise was next dealt with. In 1833 a commission inquired into the administration of the municipal corporations. The result of the inquiry was the Municipal Corporations Act 1835, which gave the municipal franchise to the ratepayers. In all the municipal corporations dealt with by the act, the town council was to consist of a mayor, aldermen and councillors, and the councils were given like powers, being divided into those with and those without a commission of the peace. The minutes were to be open to the inspection of any burgess, and an audit of accounts was required. The exclusive rights of retail trading, which in some towns were restricted to freemen of the borough, were abolished. The system of police, which in some places was still medieval in character, was placed under the control of the council. The various privileged areas within the bounds of a borough were with few exceptions made part of the borough. The powers of the council to alienate corporate property were closely restricted. The operations of the act were extended by later legislation, and the divers amendments and enactments which followed were consolidated in the Municipal Corporations Act 1882.

(M. Bat.)

Irish Boroughs.—In Ireland the earliest traces of burghal life are connected with the maritime settlements on the southern and eastern coast. The invasion of Henry II. colonized these Ostman ports with Anglo-Norman communities, who brought with them, or afterwards obtained, municipal charters of a favourable kind. The English settlement obviously depended on the advantages which the burgesses possessed over the native population outside. Quite different from these were the new close boroughs which during the plantation of Ulster James I. introduced from England. The conquest was by this time completed, and by a rigorous enforcement of the Supremacy and Uniformity Acts the existing liberties of the older boroughs were almost entirely withdrawn. By the new rules published (in terms of the Act of Settlement and Explanation) in 1672 resident traders were permitted to become freemen, but neither this regulation nor the ordinary admissions through birth, marriage and apprenticeship succeeded in giving to Ireland free and vigorous municipalities. The corrupt admission of non-resident freemen, in order to outvote the ancient freeholders in parliamentary elections, and the systematic exclusion of Roman Catholics, soon divorced the "commonalty" from true local interests, and made the corporations, which elected themselves or selected the constituency, dangerously unpopular.

Scottish Boroughs.—In Scotland burghs or burrows are divided into royal burghs, burghs of regality and burghs of barony. The first were erected by royal charter, and every burgess held direct of the crown. It was, therefore, impossible to subfeu the burgh lands,—a distinction still traceable in modern conveyancing. Where perhaps no charter ever existed, the law on proof of immemorial possession of the privileges of a royal burgh has presumed that a charter of erection once existed. The charter gave power to elect provost, bailies and council, a power long exercised under the act of 1469, which directed the new council to be chosen annually by the retiring council, and the magistrates by both councils. The jurisdiction of these magistrates, which was specially reserved in the act of 1747 abolishing heritable jurisdictions, was originally cumulative with, and as large as, that of the sheriff. It is now confined to police offences, summary ejections, orders for *interim* aliment (for prisoners), payment of burgh dues and delivery of title deeds. Three head courts were held in the year, at which all

burgesses were obliged to attend, and at which public business was done and private transactions were ratified. There were three classes of burgesses—burgesses *in sua arte*, members of one or other of the corporations; burgesses who were gild brothers; and simple burgesses. The Leges Burgorum apparently contemplate that all respectable inhabitants should have the franchise, but a ceremony of admission was required, at which the applicant swore fealty and promised to watch and ward for the community, and to pay his “maill” to the king. These borough maills, or rents, and the great and small customs of burghs, formed a large part of the royal revenue, and, although frequently leased or feued out for a fixed duty, were on the accession of James I. annexed to the crown as an alimentary fund. Burgh customs still stand in the peculiar position of being neither adjudgeable nor arrestable; they are therefore bad security. The early charters contain the usual privileges of holding a market, of exemption from toll or tribute, and that distraint will be allowed only for the burgess’s own debts. There was also the usual strife between the gildry and the craftsmen, who were generally prohibited from trading, and of whom dyers, fleshers and shoemakers were forbidden to enter the gildry. Deacons, wardens and visitors were appointed by the crafts, and the rate of wages was fixed by the magistrates. The crafts in Scotland were frequently incorporated, not by royal charter, but, as in the case of the cordiners of Edinburgh, by seals of cause from the corporation. The trade history of the free burghs is very important. Thus in 1466 the privilege of importing and exporting merchandise was confined to freemen, burgesses and their factors. Ships were directed to trade to the king’s free burghs, there to pay the customs, and to receive their *cocquets* or custom-house seals; and in 1503 persons dwelling outside burghs were forbidden to “use any merchandise,” or to sell wine or staple goods. An act of 1633, erroneously called a *Ratification* of the privileges of burghs, extended these privileges of buying and selling to retail as well as wholesale trade, but restricted their enjoyment to royal burghs. Accordingly, in 1672, a general declaratory act was passed confirming to the freemen in royal burghs the wholesale trade in wine, wax, silk, dyeing materials, &c., permitting generally to all persons the export of native raw material, specially permitting the burgesses of barony and regality to export their own manufactures, and such goods as they may buy in “markets,” and to import against these consignments certain materials for tillage, building, or for use in their own manufactures, with a general permission to retail all commodities. This extraordinary system was again changed in 1690 by an act which declared that freemen of royal burghs should have the sole right of importing everything by sea or land except bestial, and also of exporting by sea everything which was not native raw material, which might be freely exported by land. The gentry were always allowed to import for their personal consumption and to export an equal quantity of commodities. The act mentions that the royal burghs as an estate of the kingdom contributed one-sixth part of all public impositions, and were obliged to build and maintain prison-houses. Some of these trade privileges were not abolished till 1846.

In the north of Scotland there was an association of free burghs called the Hanse or *Ansus*; and the lord chamberlain, by his *Iter*, or circuit of visitation, maintained a common standard of right and duties in all burghs, and examined the state of the “common good,” the accounts of which in 1535 were appointed to be laid before the auditors in exchequer. The chamberlain latterly presided in the Curia Quatuor Burgorum (Edinburgh, Berwick, Stirling, Roxburgh), which not only made regulations in trade, but decided questions of private right (*e.g.* succession), according to the varying customs of burghs. This court frequently met at Haddington; in 1454 it was fixed at Edinburgh. The more modern convention of royal burghs (which appeared as a judicial *persona* in the Court of Session so late as 1839) probably dates from the act of James III. (1487, c. 111), which appointed the commissioners of burghs, both north and south, to meet yearly at Inverkeithing “to treat of the welfare of merchandise, the good rule and statutes for the common profit of burghs, and to provide for remeid upon the skaith and injuries sustained within the burghs.” Among the more important functions of this body (on whose decrees at one time summary diligence proceeded) were the prohibition of undue exactions within burghs, the revisal of the “set” or mode of municipal election, and the *pro rata* division among the burghs of the parliamentary subsidy required from the third estate. The reform of the municipalities, and the complete representation of the mercantile interests in the united parliament, deprived this body of any importance.

Burghs of regality and of barony held in vassalage of some great lordship, lay or ecclesiastical, but were always in theory or in practice created by crown grant. They received jurisdiction in civil and criminal matters, generally cumulative with that of the baron or the lord of regality, who in some cases obtained the right of nominating magistrates. Powers to hold markets and to levy customs were likewise given to these burghs.

The Scottish burghs emerged slowly into political importance. In 1295 the procurators of six burghs ratified the agreement for the marriage of Edward Baliol; and in 1326 they were recognized as a third estate, granting a tenth penny on all rents for the king’s life, if he should apply it for the public good. The commissioners of burghs received from the exchequer their costages or expenses of attending parliament. The burghs were represented in the judicial committee, and in the committee on articles appointed during the reign of James V. After the Reformation, in spite of the annexation of kirk lands to the crown, and the increased burdens laid on temporal lands, the proportion of general taxation borne by the burghs (viz. 1s. 6d.) was expressly preserved by act 1587, c. 112. The number of commissioners, of course, fluctuated from time to time. Cromwell assigned ten members to the Scottish burghs in the second parliament of Three Nations (1654). The general practice until 1619 had been, apparently, that each burgh should send two members. In that year (by an arrangement with the convention of burghs) certain groups of burghs returned one member, Edinburgh returning two. Under art. 22 of the treaty of Union the number of members for royal burghs was fixed at fifteen, who were elected in Edinburgh by the magistrates and town council, and in the groups of burghs by delegates chosen ad hoc.

(W. C. S.)

See C. Gross, *Bibliography of British Municipal History* (1897), which contains all needful references up to that date; F.W. Maitland, *Township and Borough* (1898); A. Ballard, *Domesday Boroughs* (1904); M. Bateson, *Borough Customs* (1904-1906); S. and B. Webb, *English Local Government* (3 vols., 1906-1908). For the character of the modern Scottish burgh see Mabel Atkinson, *Local Government in Scotland* (Edinburgh, 1904), where other works are mentioned.

BOROUGHBRIDGE, a market town in the Ripon parliamentary division of the West Riding of Yorkshire, England; 22 m. N.W. of York on a branch of the North Eastern railway. Pop. (1901) 830. It lies in the central plain of Yorkshire, on the river Ure near its confluence with the Swale. It is in the parish of Aldborough, the village of that name (*q.v.*), celebrated for its Roman remains, lying a mile south-east.

About half a mile to the west of Boroughbridge there are three upright stones called the Devil's Arrows, which are of uncertain origin but probably of the Celtic period. The manor of Boroughbridge, then called Burc, was held by Edward the Confessor and passed to William the Conqueror, but suffered so much from the ravages of his soldiers that by 1086 it had decreased in value from £10 to 55 s. When the site of the Great North Road was altered, towards the end of the 11th century, a bridge was built across the Ure, about half a mile above the Roman bridge at Aldborough, and called Burgh bridge or Ponteburgem. This caused a village to spring up, and it afterwards increased so much as to become a market town. In 1229 Boroughbridge, as part of the manor of Aldborough, was granted to Hubert de Burgh, but was forfeited a few years later by his son who fought against the king at Evesham. It then remained a royal manor until Charles I. granted it to several citizens of London, from whom it passed through numerous hands to the present owner. The history of Boroughbridge during the early 14th century centres round the war with Scotland, and culminates with the battle fought there in 1321. When in 1317 the Scots invaded England, they penetrated as far south as Boroughbridge and burnt the town. Boroughbridge was evidently a borough by prescription, and as such was called upon to return two members to parliament in 1299. It was not represented again until 1553, when the privilege was revived. The town was finally disfranchised in 1832. In 1504 the bailiff and inhabitants of Boroughbridge received a grant of two fairs, and Charles II. in 1670 created three new fairs in the borough, on the 12th of June, the 5th of August and the 12th of October, and leased them to Francis Calvert and Thomas Wilkinson for ninety-nine years.

BOROUGH ENGLISH, a custom prevailing in certain ancient English boroughs, and in districts attached to them (where the lands are held in socage), and also in certain copyhold manors (chiefly in Surrey, Middlesex, Suffolk and Sussex), by which in general lands descend to the youngest son, to the exclusion of all the other children, of the person dying seised and intestate. Descent to the youngest brother to the exclusion of all other collaterals, where there is no issue, is sometimes included in the general definition, but this is really a special custom to be proved from the court-rolls of the manor and from local reputation—a custom which is sometimes extended to the youngest sister, uncle, aunt. Generally, however, Borough English, apart from specialties, may be said to differ from gavelkind in not including collaterals. It is often found in connexion with the distinct custom that the widow shall take as dower the whole and not merely one-third of her husband's lands.

The origin of the custom of Borough English has been much disputed. Though frequently claimed to be of Saxon origin, there is no direct evidence of such being the case. The first mention of the custom in England occurs in Glanvil, without, however, any explanation as to its origin. Littleton's explanation, which is the more usually accepted, is that custom casts the inheritance upon the youngest, because after the death of his parents he is least able to support himself, and more likely to be left destitute of any other support. Blackstone derived Borough English from the usages of pastoral life, the elder sons migrating and the youngest remaining to look after the household. C.I. Elton claims it to be a survival of pre-Aryan times. It was referred to by the Normans as "the custom of the English towns." In the Yearbook of 22 Edward IV. fol. 32b it is described as the custom of Nottingham, which is made clear by the report of a trial in the first year of Edward III. where it was found that in Nottingham there were two districts, the one the *Burgh-Fraunçoyes*, the other the *Burgh-Engloyes*, where descent was to the youngest son, from which circumstance the custom has derived its name. On the European continent the custom of junior-rights is not unknown, more particularly in Germany, and it has by some been ascribed to the *jus primae noctis* (*q.v.*). It is also said to exist amongst the Mongols.

See also GAVELKIND; INHERITANCE; PRIMOGENITURE; TENURE; Blackstone's *Commentaries*; Coke's *Institutes*; Comyn's *Digest of the Law*; Elton's *Origin of English History*; Pollock and Maitland, *History of English Law*.

BORROMEAN ISLANDS, a group of four islands on the W. side of Lago Maggiore off Baveno and Stresa. The southernmost, the Isola Bella, is famous for its château and terraced gardens, constructed by Count Vitaliano Borromeo (d. 1690). To the N.W. is the Isola dei Pescatori, containing a fishing village; and to the N.E. of this the Isola Madre, the largest of the group, with a château and garden; and to the N. again, off Pallanza, is the little Isola S. Giovanni.

BORROMEO, CARLO (1538-1584), saint and cardinal of the Roman Catholic Church, son of Ghiberto Borromeo, count of Arona, and Margarita de' Medici, was born at the castle of Arona on Lago Maggiore on the 2nd of October 1538. When he was about twelve years old, Giulio Cesare Borromeo resigned to him an abbacy, the revenue of which he applied wholly in charity to the poor. He studied the civil and canon law at Pavia. In 1554 his father died, and, although he had an elder brother, Count Federigo, he was requested by the family to take the management of their domestic affairs. After a time, however, he resumed his studies, and in 1559 he took his doctor's degree. In 1560 his uncle, Cardinal Angelo de' Medici, was raised to the pontificate as Pius IV. Borromeo was made prothonotary, entrusted with both the public and the privy seal of the ecclesiastical state, and created cardinal with the administration of Romagna and the March of Ancona, and the supervision of the Franciscans, the Carmelites and the knights of Malta. He was thus at the age of twenty-two practically the leading statesman of the papal court. Soon after he was raised to the archbishopric of Milan. In compliance with the pope's desire, he lived in great splendour; yet his own temperance and humility were never brought into question. He established an academy of learned persons, and published their memoirs as the *Noctes Vaticanae*. About the same time he also founded and endowed a college at Pavia, which he dedicated to Justina, virgin and martyr. On the death of his elder brother Federigo, he was advised to quit the church and marry, that his family might not become extinct. He declined the proposal, however, and became henceforward still more fervent in exercises of piety, and more zealous for the welfare of the church. Owing to his influence over Pius IV., he was able to facilitate the final deliberations of the council of Trent, and he took a large share in the drawing up of the Tridentine catechism (*Catechismus Romanus*).

On the death of Pius IV. (1566), the skill and diligence of Borromeo contributed materially to suppressing the cabals of the conclave. Subsequently he devoted himself wholly to the reformation of his diocese, which had fallen into a most unsatisfactory condition owing to the prolonged absences of its previous archbishops. He made a series of pastoral visits, and restored decency and dignity to divine service. In conformity with the decrees of the council of Trent, he cleared the cathedral of its gorgeous tombs, rich ornaments, banners, arms, sparing not even the monuments of his own relatives. He divided the nave of the church into two compartments for the separation of the sexes. He extended his reforms to the collegiate churches (even to the fraternities of penitents and particularly that of St John the Baptist), and to the monasteries. The great abuses which had overrun the church at this time arose principally from the ignorance of the clergy. Borromeo, therefore, established seminaries, colleges and communities for the education of candidates for holy orders. The most remarkable, perhaps, of his foundations was the fraternity of the Oblates, a society whose members were pledged to give aid to the church when and where it might be required. He further paved the way for the "Golden" or "Borromean" league formed in 1586 by the Swiss Catholic cantons of Switzerland to expel heretics if necessary by armed force.

In 1576, when Milan was visited by the plague, he went about giving directions for accommodating the sick and burying the dead, avoiding no danger and sparing no expense. He visited all the neighbouring parishes where the contagion raged, distributing money, providing accommodation for the sick, and punishing those, especially the clergy, who were remiss in discharging their duties. He met with much opposition to his reforms. The governor of the province, and many of the senators, apprehensive that the cardinal's ordinances and proceedings would encroach upon the civil jurisdiction, addressed remonstrances and complaints to the courts of Rome and Madrid. But Borromeo had more formidable difficulties to struggle with, in the inveterate opposition of several religious orders, particularly that of the Humiliati (Brothers of Humility). Some members of that society formed a conspiracy against his life, and a shot was fired at him in the archiepiscopal chapel under circumstances which led to the belief that his escape was miraculous. The number of his enemies was increased by his successful attack on his Jesuit confessor Ribera, who with other members of the college of Milan was found to be guilty of unnatural offences. His manifold labours and austerities appear to have shortened his life. He was seized with an intermittent fever, and died at Milan on the 4th of November 1584. He was canonized in 1610, and his feast is celebrated on the 4th of November.

Besides the *Nodes Vaticanae*, to which he appears to have contributed, the only literary relics of this intrepid and zealous reformer are some homilies, discourses and sermons, with a collection of letters. His sermons, which have little literary merit, were published by J.A. Sax (5 vols., Milan, 1747-1748), and have been translated into many languages. The record of his episcopate is to be found in the two volumes of the *Acta Ecclesiae Mediolanensis* (Milan, 1599). Contrary to his last wishes a memorial was erected to him in Milan cathedral, as well as a statue 70 ft. high on the hill above Arona, by his admirers who regarded him as the leader of a Counter-Reformation.

His nephew, Federigo Borromeo (1564-1631), was archbishop of Milan from 1595, and in 1609 founded the Ambrosian library in that city.

See G.P. Giussano, *Vita di S. Carlo Borromeo* (1610, Eng. ed. by H.E. Manning, London, 1884); A. Sala, *Documenti circa la vita e la gesta di Borromeo* (4 vols., Milan, 1857-1859); Chanoine Silvain, *Histoire de St Charles Borromée* (Milan, 1884); and A. Cantono, *Un grande riformatore del secolo XVI* (Florence, 1904); article "Borromäus" in Herzog-Hauck, *Realencyklopädie* (Leipzig, 1897).

BORROMINI, FRANCESCO (1599-1667), Italian architect, was born at Bissone in 1599. He was the chief representative of the style known in architecture as "baroque," which marked a fearless and often reckless departure from the traditional laws of the Renaissance, and often obtained originality only at the cost of beauty or wisdom. One of the main opponents of this style was Barocchio (*q.v.*). Borromini was much employed in the middle of the 17th century at Rome. His principal works are the church of St Agnese in Piazza Navona, the church of La Sapienza in Rome, the church of San Carlino alle Fontane, the church of the Collegio di Propaganda, and the restoration of San Giovanni in Laterano. He died by his own hand at Rome in 1667. Engravings of his chief compositions are to be found in the posthumous work, *Francisci Borromini opus Architectonicum* (1727).

BORROW, GEORGE HENRY (1803-1881), English traveller, linguist and author, was born at East Dereham, Norfolk, on the 5th of July 1803, of a middle-class Cornish family. His father was a recruiting officer, and his mother a Norfolk lady of French extraction. From 1816 to 1818 Borrow attended, with no very great profit, the grammar school at Norwich. After leaving school he was articled to a firm of Norwich solicitors, where he neglected the law, but gave a great deal of desultory attention to languages. He was encouraged in these studies by William Taylor, the friend of Southey. On the death of his father, in 1824 he went to London to seek his fortune as a literary adventurer. In 1826 he published a volume of *Romantic Ballads* translated from the Danish. Engaged by Sir Richard Phillips, the publisher, as a hack-writer at starvation wages, his experiences in London were bitter indeed. His struggles at last became so dire that if he would escape Chatterton's doom, he must leave London and either return to Norwich and share his mother's narrow income, or turn to account in some way the magnificent physical strength with which nature had endowed him. Determining on the latter of these courses, he left London on tramp. As he stood considerably more than 6 ft. in height, was a fairly trained athlete, and had a countenance of extraordinary impressiveness, if not of commanding beauty—Greek in type with a dash of the Hebrew—we may assume that there had never before appeared on the English high-roads so majestic-looking a tramp as he who, on an afternoon in May, left his squalid lodging with bundle and stick to begin life on the roads. Shaping his course to the south-west, he soon found himself on Salisbury Plain. And then his extraordinary adventures began. After a while he became a travelling hedge-smith, and it was while pursuing this avocation that he made the acquaintance of the splendid road-girl, born at Long Melford workhouse, whom he has immortalized under the name of Isopel Berners. He was now brought much into contact with the gipsies, and this fact gave him the most important subject-matter for his writings. For picturesque as is Borrow's style, it is this subject-matter of his, the Romany world of Great Britain, which—if his pictures of that world are true—will keep his writings alive. Now that the better class of gipsies are migrating so rapidly to America that scarcely any are left in England, Borrow's pictures of them are challenged as being too idealistic. It is unfortunate that no one who knew Borrow, and the gryengroes or horse-dealers with whom he associated, and whom he depicted, has ever written about him and them. Full of "documents" as is Dr Knapp's painstaking biography, it cannot be said to give a vital picture of Borrow and his surroundings during this most interesting period of his life. It is this same peculiar class of gipsies (the gryengroes) with whom the present writer was brought into contact, and he can only refer, in justification of Borrow's descriptions of them, to certain publications of his own, where the whole question is discussed at length, and where he has set out to prove that Borrow's pictures of the section of the English gipsies he knew are not idealized. But there is one great blemish in *all* Borrow's dramatic scenes of gipsy life, wheresoever they may be laid. This was pointed out by the gentleman who "read" *Zincali* for Mr Murray, the publisher:—

> "The dialogues are amongst the best parts of the book; but in several of them the tone of the speakers, of those especially who are in humble life, is too correct and elevated, and therefore out of character. This takes away from their effect. I think it would be very advisable that Mr Borrow should go over them with reference to this point, simplifying a few of the terms of expression and introducing a few contractions—*don'ts, can'ts*, &c. This would improve them greatly."

It is the same with his pictures of the English gipsies. The reader has only to compare the dialogues between gipsies given in that photographic study of Romany life, *In Gipsy Tents*, by F.H. Groome, with the dialogues in *Lavengro* and *The Romany Rye*, to see how the illusion in Borrow's narrative is disturbed by the uncolloquial locutions of the speakers. It is true, no doubt, that all Romanies, especially perhaps the English and Hungarian, have a passion for the use of high-sounding words, and the present writer has shown this in his remarks upon the Czigany Czindol, who is said to have taught the Czigany

language to the archduke Joseph, often called the “Gipsy Archduke.” But after all allowance is made for this racial peculiarity, Borrow’s presentation of it considerably weakens our belief in Mr and Mrs Petulengro, Ursula, and the rest, to find them using complex sentences and bookish words which, even among English people, are rarely heard in conversation. As to the deep impression that Borrow made upon his gipsy friends, that is partly explained by the singular nobility of his appearance, for the gipsies of all countries are extremely sensitive upon matters of this kind. The silvery whiteness of the thick crop of hair which Borrow retained to the last seemed to add in a remarkable way to the nobility of his hairless face, but also it gave to the face a kind of strange look “not a bit like a Gorgio’s,” to use the words of one of his gipsy friends. Moreover, the shy, defiant, stand-off way which Borrow assumed in the company of his social equals left him entirely when he was with the gipsies. The result of this was that these wanderers knew him better than did his own countrymen.

Seven years after the events recorded in *Lavengro* and *The Romany Rye* Borrow obtained the post of agent to the Bible Society, in which capacity he visited St Petersburg (1833-1835) (where he published *Targum*, a collection of translations), and Spain, Portugal and Morocco (1835-1839). From 1837 to 1839 he acted as correspondent to the *Morning Herald*. The result of these travels and adventures was the publication, in 1841, of *Zincali, or The Gypsies in Spain*, the original MS. of which, in the hands of the present writer, shows how careful was Borrow’s method of work. In 1843 appeared *The Bible in Spain*, when suddenly Borrow became famous. Every page of the book glows with freshness, picturesqueness and vivacity. In 1840 he married Mary Clarke, the widow of a naval officer, and permanently settled at Oulton Broad, near Lowestoft, with her and her daughter. Here he began to write again. Very likely Borrow would never have told the world about his vagabond life in England as a hedge-smith had not *The Bible in Spain* made him famous as a wanderer. *Lavengro* appeared in 1851 with a success which, compared with that of *The Bible in Spain*, was only partial. He was much chagrined at this, and although *Lavengro* broke off in the midst of a scene in the Dingle, and only broke off there because the three volumes would hold no more, it was not until 1857 that he published the sequel, *The Romany Rye*. In 1844 he travelled in south-eastern Europe, and in 1854 he made a tour with his step-daughter in Wales. This tour he described in *Wild Wales*, published in 1862. In 1874 he brought out a volume of ill-digested material upon the Romany tongue, *Romano Lavo-lil, or Word-book of the Gypsy Language*, a book which has been exhaustively analysed and criticized by Mr John Sampson. In the summer of 1874 he left London, bade adieu to Mr Murray and a few friends, and returned to Oulton. On the 26th of July 1881 he was found dead in his house at Oulton, in his seventy-ninth year.

Borrow was indisputably a linguist of wide knowledge, though he was not a scholar in the strict sense. The variety of his attainments is shown by his translation of the Church of England *Homilies* into Manchu, of the Gospel of St Luke into the Git dialect of the Gitanos, of *The Sleeping Bard* from the Cambrian-British, and of *Bluebeard* into Turkish. But it is not Borrow’s linguistic accomplishments that have kept his name fresh, and will continue to keep it fresh for many a generation to come. It is his character, his unique character as expressed, or partially expressed, in his books. Among all the “remarkable individuals” (to use his favourite expression) who during the middle of the 19th century figured in the world of letters, Borrow was surely the most eccentric, the most whimsical, and in many ways the most extraordinary. There was scarcely a point in which he resembled any other writer of his time. With regard to *Lavengro* and *The Romany Rye*, there has been very much discussion as to how much *Dichtung* is mingled with the *Wahrheit* in those fascinating books. Had it not been for the amazingly clumsy pieces of fiction which he threw into the narrative, few readers would have doubted the autobiographical nature of the two books. Such incidents as are here alluded to shed an air of unreality over the whole. It has been said by Dr Knapp that Borrow never created a character, and that to one who thoroughly knows the times and Borrow’s writings the originals are easily recognizable. This is true, no doubt, as regards people whom he knew at Norwich, and indeed generally as regards those he knew before the period of his gipsy wanderings. It must not be supposed, however, that such a character as the man who “touched” to avert the evil chance is in any sense a portrait of an individual with whom he had been brought into contact. The character has so many of Borrow’s own eccentricities that it might rather be called a portrait of himself. There was nothing that Borrow strove against with more energy than the curious impulse, which he seems to have shared with Dr Johnson, to touch the objects along his path in order to save himself from the evil chance. He never conquered the superstition. In walking through Richmond Park with the present writer he would step out of his way constantly to touch a tree, and he was offended if the friend he was with seemed to observe it. Many of the peculiarities of the man who taught himself Chinese in order to distract his mind from painful thoughts were also Borrow’s own.

(T. W.-D.)

BORSIPPA (*Barsip* in the Babylonian and Assyrian inscriptions; *Borsif* in the Talmud; mod. Birs or Birs-Nimrud), the Greek name of an ancient city about 15 m. S.W. of Babylon and 10 m. from Hillah, on the Nahr Hindieh, or Hindieh canal, formerly known as “the Euphrates of Borsippa,” and even during the Arabic period called “the river of Birs.” Borsippa was the sister city of Babylon, and is often called in the inscriptions Babylon II., also the “city without equal.” Its patron god was Nebo or Nabu. Like Babylon Borsippa is not mentioned in the oldest inscriptions, but comes into importance first after Khammurabi had made Babylon the capital of the whole land, somewhere before 2000 B.C. He built or

rebuilt the temple E-Zida at this place, dedicating it, however, to Marduk (Bel-Merodach). But although Khammurabi himself does not seem to have honoured Nebo (*q.v.*), subsequent kings recognized him as the deity of E-Zida and made him the son of Marduk (*q.v.*). Each new year his image was taken to visit his father, in Babylon, who in his turn gave him escort homeward, and his temple was second in wealth and importance only to E-Saggila, the temple of Marduk in Babylon. As with Babylon, so with Borsippa, the time of Nebuchadrezzar was the period of its greatest prosperity. In general Borsippa shared the fate of Babylon, falling into decay after the time of Alexander, and finally in the middle ages into ruins. The site of the ancient city is represented by two large ruin mounds. Of these the north-westerly, the lower of the two, but the larger in superficial area, is called Ibrahim Khalil, from a *ziara*, or shrine, of Abraham, the friend of God, which stands on its highest point. According to Arabic lore, based on Jewish legends, at this spot Nimrod sought to throw Abraham into a fiery furnace, from which he was saved by the grace of God. Excavations were first conducted here by the French Expédition Scientifique en Mésopotamie in 1852, with small result. In 1879 and 1880 Hormuzd Rassam conducted more extensive, although unsystematic, excavations in this mound, finding a considerable quantity of inscribed tablets and the like, now in the British Museum; but by far the greater part of this ruin still remains unexplored. The south-westerly mound, the Birs proper, is probably the most conspicuous and striking ruin in all Irak. On the top of a hill over 100 ft. high rises a pointed mass of vitrified brick split down the centre, over 40 ft. high, about which lie huge masses of vitrified brick, some as much as 15 ft. in diameter, and also single enamelled bricks, generally bearing an inscription of Nebuchadrezzar, twisted, curled and broken, apparently by great heat. Jewish and Arabic tradition makes this the Tower of Babel, which was supposed to have been destroyed by lightning. Excavations conducted here by Sir Henry Rawlinson in 1854 showed it to be the stage tower or *ziggurat*, called the “house of the seven divisions of heaven and earth,” of E-Zida, the temple of Nebo. On a large platform rose seven solid terraces, each smaller than the one below it, the lowest being 272 ft. square and 26 ft. high. Each of these terraces was faced with bricks of a different colour. The approach to this *ziggurat* was toward the north-east, and on this side lay also the principal rooms of the temple of which this was the tower. These rooms were partly excavated by Hormuzd Rassam in 1879-1880. In its final form this temple and tower were the work of Nebuchadrezzar, but from the clay cylinders found by Sir Henry Rawlinson in two of the corners of the tower it appears that he restored an incomplete *ziggurat* of a former king, “which was long since fallen into decay.” Some of the best authorities believe that it was this ambitious but incomplete and ruinous *ziggurat*, existing before the time of Nebuchadrezzar, which gave occasion to or afforded local attachment for the Biblical story of the Tower of Babel.

AUTHORITIES.—H.C. Rawlinson, *Journal of the Royal Asiatic Society* (1860); J. Oppert, *Expédition scientifique en Mésopotamie* (Paris, 1863); F. Delitzsch, *Wo lag das Paradies?* (Leipzig, 1881); J.P. Peters, *Nippur* (New York and London, 1896); H. Rassam, *Asshur and the Land of Nimrod* (London and New York, 1897); M. Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898); see also BABYLON, BABEL.

(J. P. PE.)

BORT, or BOART, an inferior kind of diamond, unfit for cutting but useful as an abrasive agent. The typical bort occurs in small spherical masses, of greyish colour, rough or drusy on the surface, and showing on fracture a radiate crystalline structure. These masses, known in Brazil as bolas, are often called “shot bort” or “round bort.” Much of the bort consists of irregular aggregates of imperfect crystals. In trade, the term bort is extended to all small and impure diamonds, and crystalline fragments of diamond, useless as gem-stones. A large proportion of the output of some of the South African mines consists of such material. This bort is crushed in steel mortars to form diamond powder, which is largely used in lapidaries’ work.

BORY DE SAINT-VINCENT, JEAN BAPTISTE GEORGE MARIE (1780-1846), French naturalist, was born at Agen in 1780. He was sent as naturalist with Captain Nicholas Baudin’s expedition to Australia in 1798, but left the vessel at Mauritius, and spent two years in exploring Réunion and other islands. Joining the army on his return, he was present at the battles of Ulm and Austerlitz, and in 1808 went to Spain with Marshal Soult. His attachment to the Napoleonic dynasty and dislike to the Bourbons were shown in various ways during 1815, and his name was consequently placed on the list of the proscribed; but after wandering in disguise from place to place he was allowed quietly to return to Paris in 1820. In 1829 he was placed at the head of a scientific expedition to the Morea, and in 1839 he had charge of the exploration of Algeria. He died on the 23rd of December 1846. He was editor of the *Dictionnaire classique d’histoire naturelle*, and among his separate productions were:—*Essais sur les Îles Fortunées* (1802); *Voyage dans les Îles d’Afrique* (1803); *Voyage souterrain, ou description du plateau de Saint-Pierre de Maestricht et de ses vastes cryptes* (1821); *L’Homme, essai zoologique sur le genre humain* (1827); *Résumé de la géographie de la Péninsule* (1838).

BORZHOM, a watering-place of Russian Transcaucasia, in the government of Tiflis, and 93 m. by rail W. of the city of Tiflis. Pop. (1897) 5800. It is situated at an altitude of 2750 ft. in the Borzhom gorge, a narrow rift in the Little Caucasus mountains, and on the Kura. Its warm climate, its two hot springs (71½°-82° Fahr.) and its beautiful parks make it a favourite summer resort, and give it its popular name of “the pearl of Caucasus.” The bottled mineral waters are very extensively exported.

BOS, LAMBERT (1670-1717), Dutch scholar and critic, was born at Workum in Friesland, where his father was headmaster of the school. He went to the university of Franeker (suppressed by Napoleon in 1811), and was appointed professor of Greek there in 1704; after an uneventful life he died at Franeker in 1717. His most famous work, *Ellipses Graecae* (1702), was translated into English by John Seager (1830); and his *Antiquitates Graecae* (1714) passed through several editions. He also published *Vetus Testamentum*, Ex Versione lxx. Interpretum (1709); notes on Thomas Magister (1698); *Exercitationes Philologicae* (1700); *Animadversiones ad Scriptores quosdam Graecos* (1715); and two small treatises on Accents and Greek Syntax.

BOSA, a seaport and episcopal see on the W. coast of Sardinia, in the province of Cagliari, 30 m. W. of Macomer by rail. Pop. (1901) 6846. The height above the town is crowned by a castle of the Malaspina family. The cathedral, founded in the 12th century, restored in the 15th, and rebuilt in 1806, is fine. There are some tanneries, and the fishing industry is important, but the coral production of Sicily has entirely destroyed that of Bosa since 1887. The district produces oil and wine. The present town of Bosa was founded in 1112 by the Malaspina, 1½ m. from the site of the ancient town (Bosa or Calmedia), where a well-preserved church still exists. The old town is of Roman origin, but is only mentioned by Pliny and Ptolemy, and as a station on the coast-road in the Itineraries (*Corp. Inscr. Lat.* x. 7939 seq.). One of the inscriptions preserved in the old cathedral records the erection of four silver statues, of Antoninus Pius, his wife Faustina and their two sons.

BOSBOOM-TOUSSAINT, ANNA LOUISA GEERTRUIDA (1812-1886), Dutch novelist, was born at Alkmaar in north Holland on the 16th of September 1812. Her father, named Toussaint, a local chemist of Huguenot descent, gave her a fair education, and at an early period of her career she developed a taste for historical research, fostered, perhaps, by a forced indoor life, the result of weak health. In 1851 she married the Dutch painter, Johannes Bosboom (1817-1891), and thereafter was known as Mrs Bosboom-Toussaint. Her first romance, *Almagro*, appeared in 1837, followed by the *Graaf van Devonshire* (*The Earl of Devonshire*) in 1838; the *Engelschen te Rome* (*The English at Rome*) in 1840, and *Het Huis Lauernesse* (*The House of Lauernesse*) in 1841, an episode of the Reformation, translated into many European languages. These stories, mainly founded upon some of the most interesting epochs of Dutch history, betrayed a remarkable grasp of facts and situations, combined with an undoubted mastery over her mother tongue, though her style is sometimes involved, and not always faultless. Ten years (1840-1850) were mainly devoted to further studies, the result of which was revealed in 1851-1854, when her *Leycester in Nederland* (3 vols.), *Vrouwen van het Leycestersche Tydperk* (*Women of Leicester’s Epoch*, 3 vols.), and *Gideon Florensz* (3 vols.) appeared, a series dealing with Robert Dudley’s adventures in the Low Countries. After 1870 Mrs Bosboom-Toussaint abandoned historical romance for the modern society novel, but her *Delftsche Wonderdokter* (*The Necromancer of Delft*, 1871, 3 vols.) and *Majoor Frans* (1875, 3 vols.) did not command the success of her earlier works. *Major Frank* has been translated into English (1885). She died at the Hague on the 13th of April 1886. Her novels have been published there in a collected edition (1885-1888, 25 vols.).

BOSC, LOUIS AUGUSTIN GUILLAUME (1759-1828), French naturalist, was born at Paris on the 29th of January 1759. He was educated at the college of Dijon, where he showed a taste for botany, and he followed up his studies in Paris at the Jardin des Plantes, where he made the acquaintance of Mme M.J.P. Roland. At the age of eighteen he obtained a government appointment, and he rose to be one of the chief officials in the postal department. Under the ministry of J.M. Roland in 1792 he also held the post of superintendent of prisons, but the violent outbreaks of 1793 drove him from office, and

compelled him to take refuge in flight. For some months he lay concealed at Sainte-Radégonde, in the forest of Montmorency, barely subsisting on roots and vegetables. He was enabled to return to Paris on the fall of Robespierre, and under the title *Appel à l'impartiale postérité par la citoyenne Roland* published a manuscript Mme Roland had entrusted to him before her execution. Soon afterwards he set out for America, resolving to explore the natural riches of that country. The immense materials he gathered were never published in a complete form, but much went to enrich the works of B.G.E. de Lacépède, P.A. Latreille and others. After his return, on the establishment of the Directory, he was reinstated in his old office. Of this he was again deprived by the *coup d'état* of 1799, and for a time he was in great destitution; but by his copious contributions to scientific literature he contrived to support himself and to lay the foundations of a solid reputation. He was engaged on the new *Dictionnaire d'histoire naturelle*, and on the *Encyclopédie méthodique*, he edited the *Dictionnaire raisonné et universel d'agriculture*, and was one of the editors of the *Annales de l'agriculture française*. He was made inspector of the gardens at Versailles, and of the public nurseries belonging to the ministry of the interior. The last years of his life were devoted to an elaborate work on the vine, for which he had amassed an immense quantity of materials, but his death at Paris on the 10th of July 1828 prevented its completion.

BOSCÁN ALMOGAVER, JUAN (1490?-1542), Spanish poet, was born about the close of the 15th century. He was a Catalan of patrician birth, and, after some years of military service, became tutor to the duke of Alva. His poems were published in 1543 at Barcelona by his widow. They are divided into sections which mark the stages of Boscán's poetical evolution. The first book contains poems in the old Castilian metres, written in his youth, before 1526, in which year he became acquainted with the Venetian ambassador, Andrea Navagiero, who urged him to adopt Italian measures, and this advice gave a new turn to Boscán's activity. The remaining books contain a number of pieces in the Italian manner, the longest of these being *Hero y Leander*, a poem in blank verse, based on Musaeus. Boscán's best effort, the *Octava Rima*, is a skilful imitation of Petrarch and Bembo. Boscán also published in 1534 an admirable translation of Castiglione's *Il Cortegiano*. Italian measures had been introduced into Spanish literature by Santillana and Villalpando; it is Boscán's distinction to have naturalized these forms definitively, and to have founded a poetic school.

The best edition of his poems is that issued at Madrid in 1875 by W.J. Knapp; for his indebtedness to earlier writers, see Francesco Flamini, *Studi di storia literaria italiana e straniera* (Livorno, 1895).

BOSCASTLE, a small seaport and watering-place in the Launceston parliamentary division of Cornwall, England, 5 m. N. of Camelford station on the London & South-Western railway. Pop. (civil parish of Forrabury, 1901) 329. The village rises steeply above a very narrow cove on the north coast, sheltered, but difficult of access, vessels having to be warped into it by means of hawsers. A mound on a hill above the harbour marks the site of a Norman castle. The parish church of St Symphorian, Forrabury, also stands high, overlooking the Atlantic from Willapark Point. The tower is without bells, and the tradition that a ship bearing a peal hither was wrecked within sight of the harbour, and that the lost bells may still be heard to toll beneath the waves, has been made famous by a ballad of the Cornish poet Robert Stephen Hawker, vicar of Moorwinstow. The coast scenery near Boscastle is severely beautiful, with abrupt cliffs fully exposed to the sea, and broken only by a few picturesque inlets such as Crackington Cove and Pentargan Cove. Inland are bare moors, diversified by narrow dales.

BOSCAWEN, EDWARD (1711-1761), British admiral, was born on the 19th of August 1711. He was the third son of Hugh, 1st Viscount Falmouth. He early entered the navy, and in 1739 distinguished himself at the taking of Porto Bello. At the siege of Cartagena, in March 1741, at the head of a party of seamen, he took a battery of fifteen 24-pounders, while exposed to the fire of another fort. On his return to England in the following year he married, and entered parliament as member for Truro. In 1744 he captured the French frigate "Médée," commanded by M. de Hocquart, the first ship taken in the war. In May 1747 he signalized himself in the engagement off Cape Finisterre, and was wounded in the shoulder with a musket-ball. Hocquart again became his prisoner, and the French ships, ten in number, were taken. On the 15th of July he was made rear-admiral and commander-in-chief of the expedition to the East Indies. On the 29th of July 1748 he arrived off Fort St David's, and soon after laid siege to Pondicherry; but the sickness of his men and the approach of the monsoons led to the raising of the siege. Soon afterwards he received news of the peace, and Madras was delivered up to him by the French. In April 1750 he arrived in England, and was the next year made one of the lords of the

Admiralty, and chosen an elder brother of the Trinity House. In February 1755 he was appointed vice-admiral, and in April he intercepted the French squadron bound to North America, and took the "Alcide" and "Lys" of sixty-four guns each. Hocquart became his prisoner for the third time, and Boscawen returned to Spithead with his prizes and 1500 prisoners. For this exploit, he received the thanks of parliament. In 1758 he was appointed admiral of the blue and commander-in-chief of the expedition to Cape Breton, when, in conjunction with General Amherst, he took the fortress of Louisburg, and the island of Cape Breton—services for which he again received the thanks of the House of Commons. In 1759, being appointed to command in the Mediterranean, he pursued the French fleet, commanded by M. de la Clue, and after a sharp engagement in Lagos Bay took three large ships and burnt two, returning to Spithead with his prizes and 2000 prisoners. The victory defeated the proposed concentration of the French fleet in Brest to cover an invasion of England. In December 1760 he was appointed general of the marines, with a salary of £3000 per annum, and was also sworn a member of the privy council. He died at his seat near Guildford on the 10th of January 1761.

BOSCH (or Bos), **JEROM** (*c.* 1460-1518), the name generally given, from his birthplace Hertogenbosch, to Hieronymus van Aeken, the Dutch painter. He was probably a pupil of Albert Ouwater, and may be called the Breughel of the 15th century, for he devoted himself to the invention of bizarre types, *diableries*, and scenes of the kind generally associated with Breughel, whose art is to a great extent based on Bosch's. He was a satirist much in advance of his time, and one of the most original and ingenious artists of the 15th century. He exercised great influence on Lucas Cranach, who frequently copied his paintings. His works were much admired in Spain, especially by Philip II., at whose court Bosch painted for some time. One of his chief works is the "Last Judgment" at the Berlin gallery, which also owns a little "St Jerome in the Desert." "The Fall of the Rebellious Angels" and the "St Anthony" triptych are in the Brussels museum, and two important triptychs are at the Munich gallery. The Lippmann collection in Berlin contains an important "Adoration of the Magi," the Antwerp museum a "Passion," and a practically unknown painting from his brush is at the Naples museum.

BOSCOVICH, ROGER JOSEPH (1711?-1787), Italian mathematician and natural philosopher, one of the earliest of foreign *savants* to adopt Newton's gravitation theory, was born at Ragusa in Dalmatia on the 18th of May 1711, according to the usual account, but ten years earlier according to Lalande (*Éloge*, 1792). In his fifteenth year, after passing through the usual elementary studies, he entered the Society of Jesus. On completing his noviciate, which was spent at Rome, he studied mathematics and physics at the Collegium Romanum; and so brilliant was his progress in these sciences that in 1740 he was appointed professor of mathematics in the college. For this post he was especially fitted by his acquaintance with recent advances in science, and by his skill in a classical severity of demonstration, acquired by a thorough study of the works of the Greek geometricians. Several years before this appointment he had made himself a name by an elegant solution of the problem to find the sun's equator and determine the period of its rotation by observation of the spots on its surface. Notwithstanding the arduous duties of his professorship he found time for investigation in all the fields of physical science; and he published a very large number of dissertations, some of them of considerable length, on a wide variety of subjects. Among these subjects were the transit of Mercury, the Aurora Borealis, the figure of the earth, the observation of the fixed stars, the inequalities in terrestrial gravitation, the application of mathematics to the theory of the telescope, the limits of certainty in astronomical observations, the solid of greatest attraction, the cycloid, the logistic curve, the theory of comets, the tides, the law of continuity, the double refraction micrometer, various problems of spherical trigonometry, &c. In 1742 he was consulted, with other men of science, by the pope, Benedict XIV., as to the best means of securing the stability of the dome of St Peter's, Rome, in which a crack had been discovered. His suggestion was adopted. Shortly after he engaged to take part in the Portuguese expedition for the survey of Brazil, and the measurement of a degree of the meridian; but he yielded to the urgent request of the pope that he would remain in Italy and undertake a similar task there. Accordingly, in conjunction with Christopher Maire, an English Jesuit, he measured an arc of two degrees between Rome and Rimini. The operations were begun towards the close of 1750, and were completed in about two years. An account of them was published in 1755, entitled *De Litteraria expeditione per pontificam ditionem ad dimetiendos duos meridiani gradus a PP. Maire et Boscovich*. The value of this work was increased by a carefully prepared map of the States of the Church. A French translation appeared in 1770. A dispute having arisen between the grand duke of Tuscany and the republic of Lucca with respect to the drainage of a lake, Boscovich was sent, in 1757, as agent of Lucca to Vienna, and succeeded in bringing about a satisfactory arrangement of the matter. In the following year he published at Vienna his famous work, *Theoria philosophiae naturalis redacta ad unicam legem virium in natura existentium*, containing his atomic theory (see Molecule). Another occasion for the exercise of his diplomatic ability soon after presented itself. A suspicion having arisen on the part of the British government that ships of war had been fitted out in the port of Ragusa for the service of France,

and that the neutrality of Ragusa had thus been violated, Boscovich was selected to undertake an embassy to London (1760), to vindicate the character of his native place and satisfy the government. This mission he discharged successfully, with credit to himself and satisfaction to his countrymen. During his stay in England he was elected a fellow of the Royal Society. He soon after paid this society the compliment of dedicating to it his Latin poem, entitled *De Solis et Lunae Defectibus* (London, 1764). This prolix composition, one of a class which at that time was much in vogue—metrical epitomes of the facts of science—contains in about five thousand lines, illustrated by voluminous notes, a compendium of astronomy. It was for the most part written on horseback, during the author's rides in the country while engaged in his meridian measurements. The book is characterized by G.B.J. Delambre as "uninstructive to an astronomer and unintelligible to any one else."

On leaving England Boscovich travelled in Turkey, but ill-health compelled him soon to return to Italy. In 1764 he was called to the chair of mathematics at the university of Pavia, and this post he held, together with the directorship of the observatory of Brera, for six years. He was invited by the Royal Society of London to undertake an expedition to California to observe the transit of Venus in 1769; but this was prevented by the recent decree of the Spanish government for the expulsion of the Jesuits from its dominions. The vanity, egotism and petulance of Boscovich provoked his rivals and made him many enemies, so that in hope of peace he was driven to frequent change of residence. About 1770 he 279
removed to Milan, where he continued to teach and to hold the directorship of the observatory of Brera; but being deprived of his post by the intrigues of his associates he was about to retire to his native place, when the news reached him (1773) of the suppression of his order in Italy. Uncertainty as to his future led him to accept an invitation from the king of France to Paris, where he was naturalized and was appointed director of optics for the marine, an office instituted for him, with a pension of 8000 livres. He remained there ten years, but his position became irksome, and at length intolerable. He continued, however, to devote himself diligently to the pursuits of science, and published many remarkable memoirs. Among them were an elegant solution of the problem to determine the orbit of a comet from three observations, and memoirs on the micrometer and achromatic telescopes. In 1783 he returned to Italy, and spent two years at Bassano, where he occupied himself with the publication of his *Opera pertinentia ad opticam et astronomiam, &c.*, which appeared in 1785 in five volumes quarto. After a visit of some months to the convent of Vallombrosa, he went to Milan and resumed his literary labours. But his health was failing, his reputation was on the wane, his works did not sell, and he gradually sank a prey to illness and disappointment. He fell into melancholy, imbecility, and at last madness, with lucid intervals, and died at Milan on the 15th (13th) of February 1787. In addition to the works already mentioned Boscovich published *Elementa universae matheseos* (1754), the substance of the course of study prepared for his pupils; and a narrative of his travels, entitled *Giornale di un viaggio da Constantinopoli in Polonia*, of which several editions and a French translation appeared. His latest labour was the editing of the Latin poems of his friend Benedict Stay on the philosophy of Descartes, with scientific annotations and supplements.

(W. L. R. C.)

BOSNIA AND HERZEGOVINA, or Bosnia-Herzegovina, two provinces formerly included in European Turkey, which now, together with Dalmatia, form the southernmost territories of the Austro-Hungarian Monarchy. The name *Herzegovina* is also written *Hertzegovina, Hertsegovina* or, in Croatian, *Hercegovina*. In shape roughly resembling an equilateral triangle, with base uppermost, Bosnia and Herzegovina cover an area of 19,696 sq. m., in the north-west of the Balkan Peninsula. They are bounded N. and N.W. by Croatia-Slavonia; W. and S.W. by Dalmatia; S.E. by Montenegro and the Sanjak of Novibazar; and N.E. by Servia. Opposite to the promontory of Sabbioncello, and at the entrance to the Bocche di Cattaro, the frontier of Herzegovina comes down to the Adriatic; but these two strips of coast do not contain any good harbour, and extend only for a total distance of 14½ m. Bosnia is altogether an inland territory.

1. *Physical Features.*—Along the Dalmatian border, and through the centre of Bosnia, runs the backbone of the Dinaric Alps, which attain their greatest altitudes (6000-7500 ft.) near Travnik, Serajevo and Mostar. There are numerous high valleys shut in among the mountains of this range; the most noteworthy being the plain of Livno, which lies parallel to the Dalmatian border, at a height of 500 ft. above the sea. The zone of highlands throughout Bosnia and Herzegovina reaches a mean altitude of 1500 ft., while summits of more than 4000 ft. occur frequently. To the north-east of the Dinaric Alps extends a region of mountain, moor and forest, with deeply sunk alluvial basins, which finally expand into the lowlands of the Posavina, or Vale of the Save, forming the southernmost fringe of the Hungarian Alföld. Bosnia belongs wholly to the watershed of the Save, and its rivers to the Danubian system, no large stream finding a way to the Adriatic. The Save flows eastward along the northern frontier for 237 m. It is joined by four main tributaries, the Drina, Bosna, Vrbas and Una. The Drina is formed on the Montenegrin frontier by the united streams of the Tara and Piva; curving north-eastwards past Visegrad, it marches for 102 m. with Servian territory, and falls into the Save at Racha, after a total course of 155 m. The Bosna issues from many springs near Serajevo, and winds for 107 m. northward, through a succession of fertile glens, reaching the Save 1 m. west of Samac. Farther west, the Vrbas cuts a channel through the Dinaric Alps, and, after passing Jajce and Banjaluka, meets the Save 94 m. from its own headwaters. The Una rises on the Croatian border, and, after skirting the

Plješevica Planina, in Croatia, turns sharply to the north-east; serving as a frontier stream for 37 m. before entering the Save at Jasenovac. Its length is 98 m. At Novi it is joined by the Sana, a considerable affluent.

Herzegovina, which lies south of Bosnia, in a parallelogram defined by Montenegro, Dalmatia, the Dinaric Alps, and an irregular line drawn from a point 25 m. west-north-west of Mostar to the bend of the river Narenta, differs in many respects from the larger territory. Its mountains, which belong to the Adriatic watershed, and form a continuation of the Montenegrin highlands, are less rounded and more dolomitic in character. They descend in parallel ridges of grey Karst limestone, south-westwards to the sea; their last summits reappear in the multitude of rocky islands along the Dalmatian littoral. As in the peaks of Orjen, Orobac, Samotica and Veliki Kap, their height often exceeds 6000 ft. West of the Narenta, their flanks are in places covered with forests of beech and pine, but north-east of that river they present for the most part a scene of barren desolation. Their monotony is varied only by the fruitful river-valleys and *poljes*, or upland hollows, where the smaller towns and villages are grouped; the districts or cantons thus formed are walled round by a natural rampart of limestone. These *poljes* may be described as oases in what is otherwise a desert expanse of mountains. The surface of some, as notably the *Mostarsko Blato*, lying west of Mostar, is marshy, and in spring forms a lake; others are watered by streams which disappear in swallow-holes of the rock, and make their way by underground channels either to the sea or the Narenta. The most conspicuous example of these is the Trebinjcica, which disappears in two swallow-holes in Popovopolye, and after making its way by a subterranean passage through a range of mountains, wells up in the mighty source of Ombla near Ragusa, and hurries in undiminished volume to the Adriatic. The Narenta, or Neretva, is the one large river of Herzegovina which flows above ground throughout its length. Rising on the Montenegrin border, under the Lebrsnik mountains, it flows north-westwards at the foot of the Dinaric Alps; and, near Konjica, sweeps round suddenly to the south, and falls into the Adriatic near Metkovic, after traversing 125 m. North of Mostar, it cleaves a passage through the celebrated Narenta defile, a narrow gorge, 12 m. long, overshadowed by mountains which rise on either side and culminate in Lupoglav (6796 ft.) on the east, and Cvrstnica (7205 ft.) on the west.

2. *Geology and Minerals.*—Geologically, the highlands of Bosnia and Herzegovina are to be regarded, in both their orographic and tectonic character, as a continuation of the South Alpine calcareous belt. Along the west frontier there appear broad and strongly marked zones of Cretaceous limestone, alternating with Jurassic and Triassic, joined by a strip of Palaeozoic formations running from the north-west corner of Bosnia. Next, proceeding from this region in an easterly direction, are the Neogene freshwater formations, filling up the greatest part of the north-east of Bosnia, as also a zone of flysch intermingled with several strips of eruptive rock. In the south-east of Bosnia the predominant formations are Triassic and Palaeozoic strata with red sandstone and quartzite. Along the whole northern rim of Bosnia, as also in the fluvial and Karst valleys (*poljes*), are found diluvial and alluvial formations, interrupted at one place by an isolated granite layer. Bosnia is rich in minerals, including coal, iron, copper, chrome, manganese, cinnabar, zinc and mercury, besides marble and much excellent building stone. Among the mountains, gold and silver were worked by the Romans, and, in the middle ages, by the Ragusans. After 1881 the Mining Company of Bosnia began to develop the coal and iron fields; and from 1886 its operations were continued by the government. Valuable salt is obtained from the pits at Dolnja Tuzla, and the southern part of Herzegovina yields asphalt and lignite. Mineral springs also abound, and those of Ilidže, near Serajevo, have been utilized since the days of the Romans; but the majority remained unexploited at the beginning of the 20th century.

3. *Climate.*—In climate Bosnia differs considerably from Herzegovina. In both alike the *scirocco*, bringing rain from the south-west, is a prevalent wind, as well as the *bora*, the fearful north-north-easter of Illyria, which, sweeping down the lateral valleys of the Dinaric Alps, overwhelms everything in its path. The snow-fall is slight, and, except on a few of the loftier peaks, the snow soon melts. In Bosnia the weather resembles that of the south Austrian highlands, generally mild, though apt to be bitterly cold in winter. In Serajevo the mean annual temperature is 50° Fahr. Herzegovina has more affinity to the Dalmatian mountains, oppressively hot in summer, when the mercury often rises beyond 110° Fahr. The winter rains of the Karst region show that it belongs to the sub-tropical climatic zone.

4. *Fauna.*—In 1893 the bones of a cave-bear (*Ursus spelaeus*) were taken from a cavern of the Bjelasnica range, in Herzegovina, a discovery without parallel in the Balkan Peninsula. Of existing species the bear, wild-boar, badger, roe-deer and chamois may occasionally be seen in the remotest wilds of mountain and forest. Hares are uncommon, and the last red-deer was shot in 1814; but wolves, otters and squirrels abound. Snipe, woodcock, ducks and rails, in vast flocks, haunt the banks of the Drina and Save; while the crane, pelican, wild-swan and wild-goose are fairly plentiful. The lammergeier (*Gypaëtus barbatus*) had almost become extinct in 1900; but several varieties of eagle and falcon are left. Falconry was long a pastime of the Moslem landlords. The destruction of game, recklessly carried out under Turkish rule, is prevented by the laws of 1880, 1883 and 1893, which enforced a close time, and rendered shooting-licences necessary. The list of reptiles includes the venomous *Vipera ammodytes* and *Pelias berus*, while scorpions and lizards infest the stony wastes of the Karst. In the museum at Serajevo there is a large entomological collection, including the remarkable *Pogonus anophthalmus*, from the underground Karst caves. The caves are rich in curious kinds of fish, *Paraphoxinus Gethaldii*, which is unknown elsewhere, *Chondrostoma phoximus, Phoxinellus alepidatus* and others, which are caught and eaten by the peasantry. In Herzegovina, although many of the high mountain tarns are unproductive, the eel-fisheries of the Narenta are of considerable value. Leech-gathering is a characteristic Bosnian industry. The streams of both territories yield excellent trout and crayfish; salmon, sturgeon and sterlet, from the Danube, are netted in the Save.

5. *Flora.*—Serajevo museum has a collection of the Bosnian flora, representing over 3000 species; among them, the rare *Veronica crinita, Pinus leucodermis, Picea omorica* and *Daphne Blagayana*. About 50% of the occupied territory is clothed with forest. “Bosnia begins with the forest,” says a native proverb, “Herzegovina with the rock”; and this account is, broadly speaking, accurate, although the Bosnian Karst is as bare as that of Herzegovina. Below the mountain crests, where only the hardiest lichens and mosses can survive, comes a belt of large timber, including many giant trees, 200 ft. high, and 20 ft. in girth at the level of a man’s shoulder. Dense brushwood prevails on the foothills. There are three main zones of woodland. Up to 2500 ft. among the ranges of northern Bosnia, the sunnier slopes are overgrown by oaks, the shadier by beeches. Farther south, in central Bosnia, the oak rarely mounts beyond the foothills, being superseded by the beech, elm, ash, fir and pine, up to 5000 ft. The third zone is characterized by the predominance, up to 6000 ft., of the fir, pine and other conifers. In all three zones occur the chestnut, aspen, willow (especially *Salix laurea*), hornbeam, birch, alder, juniper and yew; while the mountain ash, hazel, wild plum, wild pear and other wild fruit trees are found at rarer intervals. Until 1878 the forests were almost neglected; afterwards, the government was forced to levy a graduated tax on goats, owing to the damage they inflicted upon young trees, and to curtail the popular rights of cutting timber and fir-wood and of pasturage. These measures were largely successful, but in 1902 the export of oak staves was discontinued owing to a shortage of supply.

Forests.

6. *Agriculture.*—In 1895, according to the agricultural survey, the surface of Bosnia and Herzegovina was laid out as follows:—

	Acres.
Plough-land.	2,355,499
Garden-ground.	103,040
Meadow.	739,200
Vineyards.	12,598
Pasture.	1,875,840
Forest.	5,670,619
Unproductive.	210,998

Apart from the arid wastes of the Karst, the soil is well adapted for the growing of cereals, especially Indian corn; olives, vines, mulberries, figs, pomegranates, melons, oranges, lemons, rice and tobacco flourish in Herzegovina and the more sheltered portions of Bosnia. Near Doboj, on the Bosna, there is a state sugar-refinery, for which beetroot is largely grown in the vicinity. *Pyrethrum cinerariaefolium* is exported for the manufacture of insect-powder, and sunflowers are cultivated for the oil contained in their seeds. The plum-orchards of the Posavina furnish prunes and a spirit called *šlivovica, shlivovitsa* or *sliwowitz*. This district is the headquarters of a thriving trade in pigs. Poultry, bees and silkworms are commonly kept. On the whole agriculture is backward, despite the richness of the soil; for the cultivators are a very conservative race, and prefer the methods and implements of their ancestors. Many improvements were, nevertheless, introduced by the government after 1878. Machinery was lent to the farmers, and free grants of seed were made. Model farms were established at Livno and at Gačko, on the Montenegrin border; a school of viticulture near Mostar; a model poultry-farm at Prijedor, close to the Croatian boundary; a school of agriculture and dairy farming at Ilidže; and another school at Modric, near the mouth of the Bosna, where a certain number of village schoolmasters are annually trained, for six weeks, in practical husbandry. Seed is distributed, and agricultural machinery lent, by the government. To better the breeds of live-stock, a stud-farm was opened near Serajevo, and foreign horses, cattle, sheep and poultry are imported.

7. *Land Tenure.*—The *zadruga*, or household community, more common in Servia (*q.v.*), survives to a small extent in Bosnia and Herzegovina; but, as a rule, the tenure of land resembles the system called *métayage*. At the time of the Austrian occupation (1878) it was regulated by a Turkish enactment[1] of the 12th of September 1859. Apart from gardens and house-property, all land was, according to this enactment, owned by the state; in practice, it was held by the Moslem *begs* or *beys* (nobles) and *agas* (landlords), who let it to the peasantry. The landlord received from his tenant (*kmet*) a fixed percentage, usually one third (*tretina*), of the annual produce; and, of the remaining two thirds, the cash equivalent of one tenth (*desetina*) went to the state. The amount of the *desetina* was always fixed first, and served as a basis for the assessment of the *tretina*, which, however, was generally paid in kind. At any time the tenant could relinquish his holding; but he could only be evicted for refusing to pay his *tretina*, for wilful neglect of his land or for damage done to it. The landlord was bound to keep his tenants’ dwellings and outhouses in repair. Should he desire to sell his estates, the right of pre-emption belonged to the tenants, or, in default, to the neighbours. Thus foreign speculators in land were excluded, while a class of peasant proprietors was created; its numbers being increased by the custom that, if any man reclaimed a piece of waste land, it became his own property after ten years. The Turkish land-system remained in force during the entire period of the occupation (1878-1908). It had worked, on the whole, satisfactorily; and between 1885 and 1895 the number of peasants farming their own land rose from 117,000 to 200,000. One conspicuous feature of the Bosnian land-system is the Moslem *Vakuf*, or ecclesiastical property, consisting of estates dedicated to such charitable purposes as poor-relief, and the endowment of mosques, schools, hospitals, cemeteries and baths. It is administered by a central board of Moslem officials, who meet in Sarajevo, under state supervision. Its income rose to £25,000 in 1895, having quadrupled itself in ten years. The *Vakuf* tenants were at that time extremely prosperous, for their rent had been fixed for ten years in advance on the basis of the year’s harvest, and so had not risen proportionately to the value of their holdings.

8. *Industries and Commerce.*—Beside agriculture, which employed over 88% of the whole population

in 1895, the other industries are insignificant. Chief among them are weaving and leather and metal work, carried on by the workmen in their own houses. There are also government workshops, opened with a view to a higher technical and artistic development of the house industry. More particularly, chased and inlaid metallic wares, *bez* (thin cotton) and carpet-weaving receive government support. Besides the sugar-refinery already mentioned, there were in 1900 four tobacco factories, a national printing-press, an annular furnace for brick-burning, an iron-foundry and several blast-furnaces, under the management of the state. Among the larger private establishments there existed in the same year seven breweries, one brandy distillery, two jam, two soap and candle factories, two building and furniture works, a factory for spinning thread, one iron and steel works, one paper and one ammonia and soda factory, and one mineral-oil refinery.

In respect of foreign trade Bosnia and Herzegovina were in 1882 included in the customs and commercial system of Austria-Hungary, to the extinction of all intermediate imposts. Since 1898 special statistics have been drawn up respecting their trade also with Austria and Hungary. According to these statistics the most important articles of export are coal and turf, fruit, minerals, soda, iron and steel, and cattle. Other articles of export are chemicals, dyeing and tanning stuffs, tobacco, sugar-beet and kitchen-salt. The imports consist principally of food stuffs, building materials, drinks, sugar, machinery, glass, fats, clothes, wooden and stone wares, and various manufactured goods.

There is a national bank in Serajevo, which carries on a hypothecary credit business and manages the wholesale trade of the tobacco factories. There are savings banks in Banjaluka, Bjelina and Brčka.

9. *Communications.*—The construction of carriage-roads, wholly neglected by the Turks, was carried out on a large scale by the Austrians. Two railways were also built, in connexion with the Hungarian state system. One crosses the Una at Kostajnica, and, after skirting the right bank of that river as far as Novi, strikes eastward to Banjaluka. The other, a narrow-gauge line, crosses the Save at Bosna Brod, and follows the Bosna to Serajevo, throwing out branches eastward beyond Dolnja Tuzla, and westward to Jajce and Bugojno. It then pierces through the mountains of northern Herzegovina, traverses the Narenta valley, and runs almost parallel with the coast to Trebinje, Ragusa and the Bocche di Cattaro. Up to this point the railways of the occupied territory were complete in 1901. A farther line, from Serajevo to the frontiers of Servia and Novibazar, was undertaken in 1902, and by 1906 782 m. of railway were open. Small steamers ply on the Drina, Save and Una, but the Bosna, though broad from its very source, is, like the Vrbas, too full of shallows to be utilized; while the Narenta only begins to be navigable when it enters Dalmatia. All the railway lines, like the postal, telegraphic and telephonic services, are state property. In many of the principal towns there are also government hotels.

Serajevo, with 41,543 inhabitants in 1895, is the capital of the combined provinces, and other important places are Mostar (17,010), the capital of Herzegovina, Banjaluka (14,812), Dolnja Tuzla (11,034), Travnik (6626), Livno (5273), Visoko(5000), Foča (4217), Jajce (3929) and Trebinje (2966). All these are described in separate articles.

10. *Population and National Characteristics.*—In 1895 the population, which tends to increase slowly, with a preponderance of males over females, numbered 1,568,092. The alien element is small, consisting chiefly of Austro-Hungarians, gipsies, Italians and Jews. Spanish is a comomon language of the Jews, whose ancestors fled hither, during the 16th century, to escape the Inquisition. The natives are officially described as Bosniaks, but classify themselves according to religion. Thus the Roman Catholics prefer the name of Croats, Hrvats or Latins; the Orthodox, of Serbs; the Moslems, of Turks. All alike belong to the Serbo-Croatian branch of the Slavonic race; and all speak a language almost identical with Servian, though written by the Roman Catholics in Latin instead of Cyrillic letters. A full account of this language, and its literature, is given under Servia and Croatia-Slavonia. To avoid offending either “Serbs” or “Croats,” it is officially designated “Bosnisch.” In some parts of Herzegovina the dress, manners and physical type of the peasantry are akin to those of Montenegro. The Bosnians or Bosniaks resemble their Servian kinsfolk in both appearance and character. They have the same love for poetry, music and romance; the same intense pride in their race and history; many of the same superstitions and customs. The Christians retain the Servian costume, modified in detail, as by the occasional use of the turban or fez. The “Turkish” women have in some districts abandoned the veil; but in others they even cover the eyes when they leave home. Polygamy is almost unknown, possibly because many of the “Turks” are descended from the austere Bogomils, who were, in most cases, converted to Islam, but more probably because the “Turks” are as a rule too poor to provide for more than one wife on the scale required by Islamic law. In general, the people of Bosnia and Herzegovina are sober and thrifty, subsisting chiefly on Indian corn, dried meat, milk and vegetables. Their houses are built of timber and thatch, or clay tiles, except in the Karst region, where stone is more plentiful than wood. Family ties are strong, and the women are not ill-treated, although they share in all kinds of manual labour.

11. *Government.*—At the time of the Austrian annexation in 1908, the only remaining token of Ottoman suzerainty was that the foreign consuls received their *exequatur* from Turkey, instead of Austria; otherwise the government of the country was conducted in the name of the Austrian emperor, through the imperial minister of finance at Vienna, who controlled the civil service for the occupied territory. Its central bureau, with departments of the interior, religion and education, finance and justice, was established at Serajevo; and its members were largely recruited among the Austrian Slavs, who were better able than the Germans to comprehend the local customs and language. A consultative assembly, composed of the highest ecclesiastical authorities, together with 12 popular representatives, also met at Serajevo. For administrative purposes the country was divided into 6 districts or prefectures (*kreise*), which were subdivided into 49 subprefectures (*bezirke*).

Every large town has a mayor and deputy mayor, appointed by the government, and a town council, of whom one third are similarly appointed, while the citizens choose the rest; a proportionate number of councillors representing each religious community. To ensure economy, the decisions of this body are supervised by a government commissioner. The commune is preserved, somewhat as in Servia (*q.v.*), but with modified powers. Each district has its court of law, where cases are tried by three official judges and two assessors, selected from the leading citizens. The assessors vote equally with the judges, and three votes decide the verdict. Except where the litigants and witnesses are German, the Serbo-Croatian language is used. An appeal, on points of law alone, may be carried to the supreme court in Serajevo, and there tried by five judges without assessors. In cases not involving a sum greater than 300 florins (£25), no appeal will lie; and where only 50 florins (£4 : 3 : 4) are in question, the case is summarily decided at the *Bagatelle Gericht*, or court for trifling cases. The number of lawyers admitted to practice is strictly limited. As far as possible, the Turkish law was retained during the period of occupation; all cases between Moslems were settled in separate courts by Moslem judges, against whom there was an appeal to the supreme court, aided by assessors. All able-bodied males are liable, on reaching their 21st year, for 3 years' service with the colours, and 9 years in the reserve. The garrison numbers about 20,000 Austrian troops, and there are 7100 native troops. The principal military stations are Bjelina, Zvornik, Višegrad, Goražda, Foča, Bilek, Avtovac and Trebinje, along the eastern frontier; Mostar and Stolac in the south; Livno in the west; and Bihać in the north. 282

12. *Religion*.—In 1895 43% of the population were Orthodox Christians, 35% Moslems and 21% Roman Catholics. The patriarch of Constantinople is the nominal head of the Orthodox priesthood; but by an arrangement concluded in 1879, his authority was delegated to the Austrian emperor, in exchange for a revenue equal to the tribute previously paid by the clergy of the provinces; and his nominations for the metropolitanate of Serajevo, and the bishoprics of Dolnja Tuzla, Banjaluka and Mostar require the imperial assent. Under Turkish rule the communes chose their own parish priests, but this right is now vested in the government. The Roman Catholics have an archbishop in Serajevo, a bishop in Mostar and an apostolic administrator in Banjaluka. Serajevo is also the seat of the Jewish chief rabbi; and of the highest Moslem ecclesiastic, or *reis-el-ulema*, who with his council is nominated and paid by the government. The inferior Moslem clergy draw their stipends from the *Vakuf*. Considerable bitterness prevails between the rival confessions, each aiming at political ascendancy, but the government favours none. In order to conciliate even the Moslems, who include the bulk of the great landholders and of the urban population, its representatives visit the mosques in state on festivals; grants are made for the Mecca pilgrimage; and even the howling Dervishes in Serajevo are maintained by the state.

13. *Education*.—Education for boys and girls between the ages of seven and fifteen is free, but not compulsory. The state supports primary schools (352 in 1905), where reading, writing, arithmetic and history are taught; and separate instruction is given by the Orthodox, Roman Catholic, Jewish and Moslem clergy. There are also various private schools, belonging to the different religious communities. These receive a grant from the government, which nevertheless encourages all parents to send their children to its own schools. One of the earliest and best-known private schools is the orphanage at Serajevo, founded in 1869 by two English ladies, Miss Irby and Miss Mackenzie. In the Moslem schools, which, in 1905, comprised 855 *mektebs* or primary schools, and 41 *madrasas* or high schools, instruction is usually given in Turkish or Arabic; while in Orthodox schools the books are printed in Cyrillic characters.

For higher education there were in 1908 three gymnasia, a real-school at Banjaluka, a technical college and a teachers' training-college at Serajevo, where, also, is the state school for Moslem law-students, called *scheriatschule* from the *sheri* or Turkish code; and various theological, commercial and art institutes. Promising pupils are frequently sent to Vienna University, with scholarships, which may be forfeited if the holders engage in political agitation.

14. *Antiquities*.—Up to 1900 no traces of palaeolithic man had been discovered in Bosnia or Herzegovina; but many later prehistoric remains are preserved in Serajevo museum. The neolithic station of Butmir, near Ilidže, was probably a lake-dwellers' colony, and has yielded numerous stone and horn implements, clay figures and pottery. Not far off, similar relics were found at Sobunar, Zlatište and Debelobrdo; iron and bronze ornaments, vessels and weapons, often of elaborate design, occur in the huts and cemeteries of Glasinac, and in the cemetery of Jezerine, where they are associated with objects in silver, tin, amber, glass, &c. Among the numerous finds made in other districts may be mentioned the discovery, at Vrankamer, near Bihac, of 98 African coins, the oldest of which dates from 300 B.C. Many vestiges of Roman rule survive, such as roads, mines, ruins, tombs, coins, frescoes and inscriptions. Such remains occur frequently near Bihac, Foca, Livno, Jajce and Serajevo; and especially near the sources of the Drina. The period between the downfall of Roman power, late in the 5th century, and the growth of a Bosnian state, in the 11th, is poorer in antiquities. The later middle ages are represented by several monasteries, and many castles, such as those of Dervent, Doboj, Maglaj, Žepče and Vranduk, on the Bosna; Bihać, on the Una; Prijedor and Ključ, on the Sana; and Stolac, Gabela, Irebinje and Konjica, in Herzegovina. The bridge across the Narenta, at Konjica, is said to date from the 10th century. A group of signs carved on some rocks near Višegrad have been regarded as cuneiform writing, but are probably medieval masonic symbols. In a few cases, such as the Begova Džamia at Serajevo, the Foča mosques and the Mostar bridge, the buildings raised by the Turks are of high architectural merit. More remarkable are the tombstones, generally measuring 6 ft. in length, 3 in height and 3 in breadth, which have been supposed to mark the graves of the Bogomils. These are, as a rule, quite unadorned, a few only being decorated with rude has-reliefs of animals, plants, weapons, the crescent and star, or, very rarely, the cross.

15. *History*.—Under Roman rule Bosnia had no separate name or history, and until the great Slavonic immigration of 636 it remained an undifferentiated part of Illyria (*q.v.*). Owing to the scarcity of authoritative documents, it is impossible to describe in detail the events of the next three centuries. During this period Bosnia became the generally accepted name for the valley of the Bosna (ancient *Basanius*); and subsequently for several outlying and tributary principalities, notably those of Soli, afterwards Tuzla; Usora, along the south-eastern bank of the Save; Donji Kraj, the later Krajina, Kraina or Turkish Croatia, in the north-west; and Rama, the modern district of Livno. The old Illyrian population was rapidly absorbed or expelled, its Latin institutions being replaced by the autonomous tribal divisions, or *Županates*, of the Slavs. Pressure from Hungary and Byzantium gradually welded these isolated social units into a single nation, whose ruler was known as the Ban (*q.v.*). But the central power remained weak, and the country possessed no strong natural frontiers. It seems probable that the bans were originally viceroys of the Croatian kings, who resumed their sovereignty over Bosnia from 958 to 1010. Thenceforward, until 1180, the bans continued subject to the Eastern empire or Hungary, with brief intervals of independence. The territory now called Herzegovina was also subject to various foreign powers. It comprised the principalities of Tribunia or Travunja, with its capital at Trebinje; and Hlum or Hum, the Zachlumia of Constantine Porphyrogenitus, who gives a clear picture of this region as it was in the 10th century.[2]

Formation of the Banate.

The schism between Eastern and Western Christendom left Bosnia divided between the Greek and Latin Churches. Early in the 12th century a new religion, that of the Bogomils (*q.v.*), was introduced, and denounced as heretical. Its converts nevertheless included many of the Bosnian nobles and the ban Kulin (1180-1204), whose reign was long proverbial for its prosperity, owing to the flourishing state of commerce and agriculture, and the extensive mining operations carried on by the Ragusans. An unusually able ruler, connected by marriage with the powerful Servian dynasty of Nemanya, and by treaty with the republic of Ragusa,[3] Kulin perceived in the new doctrines a barrier between his subjects and Hungary. He was compelled to recant, under strong pressure from Pope Innocent III. and Béla III. of Hungary; but, despite all efforts, Bogomilism incessantly gained ground. In 1232 Stephen, the successor of Kulin, was dethroned by the native magnates, who chose instead Matthew Ninoslav, a Bogomil. This event illustrates the three dominant characteristics of Bosnian history: the strength of the aristocracy; the corresponding weakness of the central authority, enhanced by the lack of any definite rule of inheritance; and the supreme influence of religion. Threatened by Pope Gregory IX. with a crusade, Ninoslav was baptized, only to abjure Christianity in 1233. For six years he withstood the Hungarian crusaders, led by Kaloman, duke of Croatia; in 1241 the Tatar invasion of Hungary afforded him a brief respite; and in 1244 peace was concluded after a Bosnian campaign against Croatia. A renewal of the crusade proving equally vain, in 1247 Pope Innocent III. entered into friendly negotiations with the ban, whose country was for the moment an independent and formidable state. The importance attached to its conversion is well attested by the correspondence of Pope Gregory IX. with Ninoslav and various Bosnian ecclesiastics.[4]

Religious controversies.

On the death of Ninoslav in 1250, vigorous efforts were made to exterminate the Bogomil heresy; and to this end, Béla IV., who appeared as the champion of Roman Catholicism, secured the election of his nominee Prijesda to the banate. Direct Hungarian suzerainty lasted until 1299, the bans preserving only a shadow of their former power. From 1299 to 1322 the country was ruled by the Croatian princes, Paul and Mladen Šubić, who, though vassals of Hungary, reunited the provinces of Upper and Lower Bosnia, created by the Hungarians in order to prevent the growth of a dangerous national unity. A rising of the native magnates in 1322 resulted in the election of the Bogomil, Stephen Kotromanić, last and greatest of the Bosnian bans.

Period of Hungarian supremacy.

At this period the Servian empire had reached its zenith; Hungary, governed by the feeble monarch, Charles Robert of Anjou, was striving to crush the insurgent magnates of Croatia; Venice, whose commercial interests were imperilled, desired to restore peace and maintain the balance of power. Dread of Servia impelled Kotromanic to aid Hungary. In an unsuccessful war against the Croats (1322-26), from which Venice derived the sole advantage, the ban appears to have learned the value of sea-power; immediately afterwards he occupied the principality of Hlum and the Dalmatian littoral between Spalato and the river Narenta. Ragusa furnished him with money and a fleet, in return for a guarantee of protection; commercial treaties with Venice further strengthened his position; and the Vatican, which had instigated the Croats to invade the dominions of their heretical neighbour (1337-40), was conciliated by his conversion to Roman Catholicism. Defeated by the Servian tsar Dushan, and driven to ally himself with Servia and Venice against Louis I. of Hungary, Kotromanic returned to his allegiance in 1344. Four years later his influence brought about a truce between Hungary and the Venetians, who had agreed with Bosnia for mutual support against the Croats; and in 1353, the year of his death, his daughter Elizabeth was married to King Louis.

Stephen Kotromanic.

Stephen Tvrtko, the nephew and successor of Kotromanić, was a minor, and for thirteen years his mother, Helena, acted as regent. Confronted by civil war, and deprived of Hlum by the Hungarians, she was compelled to acknowledge the suzerainty of Stephen Dushan, and afterwards of Louis. But in 1366 Tvrtko overcame all opposition at home, and forthwith embarked on a career of conquest, recapturing Hlum and annexing part of Dalmatia. The death of Stephen Dushan, in 1356, had left his empire defenceless against the Hungarians, Turks and other enemies; and to win help from Bosnia the Servian tsar Lazar ceded to

Establishment of the Bosnian kingdom.

Tvrtko a large tract of territory, including the principality of Tribunia. In 1376 Tvrtko was crowned as "Stephen I., king of Bosnia, Servia, and all the Sea-coast," although Lazar retained his own title and a diminished authority. The death of Louis in 1392, the regency of his widow Elizabeth, and a fresh outbreak in Croatia, enabled Tvrtko to fulfil his predecessor's designs by establishing a maritime state. With Venetian aid he wrested from Hungary the entire Adriatic littoral between Fiume and Cattaro, except the city of Zara; thus adding Dalmatia to his kingdom at the moment when Servia was lost through the Ottoman victory of Kossovo (1389). At his coronation he had proclaimed his purpose to revive the ancient Servian empire; in 1378 he had married the daughter of the last Bulgarian tsar; and it is probable that he dreamed of founding an empire which should extend from the Adriatic to the Black Sea. The disaster of Kossovo, though fatal to his ambition, did not immediately react on Bosnia itself; and when Tvrtko died in 1391, his kingdom was still at the summit of its prosperity.

Kotromanić and Tvrtko had known how to crush or conciliate their turbulent magnates, whose power reasserted itself under Dabisa (Stephen II., 1391-1398), a brother of Tvrtko. Sigismond of Hungary profited by the disorder that ensued to regain Croatia and Dalmatia; and in 1398 the Turks, aided by renegade Slavs,[5] overran Bosnia. Ostoja (Stephen III., 1398-1418), an illegitimate son of Tvrtko, proved a puppet in the hands of Hrvoje Vukčić, duke of Spalato, Sandalj Hranić,[6] and other leaders of the aristocracy, who fought indifferently against the Turks, the Hungarians, the king or one another. Some upheld a rival claimant to the throne in Tvrtković, a legitimate son of Tvrtko, and all took sides in the incessant feud between Bogomils and Roman Catholics. During the reigns of Ostojić (Stephen IV., 1418-1421) and Tvrtković (Stephen V., 1421-1444) Bosnia was thus left an easy prey to the Turks, who exacted a yearly tribute, after again ravaging the country, and carrying off many thousands of slaves, with a vast store of plunder.

Decline of the Bosnian kingdom.

The losses inflicted on the Turks by Hunyadi János, and the attempt to organize a defensive league among the neighbouring Christian lands, temporarily averted the ruin of Bosnia under Thomas Ostojić (Stephen VI., 1444-1461). Hoping to gain active support from the Vatican, Ostojic renounced Bogomilism, and persecuted his former co-religionists, until the menace of an insurrection forced him to grant an amnesty. His position was endangered by the growing power of his father-in-law, Stephen Vukcic, an ardent Bogomil, who had united Tribunia and Hlum into a single principality. Vukčić—or *Cosaccia*, as he is frequently called by the contemporary chroniclers, from his birthplace, Cosac—was the first and last holder of the title "Duke of St Sava," conferred on him by the emperor Frederick III. in 1448; and from this title is derived the name *Herzegovina*, or "the Duchy." Hardly had the king become reconciled with this formidable antagonist, when, in 1453, the death of Hunyadi, and the fall of Constantinople, left Bosnia defenceless against the Turks. In 1460 it was again invaded. Venice and the Papacy were unable, and Hungary unwilling, to render assistance; while the Croats proved actively hostile. Ostojic died in 1461, and his successor Tomašević (Stephen VII., 1461-1463) surrendered to the Turks and was beheaded. Herzegovina, where Vukčić offered a desperate resistance, held out until 1483; but apart from the heroic defence of Jajce, the efforts of the Bosnians were feeble and inglorious, many of the Bogomils joining the enemy. From 1463 the greater part of the country submitted to the Turks; but the districts of Jajce and Srebrenica were occupied by Hungarian garrisons, and organized as a separate "banate" or "kingdom of Bosnia," until 1526, when the Hungarian power was broken at Mohács. In 1528 Jajce surrendered, after repelling every attack by the Turkish armies for 65 years.

Turkish conquest.

The fall of Jajce was the consummation of the Turkish conquest. It was followed by the flight of large bodies of Christian refugees. Many of the Roman Catholics withdrew into Croatia-Slavonia and south Hungary, where they ultimately fell again under Ottoman dominion. Others found shelter in Rome or Venice, and a large number settled in Ragusa, where they doubtless contributed to the remarkable literary development of the 16th and 17th centuries in which the use of the Bosnian dialect was a characteristic feature. Some of the most daring spirits waged war on their conquerors from Clissa in Dalmatia, and afterwards from Zengg in maritime Croatia, where they formed the notorious pirate community of the Uskoks (*q.v.*). There was less inducement for the Orthodox inhabitants to emigrate, because almost all the neighbouring lands were governed by Moslems or Roman Catholics; and at home the peasants were permitted to retain their creed and communal organization. Judged by its influence on Bosnian politics, the Orthodox community was relatively unimportant at the Turkish conquest; and its subsequent growth is perhaps due to the official recognition of the Greek Church, as the representative of Christianity in Turkey. The Christian aristocracy lost its privileges, but its ancient titles of duke (*vojvod*) and count (*knez*) did not disappear. The first was retained by the leaders who still carried on the struggle for liberty in Montenegro; the second was transferred to the headmen of the communes. Many of the Franciscans refused to abandon their work, and in 1463 they received a charter from the sultan Mahomet II., which is still preserved in the monastery of Fojnica, near Travnik. This toleration of religious orders, though it did not prevent occasional outrages, remained to the last characteristic of Turkish policy in Bosnia; and even in 1868 a colony of Trappist monks was permitted to settle in Banjaluka.

The Turkish triumph was the opportunity of the Bogomils, who thenceforth, assuming a new character, controlled the destinies of their country for more than three centuries. Bosnia was regarded by successive sultans as the gateway into Hungary; hatred of the Hungarians and their religion was hereditary among the Bogomils. Thus the desire for vengeance and the prospect of a brilliant military career impelled the Bogomil magnates to adopt the creed of Islam, which, in its austerity, presented some points of resemblance to their own doctrines. The nominal governor of the country was the Turkish *vali*, who resided at Banjaluka or

Bosnia under Turkish rule.

Travnik, and rarely interfered in local affairs, if the taxes were duly paid. Below him ranked the newly converted Moslem aristocracy, who adopted the dress, titles and etiquette of the Turkish court, without relinquishing their language or many of their old customs. They dwelt in fortified towns or castles, where the vali was only admitted on sufferance for a few days; and, at the outset, they formed a separate military caste, headed by 48 *kapetans*—landholders exercising unfettered authority over their retainers and Christian serfs, but bound, in return, to provide a company of mounted troops for the service of their sovereign. Their favourite pursuits were fighting, either against a common enemy or among themselves, hunting, hawking and listening to the minstrels who celebrated their exploits. Their yearly visits to Serajevo assumed in time the character of an informal parliament, for the discussion of national questions; and their rights tended always to increase, and to become hereditary, in fact, though not in law. In every important campaign of the Turkish armies, these descendants of the Bogomils were represented; they amassed considerable wealth from the spoils of war, and frequently rose to high military and administrative positions. Thus, in 1570, Ali Pasha, a native of Herzegovina, became grand vizier; and he was succeeded by the distinguished soldier and statesman, Mahomet Beg Sokolović, a Bosnian. Below the feudal nobility and their Moslem soldiers came the Christian serfs, tillers of the soil and taxpayers, whose lives and property were at the mercy of their lords. The hardships of their lot, and, above all, the system by which the strongest of their sons were carried off as recruits for the corps of janissaries (*q.v.*), frequently drove them to brigandage, and occasionally to open revolt.

External history 1528-1821.

These conditions lasted until the 19th century, and meanwhile the country was involved in the series of wars waged by the Turks against Austria, Hungary and Venice. In the Krajina and all along the Montenegrin frontier, Moslems and Christians carried on a ceaseless feud, irrespective of any treaties concluded by their rulers; while the Turkish campaigns in Hungary provided constant occupation for the nobles during a large part of the 16th and 17th centuries. But after the Ottoman defeat at Vienna in 1683, the situation changed. Instead of extending the foreign conquests of their sultan, the Bosnians were hard pressed to defend their own borders. Zvornik fell before the Austro-Hungarian army in 1688, and the Turkish vali, who was still officially styled the “vali of Hungary,” removed his headquarters from Banjaluka to Travnik, a more southerly, and therefore a safer capital. Two years later, the imperial troops reached Dolnja Tuzla, and retired with 3000 Roman Catholic emigrants. Serajevo was burned in 1697 by Eugene of Savoy, who similarly deported 40,000 Christians. The treaties of Carlowitz (1699) and Passarowitz (1718) deprived the Turks of all the Primorje, or littoral of Herzegovina, except the narrow enclaves of Klek and Suttorina, left to sunder the Ragusan dominions from those of Venice. At the same time a strip of territory in northern Bosnia was ceded to Austria, which was thus able to control both banks of the Save. This territory was restored to Turkey in 1739, at the peace of Belgrade;[7] but in 1790 it was reoccupied by Austrian troops. Finally, in 1791, the treaty of Sistova again fixed the line of the Save and Una as the Bosnian frontier.

Moslem rebellions.

The reform of the Ottoman government contemplated by the sultan Mahmud II. (1808-1839) was bitterly resented in Bosnia, where Turkish prestige had already been weakened by the establishment of Servian autonomy under Karageorge. Many of the janissaries had married and settled on the land, forming a strongly conservative and fanatical caste, friendly to the Moslem nobles, who now dreaded the curtailment of their own privileges. Their opportunity came in 1820, when the Porte was striving to repress the insurrections in Moldavia, Albania and Greece. A first Bosnian revolt was crushed in 1821; a second, due principally to the massacre of the janissaries, was quelled with much bloodshed in 1827. After the Russo-Turkish War of 1828-29, a further attempt at reform was initiated by the sultan and his grand vizier, Reshid Pasha. Two years later came a most formidable outbreak; the sultan was denounced as false to Islam, and the Bosnian nobles gathered at Banjaluka, determined to march on Constantinople, and reconquer the Ottoman empire for the true faith. A holy war was preached by their leader, Hussein Aga Berberli, a brilliant soldier and orator, who called himself *Zmaj Bosanski*, the “Dragon of Bosnia,” and was regarded by his followers as a saint. The Moslems of Herzegovina, under Ali Pasha Rizvanbegovic, remained loyal to the Porte, but in Bosnia Hussein Aga encountered little resistance. At Kossovo he was reinforced by 20,000 Albanians, led by the rebel Mustapha Pasha; and within a few weeks the united armies occupied the whole of Bulgaria, and a large part of Macedonia. Their career was checked by Reshid Pasha, who persuaded the two victorious commanders to intrigue against one another, secured the division of their forces, and then fell upon each in turn. The rout of the Albanians at Prilipe and the capture of Mustapha at Scutari were followed by an invasion of Bosnia. After a desperate defence, Hussein Aga fled to Esseg in Croatia-Slavonia; his appeal for pardon was rejected, and in 1832 he was banished for life to Tribizond. The power of the Bosnian nobles, though shaken by their defeat, remained unbroken; and they resisted vigorously when their kapetanates were abolished in 1837; and again when a measure of equality before the law was conceded to the Christians in 1839. In Herzegovina, Ali Pasha Rizvanbegović reaped the reward of his fidelity. He was left free to tyrannize over his Christian subjects, a king in all but name. In 1840 he descended from his mountain stronghold of Stolac to wage war upon the vladika Peter II. of Montenegro, and simultaneously to suppress a Christian rising. Peace was arranged at Ragusa in 1842, and it was rumoured that Ali had concluded a secret alliance with Montenegro, hoping to shake off the suzerainty of the sultan, and to found an entirely independent kingdom. It is impossible to verify this charge, but during the troubled years that ensued, Ali pursued an elaborate policy of intrigue. He sent large bribes to influential persons at Constantinople; he aided the Turkish vali to repress the Christians, who had again revolted; and he supported the Bosnian nobles against reforms imposed by the vali. At last, in 1850, a Turkish army was despatched to restore quiet. Ali Pasha openly professed himself a loyal subject, but secretly sent reinforcements to the rebel aristocracy. The Turks proved everywhere successful. After a cordial

reception by their commander Omer or Omar Pasha, Ali was imprisoned; he was shortly afterwards assassinated, lest his lavish bribery of Turkish officials should restore him to favour, and bring disgrace on his captor (March 1851).

Condition of the serfs.

The downfall of the Moslem aristocracy resulted in an important administrative change: Serajevo, which had long been the commercial centre of the country, and the jealously guarded stronghold of the nobles, superseded Travnik as the official capital, and the residence of the vali. A variety of other reforms, including the reorganization of Moslem education, were introduced by Omer Pasha, who governed the country until 1860. But as the administration grew stronger, the position of the peasantry became worse. They had now to satisfy the imperial tax-farmers and excisemen, as well as their feudal lords. The begs and agas continued to exact their forced labour and one-third of their produce; the central government imposed a tithe which had become an eighth by 1875. Three kinds of cattle-tax, the tax for exemption from military service, levied on every newborn male, forced labour on the roads, forced loan of horses, a heavy excise on grapes and tobacco, and a variety of lesser taxes combined to burden the Christian serfs; but even more galling than the amount was the manner in which these dues were exacted—the extortionate assessments of tax-farmers and excisemen, the brutal licence of the soldiery who were quartered on recalcitrant villagers. A crisis was precipitated by the example of Servian independence, the hope of Austrian intervention, and the public bankruptcy of Turkey.

Christian rising of 1875.

Sporadic insurrections had already broken out among the Bosnian Christians, and on the 1st of July 1875 the villagers of Nevesinje, which gives its name to a mountain range east of Mostar, rose against the Turks. Within a few weeks the whole country was involved. The Herzegovinians, under their leaders Peko Pavlović, Socica, Ljubibratić, and others, held out for a year against all the forces that Turkey could despatch against them.[8] In July 1876 Servia and Montenegro joined the struggle, and in April 1877 Russia declared war on the sultan.

Austro-Hungarian occupation, 1878-1908.

The Austro-Hungarian occupation, authorized on the 13th of July 1878 by the treaty of Berlin (arts. 23 and 26), was not easily effected; and, owing to the difficulty of military operations among the mountains, it was necessary to employ a force of 200,000 men. Haji Loja, the native leader, was supported by a body of Albanians and mutinous Turkish troops, while the whole Moslem population bitterly resented the proposed change. The losses on both sides were very heavy, and, besides those who fell in battle, many of the insurgents were executed under martial law. But after a series of stubbornly contested engagements, the Austrian general, Philippovic, entered Serajevo on the 19th of August, and ended the campaign on the 20th of September, by the capture of Bihac in the north-west, and of Klobuk in Herzegovina. The government of the country was then handed over to the imperial ministry of finance; but the bureaucratic methods of the finance ministers, Baron von Hoffmann and Joseph de Szlávy, resulted only in the insurrection of 1881-82. Order was restored in June 1882, when the administration was entrusted to Benjamin von Kállay (*q.v.*), as imperial minister of finance. Kállay retained this position until his death on the 13th of July 1903, when he was succeeded by Baron Stephan Burian de Rajecz. During this period life and property were rendered secure, and great progress was achieved, on the lines already indicated, in creating an efficient civil service, harmonizing Moslem law with new enactments, promoting commerce, carrying out important public works, and reorganizing the fiscal and educational systems. All classes and creeds were treated impartially; and, although the administration has been reproached alike for undue harshness and undue leniency, neither accusation can be sustained. Critics have also urged that Kállay fostered the desire for material welfare at the cost of every other national ideal; that, despite his own popularity, he never secured the goodwill of the people for Austria-Hungary; that he left the agrarian difficulty unsolved, and the hostile religious factions unreconciled. These charges are not wholly unfounded; but the chief social and political evils in Bosnia and Herzegovina may be traced to historical causes operative long before the Austro-Hungarian occupation, and above all to the political ambition of the rival churches. Justly to estimate the work done by Kállay, it is only necessary to point to the contrast between Bosnia in 1882 and Bosnia in 1903; for in 21 years the anarchy and ruin entailed by four centuries of misrule were transformed into a condition of prosperity unsurpassed in south-eastern Europe.

Austrian annexation.

It was no doubt natural that Austrian statesmen should wish to end the anomalous situation created by the treaty of Berlin, by incorporating Bosnia and Herzegovina into the Dual Monarchy. The treaty had contemplated the evacuation of the occupied provinces after the restoration of order and prosperity; and this had been expressly stipulated in an agreement signed by the Austro-Hungarian and Ottoman plenipotentiaries at Berlin, as a condition of Turkish assent to the provisions of the treaty. But the Turkish reform movement of 1908 seemed to promise a revival of Ottoman power, which might in time have enabled the Turks to demand the promised evacuation, and thus to reap all the ultimate benefits of the Austrian administration. The reforms in Turkey certainly encouraged the Serb and Moslem inhabitants of the occupied territory to petition the emperor for the grant of a constitution similar to that in force in the provinces of Austria proper. But the Austro-Hungarian government, profiting by the weakness of Russia after the war with Japan, and aware that the proclamation of Bulgarian independence was imminent, had already decided to annex Bosnia and Herzegovina, in spite of the pledges given at Berlin, and although the proposal was unpopular in Hungary. Its decision, after being communicated to the sovereigns of the powers signatory to the treaty of Berlin, in a series of autograph letters from the emperor Francis Joseph, was made known to Bosnia and Herzegovina in an imperial rescript published on the 7th of October 1908. The Serb and Moslem delegates, who had started on the same day for

Budapest, to present their petition to the emperor, learned from the rescript that the government intended to concede to their compatriots “a share in the legislation and administration of provincial affairs, and equal protection for all religious beliefs, languages and racial distinctions.” The separate administration was, however, to be maintained, and the rescript did not promise that the new provincial diet would be more than a consultative assembly, elected on a strictly limited franchise.

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(K. G. J.)

1 This was soon modified in detail. Arrears of debt, for instance, were made recoverable for one year only, instead of the ten years allowed by Turkish law.

2 *De Administrando Imperio*, 33 and 34. The names of *Chulmia* and *Chelmo*, applied to this region by later Latin and Italian chroniclers, are occasionally adopted by English writers.

3 For the commercial and political relations of Ragusa and Bosnia, see L. Villari, *The Republic of Ragusa* (London, 1904).

4 Given by Theiner, *Vetera monumenta Hungariam ... illustrantia*, 173-185.

5 This is the first recorded instance of such an alliance. The Slavs were probably Bogomils.

6 These magnates played a considerable part in the politics of south-eastern Europe; see especially their correspondence with the Venetian Republic, given by Shafarik, *Acta archivi Veneti*, &c.

7 For details of these events see Umar Effendi, *History of the War in Bosnia* (1737-1739). Translated by C. Fraser (London, 1830).

8 For the Christian rebellion and its causes, see A.J. Evans, *Through Bosnia and Herzegovina on Foot* (London, 1876); and W.J. Stillman, *Herzegovina and the Late Uprising* (London, 1877).

BOSPORUS, or BOSPHORUS (Gr. Βόσπορος = ox-ford, traditionally connected with Io, daughter of Inachus, who, in the form of a heifer, crossed the Thracian Bosporus on her wanderings). By the ancients this name, signifying a strait, was especially applied to the *Bosporus Cimmerius* (see below), and the *Bosporus Thracius*; but when used without any adjective it now denotes the latter, which unites the Black Sea with the Sea of Marmora and forms part of the boundary between Europe and Asia. The channel is 18 m. long, and has a maximum breadth at the northern entrance of 2¾ m., a minimum breadth of about 800 yds., and a depth varying from 20 to 66 fathoms in mid-stream. In the centre there is a rapid current from the Black Sea to the Sea of Marmora, but a counter-current sets in the opposite direction below the surface and along the shores. The surface current varies in speed, but averages nearly 3 m. an hour; though at narrow places it may run at double this pace. The strait is very rarely frozen over, though history records a few instances; and the Golden Horn, the inlet on either side of which Constantinople lies, has been partially frozen over occasionally in modern times. The shores of the Bosporus are composed in the northern portion of different volcanic rocks, such as dolerite, granite and trachyte; but along the remaining course of the channel the prevailing formations are Devonian,

consisting of sandstones, marls, quartzose conglomerates, and calcareous deposits of various kinds. The scenery on both sides is of the most varied and beautiful description, many villages lining each well-wooded shore, while on the European side are numerous fine residences of the wealthy class of Constantinople. The Bosporus is under Turkish dominion, and by treaty of 1841, confirmed by the treaty of Berlin in 1878 and at other times, no ship of war other than Turkish may pass through the strait (or through the Dardanelles) without the countenance of the Porte. (See also CONSTANTINOPLE.)

BOSPORUS CIMMERIUS, the ancient name for the Straits of Kerch or Yenikale, connecting the Black Sea and the Sea of Azov; the Cimmerii (*q.v.*) were the ancient inhabitants. The straits are about 25 m. long and 2½ m. broad at the narrowest, and are formed by an eastern extension of the Crimea and the peninsula of Taman, a kind of continuation of the Caucasus. This in ancient times seems to have formed a group of islands intersected by arms of the Hypanis or Kuban and various sounds now silted up. The whole district was dotted with Greek cities; on the west side, Panticapaeum (Kerch, *q.v.*), the chief of all, often itself called Bosporus, and Nymphaeum (Eltegen); on the east Phanagoria (Sênnája), Cepi, Hermonassa, Portus Sindicus, Gorgippia (Anapa). These were mostly settled by Milesians, Panticapaeum in the 7th or early in the 6th century B.C., but Phanagoria (*c.* 540 B.C.) was a colony of Teos, and Nymphaeum had some connexion with Athens—at least it appears to have been a member of the Delian Confederacy. The towns have left hardly any architectural or sculptural remains, but the numerous barrows in their neighbourhood have yielded very beautiful objects now mostly preserved in the Hermitage in St Petersburg. They comprise especially gold work, vases exported from Athens, textiles and specimens of carpentry and marquetry. The numerous terra-cottas are rather rude in style.

According to Diodorus Siculus (xii. 31) the locality was governed from 480 to 438 B.C. by the Archaeanactidae, probably a ruling family, who gave place to a tyrant Spartocus (438-431 B.C.), apparently a Thracian. He founded a dynasty which seems to have endured until *c.* 110 B.C. The Spartocids have left many inscriptions which tell us that the earlier members of the house ruled as archons of the Greek cities and kings of various native tribes, notably the Sindi of the island district and other branches of the Maitae (Maeotae). The text of Diodorus, the inscriptions and the coins do not supply sufficient material for a complete list of them. Satyrus (431-387), the successor of Spartocus, established his rule over the whole district, adding Nymphaeum to his dominions and laying siege to Theodosia, which was a serious commercial rival by reason of its ice-free port and direct proximity to the cornfields of the eastern Crimea. It was reserved for his son Leucon (387-347) to take this city. He was succeeded by his two sons conjointly, Spartocus II. and Paerisades; the former died in 342 and his brother reigned alone until 310. Then followed a civil war in which Eumelus (310-303) was successful. His successor was Spartocus III. (303-283) and after him Paerisades II. Succeeding princes repeated the family names, but we cannot assign them any certain order. We know only that the last of them, a Paerisades, unable to make headway against the power of the natives, called in the help of Diophantus, general of Mithradates VI. (the Great) of Pontus, promising to hand over his kingdom to that prince. He was slain by a Scythian Saumacus who led a rebellion against him. The house of Spartocus was well known as a line of enlightened and wise princes; although Greek opinion could not deny that they were, strictly speaking, tyrants, they are always described as dynasts. They maintained close relations with Athens, their best customers for the Bosporan corn export, of which Leucon I. set the staple at Theodosia, where the Attic ships were allowed special privileges. We have many references to this in the Attic orators. In return the Athenians granted him Athenian citizenship and set up decrees in honour of him and his sons. Mithradates the Great entrusted the Bosporus Cimmerius to his son Machares, who, however, deserted to the Romans. But even when driven out of his own kingdom by Pompey, Mithradates was strong enough to regain the Bosporus Cimmerius, and Machares slew himself. Subsequently the Bosporans again rose in revolt under Pharnaces, another of the old king's sons. After the death of Mithradates (B.C. 63), this Pharnaces (63-47) made his submission to Pompey, but tried to regain his dominion during the civil war. He was defeated by Caesar at Zela, and on his return to Rome was slain by a pretender Asander who married his daughter Dynamis, and in spite of Roman nominees ruled as archon, and later as king, until 16 B.C. After his death Dynamis was compelled to marry an adventurer Scribonius, but the Romans under Agrippa interfered and set Polemon (14-8) in his place. To him succeeded Aspurgus (8 B.C.-A.D. 38?), son of Asander, who founded a line of kings which endured with certain interruptions until A.D. 341. These kings, who mostly bore the Thracian names of Cotys, Rhescuporis, Rhoemetalces, and the native name Sauromates, claimed descent from Mithradates the Great, and used the Pontic era (starting from 297 B.C.) introduced by him, regularly placing dates upon their coins and inscriptions. Hence we know their names and dates fairly well, though scarcely any events of their reigns are recorded. Their kingdom covered the eastern half of the Crimea and the Taman peninsula, and extended along the east coast of the Sea of Azov to Tanais at the mouth of the Don, a great mart for trade with the interior. They carried on a perpetual war with the native tribes, and in this were supported by their Roman suzerains, who even lent the assistance of garrison and fleet. At times rival kings of some other race arose and probably produced some disorganization. At one of these periods (A.D. 255) the Goths and Borani were enabled to seize Bosporan shipping and raid the shores of Asia Minor. With the last coin of the last Rhescuporis, A.D. 341, materials for a connected history of the Bosporus Cimmerius come to an end. The kingdom probably succumbed to the Huns established in the neighbourhood. In later times it seems in some sort to have been revived under Byzantine protection, and from time to time Byzantine officers built fortresses and exercised

authority at Bosporus, which was constituted an archbishopric. They also held Ta Matarcha on the Asiatic side of the strait, a town which in the 10th and 11th centuries became the seat of the Russian principality of Tmutarakan, which in its turn gave place to Tatar domination.

The Bosporan kingdom is interesting as the first Hellenistic state, the first, that is to say, in which a mixed population adopted the Greek language and civilization. It depended for its prosperity upon the export of wheat, fish and slaves, and this commerce supported a class whose wealth and vulgarity are exemplified by the contents of the numerous tombs to which reference has been made. In later times a Jewish element was added to the population, and under its influence were developed in all the cities of the kingdom, especially Tanais, societies of "worshippers of the highest God," apparently professing a monotheism which without being distinctively Jewish or Christian was purer than any found among the inhabitants of the Empire.

We possess a large series of coins of Panticapaeum and other cities from the 5th century B.C. The gold *staters* of Panticapaeum bearing Pan's head and a griffin are specially remarkable for their weight and fine workmanship. We have also coins with the names of the later Spartocids and a singularly complete series of dated *solidi* issued by the later or Achaemenian dynasty; in them may be noticed the swift degeneration of the gold *solidus* through silver and potin to bronze (see also NUMISMATICS).

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(E. H. M.)

BOSQUET, PIERRE FRANÇOIS JOSEPH (1810-1861), French marshal, entered the artillery in 1833, and a year later went to Algeria. Here he soon did good service, and made himself remarkable not only for technical skill but the moral qualities indispensable for high command. Becoming captain in 1839, he greatly distinguished himself at the actions of Sidi-Lakhdar and Oued-Melah. He was soon afterwards given the command of a battalion of native *tirailleurs*, and in 1843 was thanked in general orders for his brilliant work against the Flittahs. In 1845 he became lieutenant-colonel, and in 1847 colonel of a French line regiment. In the following year he was in charge of the Oran district, where his swift suppression of an insurrection won him further promotion to the grade of general of brigade, in which rank he went through the campaign of Kabulia, receiving a severe wound. In 1853 he returned to France after nineteen years' absence, a general of division. Bosquet was amongst the earliest chosen to serve in the Crimean War, and at the battle of the Alma his division led the French attack. When the Anglo-French troops formed the siege of Sevastopol, Bosquet's corps of two divisions protected them against interruption. His timely intervention at Inkerman (November 5, 1854) secured the victory for the allies. During 1855 Bosquet's corps occupied the right wing of the besieging armies opposite the Mamelon and Malakov. He himself led his corps at the storming of the Mamelon (June 7), and at the grand assault of the 8th of September he was in command of the whole of the storming troops. In the struggle for the Malakov he received another serious wound. At the age of forty-five Bosquet, now one of the foremost soldiers in Europe, became a senator and a marshal of France, but his health was broken, and he lived only a few years longer. He had the grand cross of the Bath, the grand cross of the Legion of Honour, and the Medjidieh of the 1st class.

BOSS. (1) (From the O. Eng. *boce*, a swelling, cf. Ital. *bozza*, and Fr. *bosse*, possibly connected with the O. Ger. *bōzan*, to beat), a round protuberance; the projecting centre or "umbo" of a buckler; in geology a projection of rock through strata of another species; in architecture, the projecting keystone of the ribs of a vault which masks their junction; the term is also applied to similar projecting blocks at every intersection. The boss was often richly carved, generally with conventional foliage but sometimes with angels, animals or grotesque figures. The boss was also employed in the flat timber ceilings of the 15th century, where it formed the junction of cross-ribs. (2) (From the Dutch *baas*, a word used by the Dutch settlers in New York for "master," and so generally used by the Kaffirs in South Africa; connected with the Ger. *Base*, cousin, meaning a "chief kinsman," the head of a household or family), a colloquial term, first used in America, for an employer, a foreman, and generally any one who gives orders, especially in American political slang for the manager of a party organization.

BOSSI, GIUSEPPE (1777-1816), Italian painter and writer on art, was born at the village of Busto Arsizio, near Milan. He was educated at the college of Monza; and his early fondness for drawing was fostered by the director of the college, who supplied him with prints after the works of Agostino Caracci for copies. He then studied at the academy of Brera at Milan, and about 1795 went to Rome, where he formed an intimate friendship with Canova. On his return to Milan he became assistant secretary, and then secretary, of the Academy of Fine Arts. He rendered important service in the organization of this new institution. In 1804, in conjunction with Oriani, he drew up the rules of the three academies of art of Bologna, Venice and Milan, and soon after was rewarded with the decoration of the Iron Crown. On the occasion of the visit of Napoleon I. to Milan in 1805, Bossi exhibited a drawing of the Last Judgment of Michelangelo, and pictures representing Aurora and Night, Oedipus and Creon, and the Italian Parnassus. By command of Prince Eugene, viceroy of Italy, Bossi undertook to make a copy of the Last Supper of Leonardo, then almost obliterated, for the purpose of getting it rendered in mosaic. The drawing was made from the remains of the original with the aid of copies and the best prints. The mosaic was executed by Raffaelli, and was placed in the imperial gallery of Vienna. Bossi made another copy in oil, which was placed in the museum of Brera. This museum owed to him a fine collection of casts of great works of sculpture acquired at Paris, Rome and Florence. Bossi devoted a large part of his life to the study of the works of Leonardo; and his last work was a series of drawings in monochrome representing incidents in the life of that great master. He left unfinished a large cartoon in black chalk of the Dead Christ in the bosom of Mary, with John and the Magdalene. In 1810 he published a special work in large quarto, entitled *Del Cenacolo di Leonardo da Vinci*, which had the merit of greatly interesting Goethe. His other works are *Delle Opinioni di Leonardo intorno alla simmetria de' corpi umani* (1811), and *Del Tipo dell' arte della pittura* (1816). Bossi died at Milan on the 15th of December 1816. A monument by Canova was erected to his memory in the Ambrosian library, and a bust was placed in the Brera.

BOSSU, RENÉ LE (1631-1680), French critic, was born in Paris on the 16th of March 1631. He studied at Nanterre, and in 1649 became one of the regular canons of Sainte-Geneviève. He wrote *Parallèle des principes de la physique d'Aristote et de celle de René Descartes* (1674), and a *Traité du poème épique*, highly praised by Boileau, the leading doctrine of which was that the subject should be chosen before the characters, and that the action should be arranged without reference to the personages who are to figure in the scene. He died on the 14th of March 1680.

BOSSUET, JAQUES BÉNIGNE (1627-1704), French divine, orator and writer, was born at Dijon on the 27th of September 1627. He came of a family of prosperous Burgundian lawyers; his father was a judge of the parliament (a provincial high court) at Dijon, afterwards at Metz. The boy was sent to school with the Jesuits of Dijon till 1642, when he went up to the college of Navarre in Paris to begin the study of theology; for a pious mother had brought him up to look on the priesthood as his natural vocation. At Navarre he gained a great reputation for hard work; fellow-students nicknamed him *Bos suetus aratro*—an ox broken in to the plough. But his abilities became known beyond the college walls. He was taken up by the Hôtel de Rambouillet, a great centre of aristocratic culture and the original home of the *Précieuses*. Here he became the subject of a celebrated experiment. A dispute having arisen about extempore preaching, the boy of sixteen was put up, late one night, to deliver an impromptu discourse. He acquitted himself as well as in more conventional examinations. In 1652 he took a brilliant degree in divinity, and was ordained priest. The next seven years he spent at Metz, where his father's influence had got him a canonry at the early age of thirteen; to this was now added the more important office of archdeacon. He was plunged at once into the thick of controversy; for nearly half Metz was Protestant, and Bossuet's first appearance in print was a refutation of the Huguenot pastor Paul Ferry (1655). To reconcile the Protestants with the Roman Church became the great object of his dreams; and for this purpose he began to train himself carefully for the pulpit, an all-important centre of influence in a land where political assemblies were unknown, and novels and newspapers scarcely born. Not that he reached perfection at a bound. His youthful imagination was unbridled, and his ideas ran easily into a kind of paradoxical subtlety, redolent of the divinity school. But these blemishes vanished when he settled in Paris (1659), and three years later mounted the pulpit of the Chapel Royal.

In Paris the congregations had no mercy on purely clerical logic or clerical taste; if a preacher wished to catch their ear, he must manage to address them in terms they would agree to consider sensible and well-bred. Not that Bossuet thought too much of their good opinion. Having very stern ideas of the dignity of a priest, he refused to descend to the usual devices for arousing popular interest. The narrative element in his sermons grows shorter with each year. He never drew satirical pictures, like his great rival Bourdaloue. He would not write out his discourses in full, much less learn them off by heart: of the two hundred printed in his *Works* all but a fraction are rough drafts. No wonder ladies like Mme de Sévigné forsook him, when Bourdaloue dawned on the Paris horizon in 1669; though Fénelon

and La Bruyère, two much sounder critics, refused to follow their example. Bossuet possessed the full equipment of the orator, voice, language, flexibility and strength. He never needed to strain for effect; his genius struck out at a single blow the thought, the feeling and the word. What he said of Martin Luther applies peculiarly to himself: he could “fling his fury into theses,” and thus unite the dry light of argument with the fire and heat of passion. These qualities reach their highest point in the *Oraisons funèbres*. Bossuet was always best when at work on a large canvas; besides, here no conscientious scruples intervened to prevent him giving much time and thought to the artistic side of his subject. For the *Oraison*, as its name betokened, stood midway between the sermon proper and what would nowadays be called a biographical sketch. At least, that was what Bossuet made it; for on this field he stood not merely first, but alone. His three great masterpieces were delivered at the funerals of Henrietta Maria, widow of Charles I. (1669), her daughter, Henrietta, duchess of Orleans (1670), and the great soldier Condé (1687).

Apart from these state occasions, Bossuet seldom appeared in a Paris pulpit after 1669. In that year he was gazetted bishop of Condom in Gascony, though he resigned the charge on being appointed tutor to the dauphin, only child of Louis XIV., and now a boy of nine (1670). The choice was scarcely fortunate. Bossuet unbent as far as he could, but his genius was by no means fitted to enter into the feelings of a child; and the dauphin was a cross, ungainly, sullen lad, who grew up to be a merely genealogical incident at his father’s court. Probably no one was happier than the tutor, when his charge’s sixteenth birthday came round, and he was promptly married off to a Bavarian princess. Still the nine years at court were by no means wasted. Hitherto Bossuet had published nothing, except his answer to Ferry. Now he sat down to write for his pupil’s instruction—or rather, to fit himself to give that instruction—a remarkable trilogy. First came the *Traité de la connaissance de Dieu et de soi-même*, then the *Discours sur l’histoire universelle*, lastly the *Politique tirée de l’Écriture Sainte*. The three books fit into each other. The *Traité* is a general sketch of the nature of God and the nature of man. The *Discours* is a history of God’s dealings with humanity in the past. The *Politique* is a code of rights and duties drawn up in the light thrown by those dealings. Not that Bossuet literally supposed that the last word of political wisdom had been said by the Old Testament. His conclusions are only “drawn from Holy Scripture,” because he wished to gain the highest possible sanction for the institutions of his country—to hallow the France of Louis XIV. by proving its astonishing likeness to the Israel of Solomon. Then, too, the veil of Holy Scripture enabled him to speak out more boldly than court-etiquette would have otherwise allowed, to remind the son of Louis XIV. that kings have duties as well as rights. Louis had often forgotten these duties, but Louis’ son would bear them in mind. The tutor’s imagination looked forward to a time when France would blossom into Utopia, with a Christian philosopher on the throne. That is what made him so stalwart a champion of authority in all its forms: *”le roi, Jésus-Christ et l’Église, Dieu en ces trois noms”*, he says in a characteristic letter. And the object of his books is to provide authority with a rational basis. For Bossuet’s worship of authority by no means killed his confidence in reason; what it did was to make him doubt the honesty of those who reasoned otherwise than himself. The whole chain of argument seemed to him so clear and simple. Philosophy proved that a God exists, and that He shapes and governs the course of human affairs. History showed that this governance is, for the most part, indirect, exercised through certain venerable corporations, as well civil as ecclesiastical, all of which demand implicit obedience as the immediate representatives of God. Thus all revolt, whether civil or religious, is a direct defiance of the Almighty. Cromwell becomes a moral monster, and the revocation of the edict of Nantes is “the greatest achievement of the second Constantine.” Not that Bossuet glorified the *status quo* simply as a clerical bigot. The France of his youth had known the misery of divided counsels and civil war; the France of his manhood, brought together under an absolute sovereign, had suddenly shot up into a splendour only comparable with ancient Rome. Why not, then, strain every nerve to hold innovation at bay and prolong that splendour for all time? Bossuet’s own *Discours sur l’histoire universelle* might have furnished an answer, for there the fall of many empires is detailed. But then the *Discours* was composed under a single preoccupation. To Bossuet the establishment of Christianity was the one point of real importance in the whole history of the world. Over Mahomet and the East he passed without a word; on Greece and Rome he only touched in so far as they formed part of the *Praeparatio Evangelica*. And yet his *Discours* is far more than a theological pamphlet. Pascal, in utter scorn for science, might refer the rise and fall of empires to Providence or chance—the nose of Cleopatra, or “a little grain of sand” in the English lord protector’s veins. Bossuet held fast to his principle that God works through secondary causes. “It is His will that every great change should have its roots in the ages that went before it.” Bossuet, accordingly, made a heroic attempt to grapple with origins and causes, and in this way his book deserves its place as one of the very first of philosophic histories.

From writing history he turned to history in the making. In 1681 he was gazetted bishop of Meaux; but before he could take possession of his see, he was drawn into a violent quarrel between Louis XIV. and the pope (see Gallicanism). Here he found himself between two fires. To support the pope meant supporting the Jesuits; and he hated their casuists and *dévotion aisée* almost as much as Pascal himself. To oppose the pope was to play into the hands of Louis, who was frankly anxious to humble the Church before the State. So Bossuet steered a middle course. Before the general assembly of the French clergy he preached a great sermon on the unity of the Church, and made it a magnificent plea for compromise. As Louis insisted on his clergy making an anti-papal declaration, Bossuet got leave to draw it up, and made it as moderate as he could. And when the pope declared it null and void, he set to work on a gigantic *Defensio Cleri Gallicani*, only published after his death.

The Gallican storm a little abated, he turned back to a project very near his heart. Ever since the early days at Metz he had been busy with schemes for uniting the Huguenots to the Roman Church. In 1668 he converted Turenne; in 1670 he published an *Exposition de la foi catholique*, so moderate in tone that

adversaries were driven to accuse him of having fraudulently watered down the Roman dogmas to suit a Protestant taste. Finally in 1688 appeared his great *Histoire des variations des églises protestantes*, perhaps the most brilliant of all his works. Few writers could have made the Justification controversy interesting or even intelligible. His argument is simple enough. Without rules an organized society cannot hold together, and rules require an authorized interpreter. The Protestant churches had thrown over this interpreter; and Bossuet had small trouble in showing that, the longer they lived, the more they varied on increasingly important points. For the moment the Protestants were pulverized; but before long they began to ask whether variation was necessarily so great an evil. Between 1691 and 1701 Bossuet corresponded with Leibnitz with a view to reunion, but negotiations broke down precisely at this point. Individual Roman doctrines Leibnitz thought his countrymen might accept, but he flatly refused to guarantee that they would necessarily believe to-morrow what they believe to-day. "We prefer," he said, "a church eternally variable and for ever moving forwards." Next, Protestant writers began to accumulate some startling proofs of Rome's own variations; and here they were backed up by Richard Simon, a priest of the Paris Oratory, and the father of Biblical criticism in France. He accused St Augustine, Bossuet's own special master, of having corrupted the primitive doctrine of Grace. Bossuet set to work on a *Défense de la tradition*, but Simon calmly went on to raise issues graver still. Under a veil of politely ironical circumlocutions, such as did not deceive the bishop of Meaux, he claimed his right to interpret the Bible like any other book. Bossuet denounced him again and again; Simon told his friends he would wait until "the old fellow" was no more. Another Oratorian proved more dangerous still. Simon had endangered miracles by applying to them lay rules of evidence, but Malebranche abrogated miracles altogether. It was blasphemous, he argued, to suppose that the Author of nature would break through a reign of law He had Himself established. Bossuet might scribble *nova, mira, falsa*, in the margins of his book and urge on Fénelon to attack them; Malebranche politely met his threats by saying that to be refuted by such a pen would do him too much honour. These repeated checks soured Bossuet's temper. In his earlier controversies he had borne himself with great magnanimity, and the Huguenot ministers he refuted found him a kindly advocate at court. Even his approval of the revocation of the edict of Nantes stopped far short of approving dragonades within his diocese of Meaux. But now his patience was wearing out. A dissertation by one Father Caffaro, an obscure Italian monk, became his excuse for writing certain violent *Maximes sur la comédie* (1694) wherein he made an outrageous attack on the memory of Molière, dead more than twenty years. Three years later he was battling with Fénelon over the love of God, and employing methods of controversy at least as odious as Fénelon's own (1697-1699). All that can be said in his defence is that Fénelon, four-and-twenty years his junior, was an old pupil, who had suddenly grown into a rival; and that on the matter of principle most authorities thought him right.

Amid these gloomy occupations Bossuet's life came slowly to an end. Till he was over seventy he had scarcely known what illness was; but in 1702 he was attacked by the stone. Two years later he was a hopeless invalid, and on the 12th of April 1704 he passed quietly away. Of his private life there is little to record. Meaux found him an excellent and devoted bishop, much more attentive to diocesan concerns than his more stirring occupations would seem to allow. In general society he was kindly and affable enough, though somewhat ill at ease. Until he was over forty, he had lived among purely ecclesiastical surroundings; and it was probably want of self-confidence, more than want of moral courage, that made him shut his eyes a little too closely to the disorders of Louis XIV.'s private life. After all, he was not the king's confessor; and to "reform" Louis, before age and Mme de Maintenon had sobered him down, would have taxed the powers of Daniel or Ezekiel. But in his books Bossuet was anything but timid. All of them, even the attacks on Simon, breathe an air of masculine belief in reason, rare enough among the apologists of any age. Bossuet would willingly have undertaken, as Malebranche actually undertook, to make an intelligent Chinaman accept all his ideas, if only he could be induced to lend them his attention. But his best praise is to have brought all the powers of language to paint an undying picture of a vanished world, where religion and letters, laws and science, were conceived of as fixed unalterable planets, circling for ever round one central Sun.

AUTHORITIES.—The best edition of Bossuet's sermons is the *Œuvres oratoires de Bossuet*, edited by Abbé Lebarq, in 6 vols. (Paris, 1890-1896). His complete works were edited by Lachat, in 31 vols. (Paris, 1862-1864). A complete list of the innumerable works relating to him will be found in the *Bossuet* number of the *Bibliothèque des bibliographies critiques*, compiled by Canon Charles Urbain, and published by the Société des Études Historiques (Paris, 1900). The general reader will find all he requires in the respective studies of M. Rebelliau, *Bossuet* (Paris, 1900), and M. Gustave Lanson, *Bossuet* (Paris, 1901). In English there is a modest *Bossuet* by Mrs Sidney Lear (London, 1874), and two remarkable studies by Sir J. Fitz-James Stephen in the second volume of his *Horae Sabbaticae* (London, 1892).

(ST. C.)

BOSTANAI, the name of the first exilarch under Mahommedan rule, in the middle of the 7th century. The exilarchs had their seat in Persia, and were practically the secular heads of the Jewish community in the Orient.

BOSTON, THOMAS (1676-1732), Scottish divine, was born at Duns on the 17th of March 1676. His father, John Boston, and his mother, Alison Trotter, were both Covenanters. He was educated at Edinburgh, and licensed in 1697 by the presbytery of Chirnside. In 1699 he became minister of the small parish of Simprin, where there were in all “not more than 90 examinable persons.” In 1704 he found, while visiting a member of his flock, a book which had been brought into Scotland by a commonwealth soldier. This was the famous *Marrow of Modern Divinity*, by Edward Fisher, a compendium of the opinions of leading Reformation divines on the doctrine of grace and the offer of the Gospel. Its object was to demonstrate the unconditional freeness of the Gospel. It cleared away such conditions as repentance, or some degree of outward or inward reformation, and argued that where Christ is heartily received, full repentance and a new life follow. On Boston’s recommendation, Hog of Carnock reprinted *The Marrow* in 1718; and Boston also published an edition with notes of his own. The book, being attacked from the standpoint of high Calvinism, became the standard of a far-reaching movement in Scottish Presbyterianism. The “Marrow men” were marked by the zeal of their service and the effect of their preaching. As they remained Calvinists they could not preach a universal atonement; they were in fact extreme particular redemptionists. In 1707 Boston was translated to Ettrick. He distinguished himself by being the only member of the assembly who entered a protest against what he deemed the inadequate sentence passed on John Simson, professor of divinity at Glasgow, who was accused of heterodox teaching on the Incarnation. He died on the 20th of May 1732. His books, *The Fourfold State, The Crook in the Lot*, and his *Body of Divinity* and *Miscellanies*, long exercised a powerful influence over the Scottish peasantry.

His *Memoirs* were published in 1776 (ed. G.D. Low, 1908). An edition of his works in 12 volumes appeared in 1849.

(D. Mn.)

BOSTON, a municipal and parliamentary borough and seaport of Lincolnshire, England, on the river Witham, 4 m. from its mouth in the Wash, 107 m. N. of London by the Great Northern railway. Pop. (1901) 15,667. It lies in a flat agricultural fen district, drained by numerous cuts, some of which are navigable. The church of St Botolph is a superb Decorated building, one of the largest and finest parish churches in the kingdom. A Decorated chapel in it, formerly desecrated, was restored to sacred use by citizens of Boston, Massachusetts, U.S.A., in 1857, in memory of the connexion of that city with the English town. The western tower, commonly known as Boston Stump, forms a landmark for 40 m. Its foundations were the first to be laid of the present church (which is on the site of an earlier one), but the construction was arrested until the Perpendicular period, of the work of which it is a magnificent example. It somewhat resembles the completed tower of Antwerp cathedral, and is crowned by a graceful octagonal lantern, the whole being nearly 290 ft. in height. The church of Skirbeck, 1 m. south-east, though extensively restored, retains good Early English details. Other buildings of interest are the guildhall, a 15th-century structure of brick; Shodfriars Hall, a half-timbered house adjacent to slight remains of a Dominican priory; the free grammar school, founded in 1554, with a fine gateway of wrought iron of the 17th century brought from St Botolph’s church; and the Hussey Tower of brick, part of a mansion of the 16th century. Public institutions include a people’s park and large municipal buildings (1904).

As a port Boston was of ancient importance, but in the 18th century the river had silted up so far as to exclude vessels exceeding about 50 tons. In 1882-1884 a dock some 7 acres in extent was constructed, with an entrance lock giving access to the quay sides for vessels of 3000 tons. The bed of the river was deepened to 27 ft. for 3 m. below the town, and a new cut of 3 m. was made from the mouth into deep water. An iron swing-bridge connects the dock with the Great Northern railway. There is a repairing slipway accommodating vessels of 800 tons. Imports, principally timber, grain, cotton and linseed, increased owing to these improvements from £116,179 in 1881 to £816,698 in 1899; and exports (coal, machinery and manufactured goods) from £83,000 in 1883 to £261,873 in 1899. The deep-sea and coastal fisheries are important. Engineering, oil-cake, tobacco, sail and rope works are the principal industries in the town. Boston returns one member to parliament. The parliamentary borough falls within the Holland or Spalding division of the county. The municipal borough is under a mayor, 6 aldermen and 18 councillors. Area, 2727 acres.

Boston (Icanhoe, St Botolph or Botolph’s Town) derives its name from St Botolph, who in 654 founded a monastery here, which was destroyed by the Danes, 870. Although not mentioned in Domesday, Boston was probably granted as part of Skirbeck to Alan, earl of Brittany. The excellent commercial position of the town at the mouth of the Witham explains its speedy rise into importance. King John by charter of 1204 granted the bailiff of Boston sole jurisdiction in the town. By the 13th century it was a great commercial centre second only to London in paying £780 for two years to the fifteenth levied in 1205, and Edward III. made it a staple port for wool in 1369. The Hanseatic and Flemish merchants largely increased its prosperity, but on the withdrawal of the Hanseatic League about 1470 and the break-up of the gild system Boston’s prosperity began to wane, and for some centuries it remained almost without trade. Nevertheless it was raised to the rank of a free borough by Henry VIII.’s charter of 1546, confirmed by Edward VI. in 1547, by Mary in 1553, by Elizabeth (who granted a court of admiralty) in 1558 and 1573, and by James I. in 1608. Boston sent members to the great councils in 1337, 1352 and 1353; and from 1552 to 1885 two members were returned to each parliament. The Redistribution Act 1885 reduced the representation to one member. In 1257 a market was granted to

the abbot of Crowland and in 1308 to John, earl of Brittany. The great annual mart was held before 1218 and attended by many German and other merchants. Two annual fairs and two weekly markets were granted by Henry VIII.'s charter, and are still held. The Great Mart survives only in the Beast Mart held on the 11th of December.

See Pishey Thompson, *History and Antiquities of Boston and the Hundred of Skirbeck* (Boston, 1856); George Jebb, *Guide to the Church of St Botolph, with Notes on the History of Boston; Victoria County History: Lincolnshire*.

BOSTON, the capital of the state of Massachusetts, U.S.A., in Suffolk county; lat. 42° 21′ 27.6″ N., long. 71° 3′ 30″ W. Pop. (1900) 560,892, (197,129 being foreign born); (1905, state census) 595,580; (1910), 670,585. Boston is the terminus of the Boston & Albany (New York Central), the Old Colony system of the New York, New Haven & Hartford, and the Boston & Maine railway systems, each of which controls several minor roads once independent. The city lies on Massachusetts bay, on what was once a pear-shaped peninsula attached to the mainland by a narrow, marshy neck, often swept by the spray and water. On the north is the Charles river, which widens here into a broad, originally much broader, inner harbour or back-bay. The surface of the peninsula was very hilly and irregular, the shore-line was deeply indented with coves, and there were salt marshes that fringed the neck and the river-channel and were left oozy by the ebbing tides. Until after the War of Independence the primitive topography remained unchanged, but it was afterwards subjected to changes greater than those effected on the site of any other American city. The area of the original Boston was only 783 acres, but by the filling in of tidal flats (since 1804) this was increased to 1829 acres; while the larger corporate Boston of the present day—including the annexed territories of South Boston (1804), Roxbury (1868), Charlestown, Dorchester, Brighton and West Roxbury (1874)—comprehends almost 43 sq. m. The beautiful Public Garden and the finest residential quarter of the city—the Back Bay, so called from that inner harbour from whose waters it was reclaimed (1856-1886)—stand on what was once the narrowest, but to-day is the widest and fairest portion of the original site. Whole forests, vast quarries of granite, and hills of gravel were used in fringing the water margins, constructing wharves, piers and causeways, redeeming flats, and furnishing piling and solid foundations for buildings. At the edge of the Common, which is now well within the city, the British troops in 1775 took their boats on the eve of the battle of Lexington; and the post-office, now in the very heart of the business section of the city, stands on the original shore-line. The reclaimed territory is level and excellently drained. The original territory still preserves to a large degree its irregularity of surface, but its hills have been much degraded or wholly razed. Beacon Hill, so called from its ancient use as a signal warning station, is still the most conspicuous topographical feature of the city, but it has been changed from a bold and picturesque eminence into a gentle slope. After the great fire of 1872 it became possible, in the reconstruction of the business district, to widen and straighten its streets and create squares, and so provide for the traffic that had long outgrown the narrow, crooked ways of the older city. Atlantic Avenue, along the harbour front, was created, and Washington Street, the chief business artery, was largely remade after 1866. It is probable that up to 1875, at least, there had been a larger outlay of labour, material and money, in reducing, levelling and reclaiming territory, and in straightening and widening thoroughfares[1] in Boston, than had been expended for the same purposes in all the other chief cities of the United States together. Washington Street, still narrow, is perhaps the most crowded and congested thoroughfare in America. The finest residence streets are in the Back Bay, which is laid out, in sharp contrast with the older quarters, in a regular, rectangular arrangement. The North End, the original city and afterwards the fashionable quarter, is now given over to the Jews and foreign colonies.

The harbour islands, three of which have been ceded to the United States for the purpose of fortification, are numerous, and render the navigation of the shipping channels difficult and easily guarded. Though tortuous of access, the channels afford a clear passage of 27-35 ft. since great improvements were undertaken by the national government in 1892, 1899, 1902 and 1907, and the harbour, when reached, is secure. It affords nearly 60 sq. m. of anchorage, but the wharf line, for lack of early reservation, is not so large as it might and should have been. The islands in the harbour, now bare, were for the most part heavily wooded when first occupied. It has been found impossible to afforest them on account of the roughness of the sea-air, and the wash from their bluffs into the harbour has involved large expense in the erection of sea-walls. Castle Island has been fortified since the earliest days; Fort Independence, on this island, and Forts Winthrop and Warren on neighbouring islands, constitute permanent harbour defences. The broad watercourses around the peninsula are spanned by causeways and bridges, East Boston only, that the harbours may be open to the navy-yard at Charlestown, being reached by ferry (1870), and by the electric subway under the harbour. At the Charlestown navy-yard (1800) there are docks, manufactories, foundries, machine-shops, ordnance stores, rope-walks, furnaces, casting-pits, timber sheds, ordnance-parks, ship-houses, &c. The famous frigate "Independence" was launched here in 1814, the more famous "Constitution" having been launched while the yard was still private in 1797. The first bridge over the Charles, to Charlestown, was opened in 1786. The bridge of chief artistic merit is the Cambridge Bridge (1908), which replaced the old West Boston Bridge, and is one feature of improvements long projected for the beautifying of the Charles river basin.

Comparatively few relics of the early town have been spared by time and the improvements of the

modern city. Three cemeteries remain intact—King's chapel burying ground, with the graves of John Winthrop and John Cotton; the Old Granary burial ground in the heart of the city, where Samuel Sewall, the parents of Franklin, John Hancock, James Otis and Samuel Adams are buried; and Copp's Hill burial ground, containing the tombs of the Mathers. Christ church (1723) is the oldest church of the city; in its tower the signal lanterns were displayed for Paul Revere on the night of the 18th of April 1775. The Old South church (1730-1782), the old state house (1748, restored 1882), and Faneuil Hall (1762-1763, enlarged 1805, reconstructed 1898) are rich in memorable associations of the period preceding the War of Independence. The second was the seat of the royal government of Massachusetts during the provincial period, and within its walls from 1760 to 1775 the questions of colonial dependence or independence probably first came into evident conflict. The Old South church has many associations; it was, for instance, the meeting-place of the people after the "Boston Massacre" of 1770, when they demanded the removal of the British troops from the city; and here, too, were held the meetings that led up to the "Boston Tea Party" of 1773. Faneuil Hall (the original hall of the name was given to the city by Peter Faneuil, a Huguenot merchant, in 1742) is associated, like the Old South, with the patriotic oratory of revolutionary days and is called "the cradle of American liberty." Its association with reform movements and great public issues of later times is not less close and interesting.[2] The adjoining Quincy market may be mentioned because its construction (1826) was utilized to open six new streets, widen a seventh, and secure flats, docks and wharf rights—all without laying tax or debt upon the city. The original King's chapel (1688, present building 1749-1754) was the first Episcopal church of Boston, which bitterly resented the action of the royal governor in 1687 in using the Old South for the services of the Church of England. The new state house, the oldest portion of which (designed by Charles Bulfinch) was erected in 1795-1798, was enlarged in 1853-1856, and again by a huge addition in 1889-1898 (total cost about $6,800,000 to 1900). Architecturally, everything is subordinated to a conformity with the style of the original portion; and its gilded dome is a conspicuous landmark. Other buildings of local importance are the city hall (1865); the United States government building (1871-1878, cost about $6,000,000); the county court-house (1887-1893, $2,250,000); the custom-house (1837-1848); and the chamber of commerce (1892).

Copley Square, in the Back Bay, is finely distinguished by a group of exceptional buildings: Trinity church, the old Museum of Fine Arts, the public library and the new Old South church. Trinity (1877, cost $800,000), in yellowish granite with dark sandstone trimmings, the masterpiece of H.H. Richardson, is built in the Romanesque style of southern France; it is a Latin cross surmounted by a massive central tower, with smaller towers and an adjacent chapel reached by open cloisters that distribute the balance (see Architecture, Plate XVI. fig. 137). It has windows by La Farge, William Morris, Burne-Jones and others.

The library (1888-1895; cost $2,486,000, exclusive of the site, given by the state) is a dignified, finely proportioned building of pinkish-grey stone, built in the style of the Italian Renaissance, suggesting a Florentine palace. It has an imposing exterior (see Architecture, Plate XVI. fig. 135), a beautiful inner court, and notable decorative features and embellishments, including bronze doors by D.C. French, a statue of Sir Henry Vane by Macmonnies, a fine staircase in Siena marble, some characteristic decorative panels by Puvis de Chavannes (illustrating the history of science and literature), and other notable decorative paintings by John S. Sargent (on the history of religion), Edwin A. Abbey (on the quest of the Holy Grail). The old Museum of Fine Arts (1876) is a red brick edifice in modern Gothic style, with trimmings of light stone and terra-cotta. The new Old South (the successor of the Old South, which is now a museum) is a handsome structure of Italian Gothic style, with a fine campanile. The dignified buildings of the Massachusetts Institute of Technology are near. In Huntington Avenue, at its junction with Massachusetts Avenue, is another group of handsome new buildings, including Horticultural Hall, Symphony Hall (1900) and the New England Conservatory of Music. In the Back Bay Fens, reclaimed swamps laid out by F.L. Olmsted, still other groups have formed—among others those of the marble buildings of the Harvard medical school; Fenway Court, a building in the style, internally, of a Venetian palace, that houses the art treasures of Mrs. J.L. Gardner, and Simmons College. Here, too, is the new building (1908) of the Museum of Fine Arts. Throughout the Fens excellently effective use is being made of monumental buildings grouped in ample grounds.

Boston compares favourably with other American cities in the character of its public and private architecture. The height of buildings in the business section is limited to 125 ft., and in some places to 90 ft.

One of the great public works of Boston is its subway for electric trams, about 3 m. long, in part with four tracks and in part with two, constructed since 1895 at a cost of about $7,500,000 up to 1905. The branch to East Boston (1900-1904) passes beneath the harbour bed and extends from Scollay Square, Boston, to Maverick Square, East Boston; it was the first all-cement tunnel (diameter, 23.6 ft.) in the world. The subway was built by the city, but leased and operated by a private company on such terms as to repay its cost in forty years. Another tunnel has been added to the system, under Washington Street. The narrow streets and the traffic congestion of the business district presented difficult problems of urban transit, but the system is of exceptional efficiency. There is an elevated road whose trains, like the surface cars, are accommodated in the centre of the city by the subway. All the various roads—surface, elevated (about 7 m., built 1896-1901), and subway—are controlled, almost wholly, by one company. They all connect and interchange passengers freely; so that the ordinary American five-cent fare enables a passenger to travel between almost any two points over an area of 100 sq. m. The two huge steam-railway stations of the Boston & Maine and the Boston & Albany systems also deserve mention. The former (the North, or Union station, 1893) covers 9 acres and has 23 tracks; the latter (the South Terminal, 1898), one of the largest stations in the world, covers 13 acres and has 32 tracks,

and is used by the Boston & Albany and by the New York, New Haven & Hartford railways.

A noteworthy feature of the metropolitan public water service was begun in 1896 in the Wachusett lake reservoir at Clinton, on the Nashua river. The basin here excavated by ten years of labour, lying 385 ft. above high-tide level of Boston harbour, has an area of 6.5 sq. m., an average depth of 46 ft., and a capacity of 63,068,000,000 gallons of water. It is the largest municipal reservoir in the world[3], yet it is only part of a system planned for the service of the metropolitan area.

The park system is quite unique among American cities. The Common, a park of 48 acres, in the centre of the city, has been a public reservation since 1634, and no city park in the world is cherished more affectionately for historical associations. Adjoining it is the Public Garden of 24 acres (1859), part of the made area of the city. Commonwealth Avenue, one of the Back Bay streets running from the foot of the Public Garden, is one of the finest residence streets of the country. It is 240 ft. wide, with four rows of trees shading the parking of its central mall, and is a link through the Back Bay Fens with the beautiful outer park system. The park system consists of two concentric rings, the inner being the city system proper, the outer the metropolitan system undertaken by the commonwealth in co-operation with the city. The former has been laid out since 1875, and includes upwards of 2300 acres, with more than 100 m. of walks, drives and rides. Its central ornament is Franklin Park (527 acres). The metropolitan system, which extends around the city on a radius of 10 to 12 m., was begun in 1893. It embraces over 10,000 acres, including the Blue Hill reservation (about 5000 acres), the highest land in eastern Massachusetts, a beautiful reservation of forest, crag and pond known as Middlesex Fells, two large beach bath reservations on the harbour at Revere and Hull (Nantasket), and the boating section of the Charles river. At the end of 1907 more than $13,000,000 had been expended on the system. Including the local parks of the cities and towns of the metropolitan district there are over 17,000 acres of pleasure grounds within the metropolitan park district. Boston was the pioneer municipality of the country in the establishment of open-air gymnasiums. A great improvement, planned for many years, was brought nearer by the completion of the new Cambridge Bridge. This improvement was projected to include the damming of the Charles river, and the creation of a great freshwater basin, with drive-ways of reclaimed land along the shores, and other adornments, somewhat after the model of the Alster basins at Hamburg.

Art and Literature.—The Museum of Fine Arts was founded in 1870 (though there were art exhibits collected from 1826 onward) and its present building was erected in 1908. It has one of the finest collections of casts in existence, a number of original pieces of Greek statuary, the second-best collection in the world of Aretine ware, the finest collection of Japanese pottery, and probably the largest and finest of Japanese paintings in existence. Among the memorials to men of Massachusetts (a large part of them Bostonians) commemorated by monuments in the Common, the Public Garden, the grounds of the state house, the city hall, and other public places of the city, are statues of Charles Sumner, Josiah Quincy and John A. Andrew by Thomas Ball; of Generals Joseph Hooker and William F. Bartlett, and of Rufus Choate by Daniel C. French; of W.L. Garrison and Charles Devens by Olin L. Warner; of Samuel Adams by Anne Whitney; of John Winthrop and Benjamin Franklin by R.S. Greenough; of Edward Everett (W.W. Story), Colonel W. Prescott (Story), Horace Mann (E. Stebbins), Daniel Webster (H. Powers), W.E. Channing (H. Adams), N.P. Banks (H.H. Kitson), Phillips Brooks (A. St Gaudens), and J.B. O’Reilly (D.C. French).

Among other important monuments are a group by J.Q.A. Ward commemorating the first proof of the anaesthetic properties of ether, made in 1846 in the Massachusetts General Hospital by Dr W.T.G. Morton; an emancipation group of Thomas Ball with a portrait statue of Lincoln; a fine equestrian statue, by the same sculptor, of Washington, one of the best works in the country (1869); an army and navy monument in the Common by Martin Millmore, in memory of the Civil War; another (1888) recording the death of those who fell in the Boston Massacre of 1770; statues of Admiral D.G. Farragut (H.H. Kitson), Leif Ericson (Anne Whitney), and Alexander Hamilton (W. Rimmer); and a magnificent bronze bas-relief (1897) by Augustus St Gaudens commemorating the departure from Boston of Colonel Robert G. Shaw with the first regiment of negro soldiers enlisted in the Civil War. There is an art department of the city government, under unpaid commissioners, appointed by the mayor from candidates named by local art and literary institutions; and without their approval no work of art can now become the property of the city.

The public library, containing 922,348 volumes in January 1908, is the second library of the country in size, and is the largest free circulating library in the world (circulation 1907, 1,529,111 volumes). There was a public municipal library in Boston before 1674—probably in 1653; but it was burned in 1747 and was apparently never replaced. The present library (antedated by several circulating, social and professional collections) may justly be said to have had its origin in the efforts of the Parisian, Alexandre Vattemare (1796-1864), from 1830 on, to foster international exchanges. From 1847 to 1851 he arranged gifts from France to American libraries aggregating 30,655 volumes, and a gift of 50 volumes by the city of Paris in 1843 (reciprocated in 1849 with more than 1000 volumes contributed by private citizens) was the nucleus of the Boston public library. Its legal foundation dates from 1848. Among the special collections are the George Ticknor library of Spanish and Portuguese books (6393 vols.), very full sets of United States and British public documents, the Bowditch mathematical library (7090 vols.), the Galatea collection on the history of women (2193 vols.), the Barton library, including one of the finest existing collections of Shakespeariana (3309 vols., beside many in the general library), the A.A. Brown library of music (9886 vols.), a very full collection on the anthropology and ethnology of Europe, and more than 100,000 volumes on the history, biography, geography and literature of the United States. The library is supported almost entirely by municipal appropriations, though holding also considerable trust funds ($388,742 in 1905). The other notable book-collections of the city include those

of the Athenaeum, founded in 1807 (about 230,000 vols. and pamphlets), the Massachusetts Historical Society (founded 1791; 50,300), the Boston medical library (founded 1874; about 80,000), the New England Historic-Genealogical Society (founded 1845; 33,750 volumes and 34,150 pamphlets), the state library (founded 1826; 140,000), the American Academy of Arts and Sciences (founded 1780; 30,000), the Boston Society of Natural History (founded 1830; about 35,000 volumes and 27,000 pamphlets).

The leading educational institutions are the Massachusetts Institute of Technology, the largest purely scientific and technical school in the country, opened to students (including women) in 1865, four years after the granting of a charter to Prof. W.B. Rogers, the first president; Boston University (chartered in 1869; Methodist Episcopal; co-educational); the New England Conservatory of Music (co-educational; private; 1867, incorporated 1880), the largest in the United States, having 2400 students in 1905-1906; the Massachusetts College of Pharmacy (1852); the Massachusetts Normal Art School (1873); the School of Drawing and Painting (1876) of the Museum of Fine Arts; Boston College (1860), Roman Catholic, under the Society of Jesus; St John's Theological Seminary (1880), Roman Catholic; Simmons College (1899) for women, and several departments of Harvard University. The Institute of Technology has an exceptional reputation for the wide range of its instruction and its high standards of scholarship. It was a pioneer in introducing as a feature of its original plans laboratory instruction in physics, mechanics and mining. The architects of the United States navy are sent here for instruction in their most advanced courses. Boston University was endowed by Isaac Rich (1801-1872), a Boston fish-merchant, Lee Claflin (1791-1871), a shoe manufacturer and a benefactor of Wesleyan University and of Wilbraham Seminary, and Jacob Sleeper. It has been co-educational from the beginning. Its faculties of theology—founded in 1841 at Newbury, Vt., as the Biblical Institute; in 1847-1867 in Concord, N.H.; and in 1867-1871 the Boston Theological Seminary—law, music, medicine, liberal arts and agriculture (at Amherst, in association with the Massachusetts Agricultural College), all antedate 1876. The funds for Simmons College were left by John Simmons in 1870, who wished to found a school to teach the professions and "branches of art, science and industry best calculated to enable the scholars to acquire an independent livelihood." The Lowell Institute (*q.v.*), established in 1839 (by John Lowell, Jr., who bequeathed $237,000 for the purpose), provides yearly courses of free public lectures, and its lecturers have included many of the leading scholars of America and Europe. During each winter, also, a series of public lectures on American history is delivered in the Old South meeting house. The public schools, particularly the secondary schools, enjoy a very high reputation. The new English High and Latin school, founded in 1635, is the oldest school of the country. A girls' Latin school, with the same standards as the boys' school, was established in 1878 (an outcome of the same movement that founded Radcliffe College). There are large numbers of private schools, in art, music and academic studies.

In theatrical matters Boston is now one of the chief American centres. The Federal Street theatre—the first regular theatre—was established in 1794, the old Puritan feeling having had its natural influence in keeping Boston behind New York and Philadelphia in this respect. The dramatic history of the city is largely associated with the Boston Museum, built in 1841 by Moses Kimball on Tremont Street, and rebuilt in 1846 and 1880; here for half a century the principal theatrical performances were given (see an interesting article in the *New England Magazine*, June 1903), in later years under the management of R. Montgomery Field, until in 1903 the famous Boston Museum was swept away, as other interesting old places of entertainment (the old Federal Street theatre, the Tremont theatre, &c.) had been, in the course of further building changes. The Boston theatre dates from 1854, and there were seventeen theatres altogether in 1900.

As a musical centre Boston rivals New York. Among musical organizations may be mentioned the Handel and Haydn Society (1815), the Harvard Musical Association (1837), the Philharmonic (1880) and the Symphony Orchestra, organized in 1881 by the generosity of Henry Lee Higginson. This orchestra has done much for music not only in Boston but in the United States generally. In 1908 the Boston Opera Company was incorporated, and an opera house has been erected on the north side of Huntington Avenue.

Boston was the undisputed literary centre of America until the later decades of the 19th century, and still retains a considerable and important colony of writers and artists. Its ascendancy was identical with the long predominance of the New England literary school, who lived in Boston or in the country round about. Two Boston periodicals (one no longer so) that still hold an exceptional position in periodical literature, the *North American Review* (1815) and the *Atlantic Monthly* (1857), date from this period. The great majority of names in the long list of worthies of the commonwealth—writers, statesmen, orators, artists, philanthropists, reformers and scholars, are intimately connected with Boston. Among the city's daily newspapers the *Boston Herald* (1846), the *Boston Globe*, the *Evening Transcript* (1830), the *Advertiser* (1813) and the *Post* (1831) are the most important.

Industry and Commerce.—Boston is fringed with wharves. Commercial interests are largely concentrated in East Boston. Railway connexion with Worcester, Lowell and Providence was opened in 1835; with Albany, N.Y., and thereby with various lines of interior communication, in 1841 (double track, 1868); with Fitchburg, in 1845; and in 1851 connexion was completed with the Great Lakes and Canada. In 1840 Boston was selected as the American terminus of the Cunard Line, the first regular line of trans-Atlantic steamers. The following decade was the most active of the city's history as regards the ocean carrying trade. Boston ships went to all parts of the globe. The Cunard arrangement was the first of various measures that worked for a commercial rapprochement between the New England states and Canada, culminating in the reciprocity treaty of 1854, and Boston's interests are foremost to-day in demanding a return to relations of reciprocity. Beginning about 1855 the commerce of the port greatly declined. The Cunard service has not been continuous. In 1869 there was not one vessel steaming directly for Europe; in 1900 there were 973 for foreign ports. Great improvements of the harbour were

undertaken in 1902 by the United States government, looking to the creation of two broad channels 35 ft. deep. Railway rates have also been a matter of vital importance in recent years; Boston, like New York, complaining of discriminations in favour of Philadelphia, Baltimore, New Orleans and Galveston. Boston also feels the competition of Montreal and Portland; the Canadian roads being untrammelled in the matter of freight differentials. Boston is the second import port of the United States, but its exports in 1907 were less than those of Philadelphia, of Galveston, or of New Orleans. The total tonnage in foreign trade entering and leaving in 1907 was 5,148,429 tons; and in the same year 9616 coasting vessels (tonnage, 10,261,474) arrived in Boston. The value of imports and exports for 1907 were respectively $123,414,168 and $104,610,908. Fibres and vegetable grasses, wool, hides and skins, cotton, sugar, iron and steel and their manufactures, chemicals, coal, and leather and its manufactures are the leading imports; provisions, leather and its manufactures, cotton and its manufactures, breadstuffs, iron and steel and their manufactures are the leading exports. In the exportation of cattle, and of the various meat and dairy products classed as provisions, Boston is easily second to New York. It is the largest wool and the largest fish market of the United States, being in each second in the world to London only.

Manufacturing is to-day the most distinctive industry, as was commerce in colonial times. The value of all manufactured products from establishments under the “factory system” in 1900 was $162,764,523; in 1905 it was $184,351,163. Among the leading and more distinctive items were printing and publishing ($21,023,855 in 1905); sugar and molasses refining ($15,746,547 in 1900; figures not published in 1905 because of the industry being in the hands of a single owner); men’s clothing (in 1900, $8,609,475, in 1905, $11,246,004); women’s clothing (in 1900, $3,258,483, in 1905, $5,705,470); boots and shoes (in 1900, $3,882,655, in 1905, $5,575,927); boot and shoe cut stock (in 1905, $5,211,445); malt liquors (in 1900, $7,518,668, in 1905, $6,715,215); confectionery (in 1900, $4,455,184, in 1905, $6,210,023); tobacco products (in 1900, $3,504,603, in 1905, $4,592,698); pianos and organs ($3,670,771 in 1905); other musical instruments and materials (in 1905, $231,780); rubber and elastic goods (in 1900, $3,139,783, in 1905, $2,887,323); steam fittings and heating apparatus (in 1900, $2,876,327, in 1905, $3,354,020); bottling, furniture, &c. Art tiles and pottery are manufactured in Chelsea. Shipbuilding and allied industries early became of great importance. The Waltham watch and the Singer sewing-machine had their beginning in Boston in 1850. The making of the Chickering pianos goes back to 1823, and of Mason & Hamlin reed organs to 1854; these are to-day very important and distinctive manufactures of the city. The ready-made clothing industry began about 1830.

Government.—Beyond a recognition of its existence in 1630, when it was renamed, Boston can show no legal incorporation before 1822; although the uncertain boundaries between the powers of colony and township prompted repeated petitions to the legislature for incorporation, beginning as early as 1650. In 1822 Boston became a city. Thus for nearly two centuries it preserved intact its old “town” government, disposing of all its affairs in the “town-meeting” of its citizens. Excellent political training such a government unquestionably offered; but it became unworkable as disparities of social condition increased, as the number of legal voters (above 7000 in 1822) became greater, and as the population ceased to be homogeneous in blood. All the citizens did not assemble; on the contrary ordinary business seldom drew out more than a hundred voters, and often a mere handful. From very early days executive officers known as “select-men,” constables, clerks of markets, hog reeves, packers of meat and fish, &c., were chosen; and the select-men, particularly, gained power as the attendance of the freemen on 294
meetings grew onerous. Interested cliques could control the business of the town-meeting in ordinary times, and boisterousness marred its democractic excellence in exciting times. Large sums were voted loosely, and expended by executive boards without any budgetary control. The whole system was full of looseness, complexity and makeshifts. But the tenacity with which it was clung to, proved that it was suited to the community; and whether helpful or harmful to, it was not inconsistent with, the continuance of growth and prosperity. Various other Massachusetts townships, as they have grown older, have been similarly compelled to abandon their old form of government. The powers of the old township were much more extensive than those of the present city of Boston, including as they did the determination of the residence of strangers, the allotment of land, the grant of citizenship, the fixing of wages and prices, of the conditions of lawsuits and even a voice in matters of peace and war. The city charter was revised in 1854, and again reconstructed in important particulars by laws of 1885 separating the executive and legislative powers, and by subsequent acts. A complete alteration of the government has indeed been effected since 1885. Boston proper is only the centre of a large metropolitan area, closely settled, with interests in large part common. This metropolitan area, within a radius of approximately 10 m. about the state house, contained in 1900 about 40% of the population of the state. In the last two decades of the 19th century the question of giving to this greater city some general government, fully consolidated or of limited powers, was a standing question of expediency. The commonwealth has four times recognized a community of metropolitan interests in creating state commissions since 1882 for the union of such interests, beginning with a metropolitan health district in that year. The metropolitan water district (1895) included in 1908 Boston and seventeen cities or townships in its environs; the metropolitan sewerage district (1889) twenty four; the park service (1893) thirty-nine. Local sentiment was firmly against complete consolidation. The creation of the state commissions, independent of the city’s control, but able to commit the city indefinitely by undertaking expensive works and new debt, was resented. Independence is further curtailed by other state boards semi-independent of the city—the police commission of three members from 1885 to 1906, and in 1906 a single police commissioner, appointed by the governor, a licensing board of three members, appointed by the governor; the transit commission, &c. There are, further, county offices (Suffolk county comprises only Boston, Chelsea, Revere and Winthrop), generally independent of the city, though the latter pays practically all the bills.

A new charter went into effect in 1910. It provided for municipal elections in January; for the election of a mayor for four years; for his recall at the end of two years if a majority of the registered voters so vote in the state election in November in the second year of his term; for the summary removal for cause by the mayor of any department head or other of his appointees, for a city council of one chamber of nine members, elected at large each for three years; for nomination by petition; for a permanent finance commission appointed by the governor; for the confirmation of the mayor's appointments by the state civil service commission; for the mayor's preparation of the annual budget (in which items may be reduced but not increased by the council), and for his absolute veto of appropriations except for school use. The school committee (who serve gratuitously) appoint the superintendent and supervisors of schools. The number of members of the school-board was in 1905 reduced from twenty-four to five, elected by the city at large, and serving for one, two or three years; at the same time power was centralized in the hands of the superintendent of schools. Civil service reform principles cover the entire municipal administration. The city's work is done under an eight-hour law.

An analysis of city election returns for the decade 1890-1899 showed that the interest of the citizens was greatest in the choice of a president; then, successively, in the choice of a mayor, a governor, the determination of liquor-license questions by referendum, and the settlement of other referenda. On 21 referenda, 10 being questions of license, the ratio of actual to registered voters ranged on the latter from 57.00 to 75.38% (mean 61.15), and on other referenda from 75.63 to 33.40 (mean 61.39),—the mean for all, 64.18. But the average of two presidential votes was 85.37%; and the maxima, minima and means for mayors and governors were respectively 83.86, 74.99, 78.36 and 84.73, 61.78, 75.72. Of those who might, only some 50 to 65% actually register. Women vote for school committee-men (categories as above, 95.18, 59.62, 76.49%). On a referendum in 1895 on the expediency of granting municipal suffrage to women only 59.08% of the women who were registered voted, and probably less than 10% of those entitled to be registered.

Hospitals, asylums, refuges and homes, pauper, reformatory and penal institutions, flower missions, relief associations, and other charitable or philanthropic organizations, private and public, number several hundreds. The Associated Charities is an incorporated organization for systematizing the various charities of the city. The Massachusetts general hospital (1811-1821)— with a branch for mental and nervous diseases, McLean hospital (1816), in the township of Belmont (post-office, Waverley) about 6 m. W.N.W. of Boston; the Perkins Institution and Massachusetts school for the blind (1832), famous for its conduct by Samuel G. Howe, and for association with Laura Bridgman and Helen Keller; the Massachusetts school for idiotic and feebleminded children (1839); and the Massachusetts charitable eye and ear infirmary (1824), all receive financial aid from the commonwealth, which has representation in their management. The city hospital dates from 1864. A floating hospital for women and children in the summer months, with permanent and transient wards, has been maintained since 1894 (incorporated 1901). Boston was one of the first municipalities of the country to make provision for the separate treatment of juvenile offenders; in 1906 a juvenile court was established. A People's Palace dedicated to the work of the Salvation Army, and containing baths, gymnasium, a public hall, a library, sleeping-rooms, an employment bureau, free medical and legal bureaus, &c., was opened in 1906. Simmons College and Harvard University maintain the Boston school for social workers (1904). Beneficent social work out of the more usual type is directed by the music and bath departments of the city government. In the provision of public gymnasiums and baths (1866) Boston was the pioneer city of the country, and remains the most advanced. The beach reservations of the metropolitan park system at Revere and Nantasket, and several smaller city beaches are a special feature of this service. Benjamin Franklin, who was born and spent his boyhood in Boston, left £1000 to the city in his will; it amounted in 1905 to $403,000, and constituted a fund to be used for the good of the labouring class of the city.

Largely owing to activity in public works Boston has long been the most expensively governed of American cities. The average yearly expenditure for ten years preceding 1904 was $27,354,416, exclusive of payments on funded and floating debts. The running expenses *per-capita* in 1900 were $35.23; more than twice the average of 86 leading cities of the country (New York, $23.92; Chicago, $11.62). Schools, police, charities, water, streets and parks are the items of heaviest cost. The cost of the public schools for the five years from 1901-1902 to 1906-1907 was $27,883,937, of which $7,057,895.42 was for new buildings; the cost of the police department was $11,387,314.66 for the six years 1902-1907; and of the water department $4,941,343.37 for the six years 1902-1907; of charities and social work a much larger sum. The remaking of the city was enormously expensive, especially the alteration of the streets after 1866, when the city received power to make such alterations and assess a part of the improvements upon abutting estates. The creation of the city water-system has also been excessively costly, and the total cost up to the 31st of January 1908 of the works remaining to the city after the creation of the metropolitan board in 1898 was about $17,000,000. The metropolitan water board—of whose expenditures Boston bears only a share—expended from 1895 to 1900 $20,693,870; and the system was planned to consume finally probably 40 millions at least. The city park system proper had cost $16,627,033 up to 1899 inclusive; and the metropolitan parks $13,679,456 up to 1907 inclusive. There are no municipal lighting-plants; but the companies upon which the city depends for its service are (with all others) subject to the control of a state commission. In 1885 a state law placed a limit on the contractable debt and upon the taxation rate of the city. Revenues were not realized adequate to its lavish undertakings, and loans were used to meet current expenses. The limits were altered subsequently, but the net debt has continued to rise. In 1822 it was $100,000; in 1850, $6,195,144; in 1886, $24,712,820; in 1904, $58,216,725; in 1907, $70,781,969 (gross debt, $104,206,706)—this included the debt of Suffolk county which in 1907 was $3,517,000. The chief objects for which the city debt was created were in 1907, in millions of dollars: highways, 24.07, parks, 16.29, drainage and sewers, 15.05, rapid transit, 13.57 and water-works, 4.53. Boston paid in 1907 36% of all state taxes, and about 33, 62, 47 and 79% respectively of the assessments for the metropolitan

sewer, parks, boulevards and water services. About a third of its revenue goes for such uses or for Suffolk county expenditures over which it has but limited control. The improvement of the Back Bay and of the South Boston flats was in considerable measure forced upon the city by the commonwealth. The debt per capita is as high as the cost of current administration relatively to other cities. The average interest rate on the city obligations in 1907 was about 3.7%. The city's tax valuation in 1907 was $1,313,471,556 (in 1822, $42,140,200; in 1850, $180,000,500), of which only $242,606,856 represented personalty; although in the judgment of the city board of trade such property cannot by any possibility be inferior in value to realty.

Population.—Up to the War of Independence the population was not only American, but it was in its ideas and standards essentially Puritan; modern liberalism, however, has introduced new standards of social life. In 1900 35.1% of the inhabitants were foreign-born, and 72.2% wholly or in part of foreign parentage. Irish, English-Canadian, Russian, Italian, English and German are the leading races. Of the foreign-born population these elements constituted respectively 35.6, 24.0, 7.6, 7.0, 6.7 and 5.3%. Large foreign colonies, like adjoining but unmixing nations, divide among themselves a large part of the city, and give to its life a cosmopolitan colour of varied speech, opinion, habits, traditions, social relations and religions. Most remarkable of all, the Roman Catholic churches, in this stronghold of exiled Puritanism where Catholics were so long under the heavy ban of law, outnumber those of any single Protestant denomination; Irish Catholics dominate the politics of the city, and Protestants and Catholics have been aligned against each other on the question of the control of the public schools. Despite, however, its heavy foreign admixture the old Americanism of the city remains strikingly predominant. The population of Boston at the end of each decennial period since 1790 was as follows:—(1790), 18,320; (1800), 24,937; (1810), 33,787; (1820), 43,298; (1830), 61,392; (1840), 93,383; (1850), 136,881; (1860), 177,840; (1870), 250,526; (1880), 362,839; (1890), 448,477; (1900), 560,892.

History.—John Smith visited Boston Harbour in 1614, and it was explored in 1621 by a party from Plymouth. There were various attempts to settle about its borders in the following years before John Endecott in 1628 landed at Salem as governor of the colony of Massachusetts bay, within which Boston was included. In June 1630 John Winthrop's company reached Charlestown. At that time a "bookish recluse," William Blaxton (Blackstone), one of the several "old planters" scattered about the bay, had for several years been living on Boston peninsula. The location seemed one suitable for commerce and defence, and the Winthrop party chose it for their settlement. The triple summit of Beacon Hill, of which no trace remains to-day (or possibly a reference to the three hills of the then peninsula, Beacon, Copp's and Fort) led to the adoption of the name Trimountaine for the peninsula,—a name perpetuated variously in present municipal nomenclature as in Tremont; but on the 17th of September 1630, the date adopted for anniversary celebrations, it was ordered that "Trimountaine shall be called Boston," after the borough of that name in Lincolnshire, England, of which several of the leading settlers had formerly been prominent citizens.[4]

For several years it was uncertain whether Cambridge, Charlestown or Boston should be the capital of the colony, but in 1632 the General Court agreed "by general consent, that Boston is the fittest place for public meetings of any place in the Bay." It rapidly became the wealthiest and most populous. Throughout the 17th century its history is so largely that of Massachusetts generally that they are inseparable. Theological systems were largely concerned. The chief features of this epoch —the Antinomian dissensions, the Quaker and Baptist persecutions, the witchcraft delusion (four witches were executed in Boston, in 1648, 1651, 1656, 1688) &c.—are referred to in the article Massachusetts (*q.v.*). In 1692 the first permanent and successful printing press was established; in 1704 the first newspaper in America, the *Boston News-Letter*, which was published weekly until 1776. Puritanism steadily mellowed under many influences. By the turn of the first century bigotry was distinctly weakened. Among the marks of the second half of the 17th century was growing material prosperity, and there were those who thought their fellows unduly willing to relax church tests of fellowship when good trade was in question. There was an unpleasant Englishman who declared in 1699 that he found "Money Their God, and Large Possessions the only Heaven they Covet." Prices were low, foreign commerce was already large, business thriving; wealth gave social status; the official British class lent a lustre to society; and Boston "town" was drawing society from the "country." Of the two-score or so of families most prominent in the first century hardly one retained place in the similar list for the early years of the second. Boston was a prosperous, thrifty, English country town, one traveller thought. Another, Daniel Neal, in 1720, found Boston conversation "as polite as in most of the cities and towns in England, many of their merchants having the advantage of a free conversation with travellers; so that a gentleman from London would almost think himself at home at Boston, when he observes the number of people, their houses, their furniture, their tables, their dress and conversation, which perhaps is as splendid and showy as that of the most considerable tradesmen in London."

The population, which was almost stationary through much of the century, was about 20,000 in the years immediately before the War of Independence. At this time Boston was the most flourishing town of North America. It built ships as cheaply as any place in the world, it carried goods for other colonies, it traded—often evading British laws—with Europe, Guinea, Madagascar and above all with the West Indies. The merchant princes and social leaders of the time are painted with elaborate show of luxury in the canvases of Copley. The great English writers of Queen Anne's reign seem to have been but little known in the colony, and the local literature, though changed somewhat in character, showed but scant improvement. About the middle of the century restrictions upon the press began to disappear. At the same time questions of trade, of local politics, finally of colonial autonomy, of imperial policy, had gradually, but already long since, replaced theology in leading interest. In the years 1760-1776 Boston was the most frequently recurring and most important name in British colonial history. Sentiments of

limited independence of the British government had been developing since the very beginning of the settlement (see Massachusetts), and their strength in 1689 had been strikingly exhibited in the local revolution of that year, when the royal governor, Sir Edmund Andros, and other high officials, were frightened into surrender and were imprisoned. This movement, it should be noted, was a popular rising, and not the work of a few leaders.

The incidents that marked the approach of the War of Independence need barely be adverted to. Opposition to the measures of the British government for taxing and oppressing the colonies began in Boston. The argument of Otis on the writs of assistance was in 1760-1761. The Stamp Act, passed in 1765, was repealed in 1766; it was opposed in Boston by a surprising show of determined and unified public sentiment. Troops were first quartered in the town in 1768. In 1770, on the 5th of March, in a street brawl, a number of citizens were killed or wounded by the soldiers, who fired into a crowd that were baiting a sentry. This incident is known as the “Boston Massacre.” The Tea Act of 1773 was defied by the emptying into the harbour of three cargoes of tea on the 16th of December 1773, by a party of citizens disguised as Indians, after the people in town-meeting had exhausted every effort, through a period of weeks, to procure the return of the tea-ships to England. To this act Great Britain replied by various penal regulations and reconstructive acts of government. She quartered troops in Boston; she made the juries, sheriffs and judges of the colony dependent on the royal officers; she ordered capital offenders to be tried in Nova Scotia or England; she endeavoured completely to control or to abolish town-meetings; and finally, by the so-called “Boston Port Bill,” she closed the port of Boston on the 1st of June 1774. Not even a ferry, a scow or other boat could move in the harbour. Marblehead and Salem were made ports of entry, and Salem was made the capital. But they would not profit by Boston’s misfortune. The people covenanted not to use British goods and to suspend trade with Great Britain. From near neighbours and from distant colonies came provisions and encouragement. In October 1774, when General Gage refused recognition to the Massachusetts general court at Salem, the members adjourned to Concord as the first provincial congress. Finally came war, with Lexington and Bunker Hill, and beleaguerment by the colonial army; until on the 17th of March 1776 the British were compelled by Washington to evacuate the city. With them went about 1100 Tory refugees, many of them of the finest families of the city and province. The evacuation closed the heroic period of Boston’s history. War did not again approach the city.

The years from 1776 to the end of “town” government in 1822 were marked by slow growth and prosperity. Commerce and manufactures alike took great impetus. Direct trade with the East Indies began about 1785, with Russia in 1787. A Boston vessel, the “Columbia” (Captain Robert Gray), opened trade with the north-west coast of America, and was the first American ship to circumnavigate the globe (1787-1790). In 1805 Boston began the export of ice to Jamaica, a trade which was gradually extended to Cuba, to ports of the southern states, and finally to Rio de Janeiro and Calcutta (1833), declining only after the Civil War; it enabled Boston to control the American trade of Calcutta against New York throughout the entire period. But of course it was far less important than various other articles of trade in the aggregate values of commerce. It was Boston commerce that was most sorely hurt by the embargo and non-importation policy of President Jefferson. In manufactures the foundation was laid of the city’s wealth. In politics the period is characterized by Boston’s connexion with the fortunes of the Federalist party. The city was warmly in favour of the adoption of the federal constitution of 1787; even Samuel Adams was rejected for Congress because he was backward in its support. It was the losses entailed upon her commerce by the commercial policy of Jefferson’s administration that embittered Boston against the Democratic-Republican party and put her public men in the forefront of the opposition to its policies that culminated in lukewarmness toward the War of 1812, and in the Hartford Convention of 1814.

Some mention must be made of the Unitarian movement. Unitarian tendencies away from the Calvinism of the old Congregational churches were plainly evident about 1750, and it is said by Andrew P. Peabody (1811-1893) that by 1780 nearly all the Congregational pulpits around Boston were filled by Unitarians. Organized Unitarianism in Boston dates from 1785. In 1782 King’s chapel (Episcopal) became Unitarian, and in 1805 one of that faith was made professor of divinity in Harvard. But the Unitarianism of those times, even the Unitarianism of Channing, was very different from that of to-day. Theodore Parker and Channing have been the greatest leaders. The American Unitarian Association, organized in 1825, has always retained its headquarters in Boston. The theological and philosophical developments of the second quarter of the 19th century were characterized by the transcendental movement (see Massachusetts).

In the period from 1822 to the Civil War anti-slavery is the most striking feature of Boston’s annals. Garrison established the Liberator in 1831; W.E. Channing became active in the cause of abolition in 1835, and Wendell Phillips a little later. In 1835 a mob, composed in part of wealthy and high-standing citizens, attacked a city-building, and dragged Garrison through the streets until the mayor secured his safety by putting him in gaol. But times changed. In 1850 a reception was given in Faneuil Hall in honour of the English anti-slavery leader, George Thompson, whose reported intention to address Bostonians in 1835 precipitated the riot of that year. In 1851 the Court House was surrounded with chains to prevent the “rescue” of a slave (Sims) held for rendition under the Fugitive Slave Law; another slave (Shadrach) was released this same year, and in 1854 there was a riot and intense excitement over the rendition of Anthony Burns. Boston had long since taken her place in the very front of anti-slavery ranks, and with the rest of Massachusetts was playing somewhat the same part as in the years before the War of Independence.

Later events of importance have already been indicated in essentials. On the 9th-10th of November 1872 a terrible fire swept the business part of the city, destroying hundreds of buildings of brick and

granite, and inflicting a loss of some $75,000,000. Within two years the whole area, solidly rebuilt and with widened and straightened streets, showed no traces of the ruin except an appearance superior in all respects to that presented before the fire. The expense of this re-creation probably duplicated, at least, the loss from the conflagration. Since this time there has been no set-back to the prosperity of the city. But it is not upon material prosperity that Boston rests its claims for consideration. It prides itself on its schools, its libraries, its literary traditions, its splendid public works and its reputation as the chief centre of American culture.

AUTHORITIES.—See the annual *City Documents*; also Justin Winsor (ed.) *The Memorial History of Boston, including Suffolk County ... 1630-1880* (4 vols., Boston, 1880-1881), a work that covers every phase of the city's growth, history and life; S.A. Drake, *The History and Antiquities of ... Boston* (2 vols., Boston, 1854; and later editions), and *Old Landmarks and Historic Personages of Boston* (Boston, 1873, and later editions); Josiah Quincy, *A Municipal History of ... Boston ... to ... 1830* (Boston, 1852); C.W. Ernst, *Constitutional History of Boston* (Boston, 1894); H.H. Sprague, *City Government in Boston—its Rise and Development* (Boston, 1890); E.E. Hale, *Historic Boston and its Neighbourhood* (New York, 1898), and L. Swift, *Literary Landmarks of Boston* (Boston, 1903). A great mass of original historical documents have been published by the registry department of the city government since 1876 (34 v. to 1905). Boston has been described in many works of fiction, and the reader may be referred to the novels of E.L. Bynner, to L. Maria Childs' *The Rebels*, to J.F. Cooper's *Lionel Lincoln*, to the early novels of W.D. Howells (also those of Arlo Bates), to O.W. Holmes' *Poet* and *Autocrat*, and Hawthorne's *Scarlet Letter*, as pictures of Boston life at various periods since early colonial days.

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1 On the alteration of streets alone $26,691,496 were expended from 1822 to 1880.

2 Faneuil Hall is the headquarters of the Ancient and Honourable Artillery Company of Boston, the oldest military organization of the country, organized in 1638.

3 The dam is 1250 ft. long, with a maximum height of 129 ft., only 750 ft. having a depth of more than 40 ft. from high water to rock. The entire surface of the basin was scraped to bed rock, sand or mineral earth, this alone costing $3,000,000. Connected with the reservoir is an aqueduct, of which 2 m. are tunnel and 7 m. covered masonry. The metropolitan system as planned in 1905 for the near future contemplated storage for 80,000,000,000 gallons, reservoirs holding 2,200,000,000 gallons for immediate use, aqueducts capable of carrying 420,000,000 gallons daily, and a minimum daily supply of 173,000,000 gallons.

4 In 1851 the mayor of the English Boston sent over a copy of that city's seals, framed in oak from St Botolph's church, of which John Cotton, the famous Boston divine (he came over in 1633) had been vicar. The seals now hang in the city hall. In 1855 a number of Americans, including Charles Francis Adams and Edward Everett, and also various descendants of Cotton, united to restore the south-west chapel of St Botolph's church, and to erect in it a memorial tablet to Cotton's memory. The total amount raised by subscription for this purpose was £673.

BOSTON, a game of cards invented during the last quarter of the 18th century. It is said to have originated in Boston, Massachusetts, during the siege by the British. It seems to have been invented by the officers of the French fleet which lay for a time off the town of Marblehead, and the name of the two small islands in Marblehead harbour which have, from the period of the American Revolution, been called Great and Little Misery, correspond with expressions used in the game. William Tudor, in his *Letters on the Eastern States*, published in 1821, states somewhat differently that "A game of cards was invented in Versailles and called in honour of the town, Boston; the points of the game are allusive, 'great independence,' 'little independence,' 'great misery,' 'little misery,' &c. It is composed partly of whist and partly of quadrille, though partaking mostly of the former." The game enjoyed an extraordinary vogue in high French society, where it was the fashion at that time to admire all things 297
American. "The ladies... filled my pockets with bon-bons, and ... called me '*le pétit Bostonien.*' It was indeed by the name of Bostonian that all Americans were known in France then. The war having broken out in Boston and the first great battle fought in its neighbourhood, gave to that name universal celebrity. A game invented at that time, played with cards, was called 'Boston,' and is to this day (1830) exceedingly fashionable at Paris by that appellation" (*Recollections of Samuel Breck*, Philadelphia, 1877). There was a tradition that Dr Franklin was fond of the game and even that he had a hand in its invention. At the middle of the 19th century it was still popular in Europe, and to a less degree in America, but its favour has steadily declined since then.

The rules of Boston recognized in English-speaking countries differ somewhat from those in vogue in France. According to the former, two packs of 52 cards are used, which rank as in whist, both for cutting and dealing. Four players take part, and there are usually no partners. Counters are used, generally of three colours and values, and each hand is settled for as soon as finished. The entire first pack is dealt out by fours and fives, and the second pack is cut for the trump, the suit of the card turned being "first preference," the other suit of the same colour "second preference" or "colour," while the two remaining suits are "plain suits." The eldest hand then announces that he will make a certain number of tricks provided he may name the trump, or lose a certain number without trumps. The different bids are called by various names, but the usual ones are as follows:—To win five tricks, "Boston." (To win) "six tricks." (To win) "seven tricks." To lose twelve tricks, after discarding one card that is not shown, "little *misère*." (To win) "eight tricks." (To win) "nine tricks." To lose every trick, "grand *misère*." (To win) "ten tricks." (To win) "eleven tricks." To lose twelve tricks, after discarding

one card that is not shown, the remaining twelve cards being exposed on the table but not liable to be called, “little spread.” (To win) “twelve tricks.” To lose every trick with exposed cards, “grand spread.” To win thirteen tricks, “grand slam.” If a player does not care to bid he may pass, and the next player bids. Succeeding players may “overcall,” *i.e.* overbid, previous bidders. Players passing may thereafter bid only “*misères*.” If a player bids seven but makes ten he is paid for the three extra tricks, but on a lower scale than if he had bid ten. If no bid should be made, a “*misère partout*” (general poverty) is often played, the trump being turned down and each player striving to take as few tricks as possible. Payments are made by each loser according to the value of the winner’s bid and the overtricks he has scored. There are regular tables of payments. In America overtricks are not usually paid for. In French Boston the knave of diamonds arbitrarily wins over all other cards, even trumps. The names of the different bids remind one of the period of the American Revolution, including “Independence,” “Philadelphia,” “Souveraine,” “Concordia,” &c. Other variations of the game are *Boston de Fontainebleau* and Russian Boston.

BOSTONITE, in petrology, a fine-grained, pale-coloured, grey or pinkish rock, which consists essentially of alkali-felspar (orthoclase, microperthite, &c.). Some of them contain a small amount of interstitial quartz (quartz bostonites); others have a small percentage of lime, which occasions the presence of a plagioclase felspar (maenite, gauteite, lime-bostonite). Other minerals, except apatite, zircon and magnetite, are typically absent. They have very much the same composition as the trachytes; and many rocks of this series have been grouped with these or with the orthophyres. Typically they occur as dikes or as thin sills, often in association with nepheline-syenite; and they seem to bear a complementary relationship to certain types of lamprophyre, such as camptonite and monchiquite. Though nowhere very common they have a wide distribution, being known from Scotland, Wales, Massachusetts, Montreal, Portugal, Bohemia, &c. The lindoites and quartz-lindoites of Norway are closely allied to the bostonites.

BOSTRÖM, CHRISTOFFER JACOB (1797-1866), Swedish philosopher, was born at Piteå and studied at Upsala, where from 1840 to 1863 he was professor of practical philosophy. His philosophy, as he himself described it, is a thoroughgoing rational idealism founded on the principle that the only true reality is spiritual. God is Infinite Spirit in whom all existence is contained, and is outside the limitations of time and space. Thus Boström protests not only against empiricism but also against those doctrines of Christian theology which seemed to him to picture God as something less than Pure Spirit. In ethics the highest aim is the direction of actions by reason in harmony with the Divine; so the state, like the individual, exists solely in God, and in its most perfect form consists in the harmonious obedience of all its members to a constitutional monarch; the perfection of mankind as a whole is to be sought in a rational orderly system of such states in obedience to Universal Reason. This system differs from Platonism in that the “ideas” of God are not archetypal abstractions but concrete personalities.

Boström’s writings were edited by H. Edfeldt (2 vols., Upsala, 1883). For his school see SWEDEN: *Literature*; also H. Höffding, *Filosofien i Sverig* (German trans. in *Philos. Monatsheften*, 1879), and *History of Mod. Philos.* (Eng. trans., 1900), p. 284; R. Falckenberg, *Hist. of Phil.* (Eng. trans., 1895); A. Nyblaeus, *Om den Boströmske filosofien* (Lund, 1883), and *Karakteristik af den Boströmska filosofien* (Lund, 1892).

BOSWELL, JAMES (1740-1795), Scottish man of letters, the biographer of Samuel Johnson, was born at Edinburgh on the 29th of October 1740. His grandfather was in good practice at the Scottish bar, and his father, Alexander Boswell of Auchinleck, was also a noted advocate, who, on his elevation to the supreme court in 1754, took the name of his Ayrshire property as Lord Auchinleck. A Thomas Boswell (said upon doubtful evidence to have been a minstrel in the household of James IV.) was killed at Flodden, and since 1513 the family had greatly improved its position in the world by intermarriage with the first Scots nobility. In contradiction to his father, a rigid Presbyterian Whig, James was “a fine boy, wore a white cockade, and prayed for King James until his uncle Cochrane gave him a shilling to pray for King George, which he accordingly did” (“Whigs of all ages are made in the same way” was Johnson’s comment). He met one or two English boys, and acquired a “tincture of polite letters” at the high school in Edinburgh. Like R.L. Stevenson, he early frequented society such as that of the actors at the Edinburgh theatre, sternly disapproved of by his father. At the university, where he was constrained for a season to study civil law, he met William Johnson Temple, his future friend and correspondent. The letters of Boswell to his “Atticus” were first published by Bentley in 1857. One winter he spent at

Glasgow, where he sat under Adam Smith, who was then lecturing on moral philosophy and rhetoric.

In 1760 he was first brought into contact with “the elegance, the refinement and the liberality” of London society, for which he had long sighed. The young earl of Eglintoun took him to Newmarket and introduced him into the society of “the great, the gay and the ingenious.” He wrote a poem called “The Cub at Newmarket,” published by Dodsley in 1762, and had visions of entering the Guards. Reclaimed with some difficulty by his father from his rakish companions in the metropolis, he contrived to alleviate the irksomeness of law study in Edinburgh by forcing his acquaintance upon the celebrities then assembled in the northern capital, among them Kames, Blair, Robertson, Hume and Sir David Dalrymple (Lord Hailes), of whose sayings on the Northern Circuit he kept a brief journal. Boswell had already realized his vocation, the exercise of which was to give a new word to the language. He had begun to Boswellize. He was already on the track of bigger game—the biggest available in the Britain of that day. In the spring of 1763 Boswell came to a composition with his father. He consented to give up his pursuit of a guidon in the Guards and three and sixpence a day on condition that his father would allow him to study civil law on the continent. He set out in April 1763 by “the best road in Scotland” with a servant, on horseback like himself, in “a cocked hat, a brown wig, brown coat made in the court fashion, red vest, corduroy small clothes and long military boots.” On Monday, the 16th of May 1763, in the back shop of Tom Davies the bookseller, No. 8 Russell Street, Covent Garden, James Boswell first met “Dictionary Johnson,” the great man of his dreams, and was severely buffeted by him. Eight days later, on Tuesday, the 24th of May, Boswell boldly called on Mr Johnson at his chambers on the first floor of No. 1 Inner Temple Lane. On this occasion Johnson pressed him to stay; on the 13th of June he said, “Come to me as often as you can”; on the 25th of June Boswell gave the great man a little sketch of his own life, and Johnson exclaimed with warmth, “Give me your hand; I have taken a liking to you.” Boswell experienced a variety of sensations, among which exultation was predominant. Some one asked, “Who is this Scotch cur at Johnson’s heels?” “He is not a cur,” replied Goldsmith, “he is only a bur. Tom Davies flung him at Johnson in sport, and he has the faculty of sticking.” Johnson was fifty-four at this time and Boswell twenty-three. After June 1763 they met on something like 270 subsequent days. These meetings formed the memorable part of Boswell’s life, and they are told inimitably in his famous biography of his friend.

The friendship, consecrated by the most delightful of biographies, and one of the most gorgeous feasts in the whole banquet of letters, was not so ill-assorted as has been inconsiderately maintained. Boswell’s freshness at the table of conversation gave a new zest to every maxim that Johnson enunciated, while Boswell developed a perfect genius for interpreting the kind of worldly philosophy at which Johnson was so unapproachable. Both men welcomed an excuse for avoiding the task-work of life. Johnson’s favourite indulgence was to talk; Boswell’s great idea of success to elicit memorable conversation. Boswell is almost equally admirable as a reporter and as an interviewer, as a collector and as a researcher. He prepared meetings for Johnson, he prepared topics for him, he drew him out on questions of the day, he secured a copy of his famous letter to Lord Chesterfield, he obtained an almost verbatim report of Johnson’s interview with the king, he frequented the tea-table of Miss Williams, he attended the testy old scholar on lengthy peregrinations in the Highlands and in the midlands. “Sir,” said Johnson to his follower, “you appear to have only two subjects, yourself and me, and I am sick of both.” Yet thorough as the scheme was from the outset, and admirable as was the devotedness of the biographer, Boswell was far too volatile a man to confine himself to any one ambition in life that was not consistent with a large amount of present fame and notoriety. He would have liked to Boswellize the popular idol Wilkes, or Chatham, or Voltaire, or even the great Frederick himself. As it was, during his continental tour he managed in the autumn of 1765 to get on terms with Pasquale di Paoli, the leader of the Corsican insurgents in their unwise struggle against Genoa. After a few weeks in Corsica he returned to London in February 1766, and was received by Johnson with the utmost cordiality. In accordance with the family compact referred to, he was now admitted advocate at Edinburgh, and signalized his return to the law by an enthusiastic pamphlet entitled *The Essence of the Douglas Cause* (November 1767), in which he vigorously repelled the charge of imposture from the youthful claimant. In the same year he issued a little book called *Dorando*, containing a history of the Douglas cause in the guise of a Spanish tale, and bringing the story to a conclusion by the triumph of Archibald Douglas in the law courts. Editors who published extracts while the case was still *sub judice* were censured severely by the court of session; but though his identity was notorious the author himself escaped censure. In the spring of 1768 Boswell published through the Foulis brothers of Glasgow his *Account of Corsica, Journal of a Tour to that Island, and Memoirs of Pascal Paoli*. The liveliness of personal impression which he managed to communicate to all his books gained for this one a deserved success, and the *Tour* was promptly translated into French, German, Italian and Dutch. Walpole and others, jeered, but Boswell was talked about everywhere, as Paoli Boswell or Paoli’s Englishman, and to aid the mob in the task of identifying him at the Shakespeare jubilee of 1769 he took the trouble to insert a placard in his hat bearing the legend “Corsica Boswell.” The amazing costume of “a Corsican chief” which he wore on this occasion was described at length in the magazines.

On the 25th of November 1769, after a short tour in Ireland undertaken to empty his head of Corsica (Johnson’s emphatic direction), Boswell married his cousin Margaret Montgomery at Lainshaw in Ayrshire. For some years henceforth his visits to London were brief, but on the 30th of April 1773 he was present at his admission to the Literary Club, for which honour he had been proposed by Johnson himself, and in the autumn of this year in the course of his tour to the Hebrides Johnson visited the Boswells in Ayrshire. Neither Boswell’s father nor his wife shared his enthusiasm for the lexicographer. Lord Auchinleck remarked that Jamie was “gane clean gyte ... And whose tail do ye think he has pinned himself to now, man? A dominie, an auld dominie, that keepit a schule and ca’d it an academy!” Housewives less prim than Mrs Boswell might have objected to Johnson’s habit of turning lighted

candles upside down when in the parlour to make them burn better. She called the great man a bear. Boswell's *Journal of a Tour in the Hebrides* was written for the most part during the journey, but was not published until the spring of 1786. The diary of Pepys was not then known to the public, and Boswell's indiscretions as to the emotions aroused in him by the neat ladies' maids at Inveraray, and the extremity of drunkenness which he exhibited at Corrichatachin, created a literary sensation and sent the *Tour* through three editions in one year. In the meantime his pecuniary and other difficulties at home were great; he made hardly more than £100 a year by his profession, and his relations with his father were chronically strained. In 1775 he began to keep terms at the Inner Temple and managed to see a good deal of Johnson, between whom and John Wilkes he succeeded in bringing about a meeting at the famous dinner at Dilly's on the 15th of May 1776. On the 30th of August 1782 his father died, leaving him an estate worth £1600 a year. On the 30th of June 1784, Boswell met Johnson for the last time at a dinner at Sir Joshua Reynolds's. He accompanied him back in the coach from Leicester Square to Bolt Court. "We bade adieu to each other affectionately in the carriage. When he had got down upon the foot pavement he called out 'Fare you well'; and without looking back, sprung away with a kind of pathetic briskness, if I may use that expression, which seemed to indicate a struggle to conceal uneasiness, and impressed me with a foreboding of our long, long separation." Johnson died that year, and two years later the Boswells moved to London. In 1789 Mrs Boswell died, leaving five children. She had been an excellent mother and a good wife, despite the infidelities and drunkenness of her husband, and from her death Boswell relapsed into worse excesses, grievously aggravated by hypochondria. He died of a complication of disorders at his house in Great Poland Street on the 19th of May 1795, and was buried a fortnight later at Auchinleck.

Up to the eve of his last illness Boswell had been busy upon his magnum opus, *The Life of Samuel Johnson*, which was in process of crystallization to the last. The first edition was published in two quarto volumes in an edition of 1700 copies on the 16th of May 1791. He was preparing a third edition when he died; this was completed by his friend Edmund Malone, who brought out a fifth edition in 1807. That of James Boswell junior (the editor of Malone's *Variorum Shakespeare*, 1821) appeared in 1811.

The *Life of Johnson* was written on a scale practically unknown to biographers before Boswell. It is a full-length with all the blotches and pimples revealed ("I will not make my tiger a cat to please anybody," wrote "Bozzy"). It may be overmuch an exhibition of oddities, but it is also, be it remembered, a pioneer application of the experimental method to the determination of human character. Its size and lack of divisions (to divide it into chapters was an original device of Croker's) are a drawback, and have prevented Boswell's *Life* from that assured triumph abroad which has fallen to the lot of various English classics such as *Robinson Crusoe* or *Gulliver's Travels*. But wherever English is spoken, it has become a veritable sacred book and has pervaded English life and thought in the same way, that the Bible, Shakespeare and Bunyan have done. Boswell has successfully (to use his own phrase) "Johnsonized" Britain, but has not yet Johnsonized the planet. The model originally proposed to himself by Boswell was Mason's *Life of Gray*, but he far surpassed that, or indeed any other, model. The fashion that Boswell adopted of giving the conversations not in the neutral tints of *oratio obliqua* but in full *oratio recta* was a stroke of genius. But he is far from being the mere mechanical transmitter of good things. He is a dramatic and descriptive artist of the first order. The extraordinary vitality of his figures postulates a certain admixture of fiction, and it is certain that Boswell exaggerates the sympathy expressed in word or deed by Johnson for some of his own tenderer foibles. But, on the whole, the best judges are of opinion that Boswell's accuracy is exceptional, as it is undoubtedly seconded by a power of observation of a singular retentiveness and intensity. The difficulty of dramatic description can only be realized, as Jowett well pointed out, by those who have attempted it, and it is not until we compare Boswell's reports with those of less skilful hearers that we can appreciate the skill with which the essence of a conversation is extracted, and the whole scene indicated by a few telling touches. The result is that Johnson, not, it is true, in the early days of his poverty, total idleness and the pride of literature, but in the fulness of fame and competence of fortune from 1763 to 1784, is better known to us than any other man in history. The old theory to explain such a marvel (originally propounded by Gray when the *Tour in Corsica* appeared) that "any fool may write a valuable book by chance" is now regarded as untenable. If fool is a word to describe Boswell (and his folly was at times transcendent) he wrote his great book because and not in despite of the fact that he was one. There can be no doubt, in fact, that he was a biographical genius, and that he arranged his opportunities just as he prepared his transitions and introduced those inimitable glosses by which Johnson's motives are explained, his state of mind upon particular occasions indicated, and the general feeling of his company conveyed. This remarkable literary faculty, however, was but a fraction of the total make-up requisite to produce such a masterpiece as the *Life*. There is a touch of genius, too, in the naïf and imperturbable good nature and persistency ("Sir, I will not be baited with 'what' and 'why.' 'Why is a cow's tail long?' 'Why is a fox's tail bushy?'"), and even in the abnegation of all personal dignity, with which Boswell pursued his hero. As he himself said of Goldsmith, "He had sagacity enough to cultivate assiduously the acquaintance of Johnson, and his faculties were gradually enlarged." Character, the vital principle of the individual, is the *ignis fatuus* of the mechanical biographer. Its attainment may be secured by a variety of means—witness Xenophon, Cellini, Aubrey, Lockhart and Froude—but it has never been attained with such complete intensity as by Boswell in his *Life of Johnson*. The more we study Boswell, the more we compare him with other biographers, the greater his work appears.

The eleventh edition of Boswell's *Johnson* was brought out by John Wilson Croker in 1831; in this the original text is expanded by numerous letters and variorum anecdotes and is already knee-deep in annotation. Its blunders provoked the celebrated and mutually corrective criticisms of Macaulay and Carlyle. Its value as an unrivalled granary of Johnsoniana, stored opportunely before the last links with a Johnsonian age had disappeared, has not been adequately recognized. A new edition of the original text

was issued in 1874 by Percy Fitzgerald (who has also written a useful life of James Boswell in 2 vols., London, 1891); a six-volume edition, including the *Tour* and Johnsoniana, was published by the Rev. Alexander Napier in 1884; the definitive edition is that by Dr Birkbeck Hill in 6 vols., 1887, with copious annotations and a model index. A generously illustrated edition was completed in 1907 in two large volumes by Roger Ingpen, and reprints of value have also been edited by R. Carruthers (with woodcuts), A. Birrell, Mowbray Morris (Globe edition) and Austin Dobson. A short biography of Boswell was written in 1896 by W. Keith Leask. Boswell's commonplace-book was published in 1876, under the title of *Boswelliana*, with a memoir by the Rev. C. Rogers.

(T. Se.)

BOSWORTH, JOSEPH (1789-1876), British Anglo-Saxon scholar, was born in Derbyshire in 1789. Educated at Repton, whence he proceeded to Aberdeen University, he became in 1817 vicar of Little Horwood, Buckinghamshire, and devoted his spare time to literature and particularly to the study of Anglo-Saxon. In 1823 appeared his *Elements of Anglo-Saxon Grammar*. In 1829 Bosworth went to Holland as chaplain, first at Amsterdam and then at Rotterdam. He remained in Holland until 1840, working there on his *Dictionary of the Anglo-Saxon Language* (1838), his best-known work. In 1857 he became rector of Water Shelford, Buckinghamshire, and in the following year was appointed Rawlinson professor of Anglo-Saxon at Oxford. He gave to the university of Cambridge in 1867 £10,000 for the establishment of a professorship of Anglo-Saxon. He died on the 27th of May 1876, leaving behind him a mass of annotations on the Anglo-Saxon charters.

BOTANY (from Gr. βοτάνη, plant; βόσκειν, to graze), the science which includes everything relating to the vegetable kingdom, whether in a living or in a fossil state. It embraces a consideration of the external forms of plants—of their anatomical structure, however minute—of the functions which they perform—of their arrangement and classification—of their distribution over the globe at the present and at former epochs—and of the uses to which they are subservient. It examines the plant in its earliest state of development, and follows it through all its stages of progress until it attains maturity. It takes a comprehensive view of all the plants which cover the earth, from the minutest organism, only visible by the aid of the microscope, to the most gigantic productions of the tropics. It marks the relations which subsist between all members of the plant world, including those between existing groups and those which are known only from their fossilized remains preserved in the rocks. We deal here with the history and evolution of the science.

The plants which adorn the globe more or less in all countries must necessarily have attracted the attention of mankind from the earliest times. The science that treats of them dates back to the days of Solomon, who "spake of trees, from the cedar of Lebanon to the hyssop on the wall." The Chaldaeans, Egyptians and Greeks were the early cultivators of science, and botany was not neglected, although the study of it was mixed up with crude speculations as to vegetable life, and as to the change of plants into animals. About 300 years before Christ Theophrastus wrote a *History of Plants*, and described about 500 species used for the treatment of diseases. Dioscorides, a Greek writer, who appears to have flourished about the time of Nero, issued a work on Materia Medica. The elder Pliny described about a thousand plants, many of them famous for their medicinal virtues. Asiatic and Arabian writers also took up this subject. Little, however, was done in the science of botany, properly so called, until the 16th century of the Christian era, when the revival of learning dispelled the darkness which had long hung over Europe. Otto Brunfels, a physician of Bern, has been looked upon as the restorer of the science in Europe. In his *Herbarium*, printed at Strassburg (1530-1536), he gave descriptions of a large number of plants, chiefly those of central Europe, illustrated by beautiful woodcuts. He was followed by other writers,—Leonhard Fuchs, whose *Historia Stirpium* (Basel, 1542) is worthy of special note for its excellent woodcuts; Hieronymus Bock, whose *Kreutter Buch* appeared in 1539; and William Turner, "The Father of English Botany," the first part of whose *New Herbal*, printed in English, was issued in 1551. The descriptions in these early works were encumbered with much medicinal detail, including speculations as to the virtues of plants. Plants which were strikingly alike were placed together, but there was at first little attempt at systematic classification. A crude system, based on the external appearance of plants and their uses to man, was gradually evolved, and is well illustrated in the *Herbal*, issued in 1597 by John Gerard (1545-1612), a barber-surgeon, who had a garden in Holborn, and was a keen student of British plants.

One of the earliest attempts at a methodical arrangement of plants was made in Florence by Andreas Caesalpinus (1519-1603), who is called by Linnaeus *primus verus systematicus*. In his work *De Plantis*, published at Florence in 1583, he distributed the 1520 plants then known into fifteen classes, the distinguishing characters being taken from the fruit.

John Ray (1627-1705) did much to advance the science of botany, and was also a good zoologist. He promulgated a system which may be considered as the dawn of the "natural system" of the present day

(Ray, *Methodus Plantarum*, 1682). He separated flowering from flowerless plants, and divided the former into Dicotyledons and Monocotyledons. His orders (or "classes") were founded to some extent on a correct idea of the affinities of plants, and he far outstripped his contemporaries in his enlightened views of arrangement.

About the year 1670 Dr Robert Morison[1] (1620-1683), the first professor of botany at Oxford, published a systematic arrangement of plants, largely on the lines previously suggested by Caesalpinus. He divided them into eighteen classes, distinguishing plants according as they were woody or herbaceous, and taking into account the nature of the flowers and fruit. In 1690 Rivinus[2] promulgated a classification founded chiefly on the forms of the flowers. J.P. de Tournefort[3] (1656-1708), who about the same time took up the subject of vegetable taxonomy, was long at the head of the French school of botany, and published a systematic arrangement in 1694-1700. He described about 8000 species of plants, and distributed them into twenty-two classes, chiefly according to the form of the corolla, distinguishing herbs and under-shrubs on the one hand from trees and shrubs on the other. The system of Tournefort was for a long time adopted on the continent, but was ultimately displaced by that of Carl von Linné, or Linnaeus (*q.v.*; 1707-1778).

The system of Linnaeus was founded on characters derived from the stamens and pistils, the so-called sexual organs of the flower, and hence it is often called the sexual system. It is an artificial method, because it takes into account only a few marked characters in plants, and does not propose to unite them by natural affinities. It is an index to a department of the book of nature, and as such is useful to the student. It does not aspire to any higher character, and although it cannot be looked upon as a scientific and natural arrangement, still it has a certain facility of application which at once commended it. It does not of itself give the student a view of the true relations of plants, and by leading to the discovery of the name of a plant, it is only a stepping-stone to the natural system. Linnaeus himself claimed nothing higher for it. He says—"Methodi Naturalis fragmenta studiose inquirenda sunt. Primum et ultimum hoc in botanicis desideratum est. Natura non facit saltus. Plantae omnes utrinque affinitatem monstrant, uti territorium in mappa geographica." Accordingly, besides his artificial index, he also promulgated fragments of a natural method of arrangement.

The Linnean system was strongly supported by Sir James Edward Smith (1759-1828), who adopted it in his *English Flora*, and who also became possessor of the Linnean collection. The system was for a long time the only one taught in the schools of Britain, even after it had been discarded by those in France and in other continental countries.

The foundation of botanic gardens during the 16th and 17th centuries did much in the way of advancing botany. They were at first appropriated chiefly to the cultivation of medicinal plants. This was especially the case at universities, where medical schools existed. The first botanic garden was established at Padua in 1545, and was followed by that of Pisa. The garden at Leiden dates from 1577, that at Leipzig from 1579. Gardens also early existed at Florence and Bologna. The Montpellier garden was founded in 1592, that of Giessen in 1605, of Strassburg in 1620, of Altdorf in 1625, and of Jena in 1629. The Jardin des Plantes at Paris was established in 1626, and the Upsala garden in 1627. The botanic garden at Oxford was founded in 1632. The garden at Edinburgh was founded by Sir Andrew Balfour and Sir Robert Sibbald in 1670, and, under the name of the Physic Garden, was placed under the superintendence of James Sutherland, afterwards professor of botany in the university. The garden at Kew dates from about 1730, when Frederick, prince of Wales, obtained a long lease of Kew House and its gardens from the Capel family. After his death in 1751 his widow, Princess Augusta of Saxe-Gotha, showed great interest in their scientific development, and in 1759 engaged William Aiton to establish a Physic Garden. The garden of the Royal Dublin Society at Glasnevin was opened about 1796; that of Trinity College, Dublin, in 1807; and that of Glasgow in 1818. The Madrid garden dates from 1763, and that of Coimbra from 1773. Jean Gesner (1709-1790), a Swiss physician and botanist, states that at the end of the 18th century there were 1600 botanic gardens in Europe.

A new era dawned on botanical classification with the work of Antoine Laurent de Jussieu (1748-1836). His uncle, Bernard de Jussieu, had adopted the principles of Linnaeus's *Fragmenta* in his arrangement of the plants in the royal garden at the Trianon. At an early age Antoine became botanical demonstrator in the Jardin des Plantes, and was thus led to devote his time to the science of botany. Being called upon to arrange the plants in the garden, he necessarily had to consider the best method of doing so, and, following the lines already suggested by his uncle, adopted a system founded in a certain degree on that of Ray, in which he embraced all the discoveries in organography, adopted the simplicity of the Linnean definitions, and displayed the natural affinities of plants. His *Genera Plantarum*, begun in 1778, and finally published in 1789, was an important advance, and formed the basis of all natural classifications. One of the early supporters of this natural method was Augustin Pyramus de Candolle (1778-1841), who in 1813 published his *Théorie élémentaire de la botanique*, in which he showed that the affinities of plants are to be sought by the comparative study of the form and development of organs (morphology), not of their functions (physiology). His *Prodromus Systematis Naturalis Regni Vegetabilis* was intended to embrace an arrangement and description of all known plants. The work was continued after his death, by his son Alphonse de Candolle, with the aid of other eminent botanists, and embraces descriptions of the genera and species of the orders of Dicotyledonous plants. The system followed by de Candolle is a modification of that of Jussieu.

In arranging plants according to a natural method, we require to have a thorough knowledge of structural and morphological botany, and hence we find that the advances made in these departments have materially aided the efforts of systematic botanists.

Robert Brown (1773-1858) was the first British botanist to support and advocate the natural system of classification. The publication of his *Prodromus Florae Novae Hollandiae* (in 1810), according to the natural method, led the way to the adoption of that method in the universities and schools of Britain. In 1827 Brown announced his important discovery of the distinction between Angiosperms and Gymnosperms, and the philosophical character of his work led A. von Humboldt to refer to him as "Botanicorum facile princeps." In 1830 John Lindley published the first edition of his *Introduction to the Natural System*, embodying a slight modification of de Candolle's system. From the year 1832 up to 1859 great advances were made in systematic botany, both in Britain and on the continent of Europe. The *Enchiridion* and *Genera Plantarum* of S.L. Endlicher (1804-1849), the *Prodromus* of de Candolle, and the *Vegetable Kingdom* (1846) of J. Lindley became the guides in systematic botany, according to the natural system.

The least satisfactory part of all these systems was that concerned with the lower plants or Cryptogams as contrasted with the higher or flowering plants (Phanerogams). The development of the compound microscope rendered possible the accurate study of their life-histories; and the publication in 1851 of the results of Wilhelm Hofmeister's researches on the comparative embryology of the higher Cryptogamia shed a flood of light on their relationships to each other and to the higher plants, and supplied the basis for the distinction of the great groups Thallophyta, Bryophyta, Pteridophyta and Phanerogamae, the last named including Gymnospermae and Angiospermae.

A system of classification for the Phanerogams, or, as they are frequently now called, Spermatophyta (seed-plants), which has been much used in Great Britain and in America, is that of Bentham and Hooker, whose *Genera Plantarum* (1862-1883) is a descriptive account of all the genera of flowering plants, based on their careful examination. The arrangement is a modification of that adopted by the de Candolles. Another system differing somewhat in detail is that of A.W. Eichler (Berlin, 1883), a modified form of which was elaborated by Dr Adolf Engler of Berlin, the principal editor of *Die natrürliche Pflanzenfamilien*.

The study of the anatomy and physiology of plants did not keep pace with the advance in classification. Nehemiah Grew and his contemporary Marcello Malpighi were the earliest discoverers in the department of plant anatomy. Both authors laid an account of the results of their study of plant structure before the Royal Society of London almost at the same time in 1671. Malpighi's complete work, *Anatome Plantarum*, appeared in 1675 and Grew's *Anatomy of Plants* in 1682. For more than a hundred years the study of internal structure was neglected. In 1802 appeared the *Traité d'anatomie et de physiologie végétale* of C.F.B. de Mirbel (1776-1854), which was quickly followed by other publications by Kurt Sprengel, L.C. Treviranus (1779-1864), and others. In 1812 J.J. P. Moldenhawer isolated cells by maceration of tissues in water. The work of F.J.F. Meyen and H. von Mohl in the middle of the 19th century placed the study of plant anatomy on a more scientific basis. Reference must also be made to M.J. Schleiden (1804-1881) and F. Unger (1800-1870), while in K.W. von Nägeli's investigations on molecular structure and the growth of the cell membrane we recognize the origin of modern methods of the study of cell-structure included under cytology (*q.v.*). The work of Karl Sanio and Th. Hartig advanced knowledge on the structure and development of tissues, while A. de Bary's *Comparative Anatomy of the Phanerogams and Ferns* (1877) supplied an admirable presentation of the facts so far known. Since then the work has been carried on by Ph. van Tieghem and his pupils, and others, who have sought to correlate the large mass of facts and to find some general underlying principles (see PLANTS: *Anatomy of*).

The subject of fertilization was one which early excited attention. The idea of the existence of separate sexes in plants was entertained in early times, long before separate male and female organs had been demonstrated. The production of dates in Egypt, by bringing two kinds of flowers into contact, proves that in very remote periods some notions were entertained on the subject. Female date-palms only were cultivated, and wild ones were brought from the desert in order to fertilize them. Herodotus informs us that the Babylonians knew of old that there were male and female date-trees, and that the female required the concurrence of the male to become fertile. This fact was also known to the Egyptians, the Phoenicians and other nations of Asia and Africa. The Babylonians suspended male clusters from wild dates over the females; but they seem to have supposed that the fertility thus produced depended on the presence of small flies among the wild flowers, which, by entering the female flowers, caused them to set and ripen. The process was called palmification. Theophrastus, who succeeded Aristotle in his school in the 114th Olympiad, frequently mentions the sexes of plants, but he does not appear to have determined the organs of reproduction. Pliny, who flourished under Vespasian, speaks particularly of a male and female palm, but his statements were not founded on any real knowledge of the organs. From Theophrastus down to Caesalpinus, who died at Rome in 1603, there does not appear to have been any attention paid to the reproductive organs of plants. Caesalpinus had his attention directed to the subject, and he speaks of a halitus or emanation from the male plants causing fertility in the female.

Nehemiah Grew seems to have been the first to describe, in a paper on the *Anatomy of Plants*, read before the Royal Society in November 1676, the functions of the stamens and pistils. Up to this period all was vague conjecture. Grew speaks of the *attire*, or the stamens, as being the male parts, and refers to conversations with Sir Thomas Millington, Sedleian professor at Oxford, to whom the credit of the sexual theory seems really to belong. Grew says that "when the attire or apices break or open, the globules or dust falls down on the seedcase or uterus, and touches it with a prolific virtue." Ray adopted Grew's views, and states various arguments to prove their correctness in the preface to his work on European plants, published in 1694. In 1694 R.J. Camerarius, professor of botany and medicine at Tübingen, published a letter on the sexes of plants, in which he refers to the stamens and pistils as the

organs of reproduction, and states the difficulties he had encountered in determining the organs of Cryptogamic plants. In 1703 Samuel Morland, in a paper read before the Royal Society, stated that the farina (pollen) is a congeries of seminal plants, one of which must be conveyed into every ovum or seed before it can become prolific. In this remarkable statement he seems to anticipate in part the discoveries afterwards made as to pollen tubes, and more particularly the peculiar views promulgated by Schleiden. In 1711 E.F. Geoffrey, in a memoir presented to the Royal Academy at Paris, supported the views of Grew and others as to the sexes of plants. He states that the germ is never to be seen in the seed till the apices (anthers) shed their dust; and that if the stamina be cut out before the apices open, the seed will either not ripen, or be barren if it ripens. He mentions two experiments made by him to prove this—one by cutting off the staminal flowers in Maize, and the other by rearing the female plant of Mercurialis apart from the male. In these instances most of the flowers were abortive, but a few were fertile, which he attributes to the dust of the apices having been wafted by the wind from other plants.

Linnaeus took up the subject in the inauguration of his sexual system. He first published his views in 1736, and he thus writes—“Antheras et stigmata constituere sexum plantarum, a palmicolis, Millingtono, Grewio, Rayo, Camerario, Godofredo, Morlando, Vaillantio, Blairio, Jussievio, Bradleyo, Royeno, Logano, &c., detectum, descriptum, et pro infallibili assumptum; nec ullum, apertis oculis considerantem cujuscunque plantae flores, latere potest.” He divided plants into sexual and asexual, the former being Phanerogamous or flowering, and the latter Cryptogamous or flowerless. In the latter division of plants he could not detect stamens and pistils, and he did not investigate the mode in which their germs were produced. He was no physiologist, and did not promulgate any views as to the embryogenic process. His followers were chiefly engaged in the arrangement and classification of plants, and while descriptive botany made great advances the physiological department of the science was neglected. His views were not, however, adopted at once by all, for we find Charles Alston stating arguments against them in his *Dissertation on the Sexes of Plants*. Alston’s observations were founded on what occurred in certain unisexual plants, such as Mercurialis, Spinach, Hemp, Hop and Bryony. The conclusion at which he arrives is that the pollen is not in all flowering plants necessary for impregnation, for fertile seeds can be produced without its influence. He supports parthenogenesis in some plants. Soon after the promulgation of Linnaeus’s method of classification, the attention of botanists was directed to the study of Cryptogamic plants, and the valuable work of Johann Hedwig (1730-1799) on the reproductive organs of mosses made its appearance in 1782. He was one of the first to point out the existence of certain cellular bodies in these plants which appeared to perform the functions of reproductive organs, and to them the names of antheridia and pistillidia were given. This opened up a new field of research, and led the way in the study of Cryptogamic reproduction, which has since been much advanced by the labours of numerous botanical inquiries. The interesting observations of Morland, already quoted, seem to have been neglected, and no one attempted to follow in the path which he had pointed out. Botanists were for a long time content to know that the scattering of the pollen from the anther, and its application to the stigma, were necessary for the production of perfect seed, but the stages of the process of fertilization remained unexplored. The matter seemed involved in mystery, and no one attempted to raise the veil which hung over the subject of embryogeny. The general view was, that the embryo originated in the ovule, which was in some obscure manner fertilized by the pollen.

In 1815 L.C. Treviranus, professor of botany in Bonn, roused the attention of botanists to the development of the embryo, but although he made valuable researches, he did not add much in the way of new information. In 1823 G.B. Amici discovered the existence of pollen tubes, and he was followed by A.T. Brongniart and R. Brown. The latter traced the tubes as far as the nucleus of the ovule. These important discoveries mark a new epoch in embryology, and may be said to be the foundation of the views now entertained, which were materially aided by the subsequent elucidation of the process of cytogenesis, or cell-development, by Schleiden, Schwann, Mohl and others. The whole subject of fertilization and development of the embryo has been more recently investigated with great assiduity and zeal, as regards both cryptogamous and phanerogamous plants, and details must be sought in the various special articles. The observations of Darwin as to the fertilization of orchids, *Primula, Linum* and *Lythrum*, and other plants, and the part which insects take in this function, gave an explanation of the observations of Christian Konrad Sprengel, made at the close of the 18th century, and opened up a new phase in the study of botany, which has been followed by Hermann Müller, Federico Delpino and others, and more recently by Paul Knuth.

One of the earliest workers at plant physiology was Stephen Hales. In his *Statical Essays* (1727) he gave an account of numerous experiments and observations which he had made on the nutrition of plants and the movement of sap in them. He showed that the gaseous constituents of the air contribute largely to the nourishment of plants, and that the leaves are the organs which elaborate the food; the importance of leaves in nutrition had been previously pointed out by Malpighi in a short account of nutrition which forms an appendix to his anatomical work. The birth of modern chemistry in the work of J. Priestley and Lavoisier, at the close of the 18th century, made possible the scientific study of plant-nutrition, though Jan Ingenhousz in 1779 discovered that plants incessantly give out carbonic acid gas, but that the green leaves and shoots only exhale oxygen in sunlight or clear daylight, thereby indicating the distinction between assimilation of carbonic acid gas (photosynthesis) and respiration. N.T. de Saussure (1767-1845) gave precision to the science of plant-nutrition by use of quantitative methods. The subjects of plant nutrition and respiration were further studied by R.J.H. Dutrochet towards the middle of the century, and Liebig’s application of chemistry to agriculture and physiology put beyond question the parts played by the atmosphere and the soil in the nutrition of plants.

The phenomena of movements of the organs of plants attracted the attention of John Ray (1693), who

ascribed the movements of the leaf of Mimosa and others to alteration in temperature. Linnaeus also studied the periodical movements of flowers and leaves, and referred to the assumption of the night-position as the sleep-movement. Early in the 19th century Andrew Knight showed by experiment that the vertical growth of stems and roots is due to the influence of gravitation, and made other observations on the relation between the position assumed by plant organs and external directive forces, and later Dutrochet, H. von Mohl and others contributed to the advance of this phase of plant physiology. Darwin's experiments in reference to the movements of climbing and twining plants, and of leaves in insectivorous plants, have opened up a wide field of inquiry as to the relation between plants and the various external factors, which has attracted numerous workers. By the work of Julius Sachs and his pupils plant physiology was established on a scientific basis, and became an important part of the study of plants, for the development of which reference may be made to the article Plants: *Physiology*. The study of form and development has advanced under the name "morphology," with the progress of which are associated the names of K. Goebel, E. Strasburger, A. de Bary and others, while more recently, as cytology (*q.v.*), the intimate study of the cell and its contents has attracted considerable attention.

The department of geographical botany made rapid advance by means of the various scientific expeditions which have been sent to all quarters of the globe, as well as by individual effort (see Plants: *Distribution*) since the time of A. von Humboldt. The question of the mode in which the floras of islands and of continents have been formed gave rise to important speculations by such eminent botanical travellers as Charles Darwin, Sir J.D. Hooker, A.R. Wallace and others. The connexion between climate and vegetation has also been studied. Quite recently under the name of "Ecology" or "Oecology" the study of plants in relation to each other and to their environment has become the subject of systematic investigation.

The subject of palaeontological botany (see Palaeobotany) has been advanced by the researches of both botanists and geologists. The nature of the climate at different epochs of the earth's history has also been determined from the character of the flora. The works of A.T. Brongniart, H.R. Goeppert and W.P. Schimper advanced this department of science. Among others who contributed valuable papers on the subject may be noticed Oswald Heer (1809-1883), who made observations on the Miocene flora, especially in Arctic regions; Gaston de Saporta (1823-1895), who examined the Tertiary flora; Sir J.W. Dawson and Leo Lesquereux, and others who reported on the Canadian and American fossil plants. In Great Britain also W.C. Williamson, by his study of the structure of the plants of the coal-measures, opened up a new line of research which has been followed by Bertrand Renault, D.H. Scott, A.C. Seward and others, and has led to important discoveries on the nature of extinct groups of plants and also on the phylogeny of existing groups.

Botany may be divided into the following departments:—

1. Structural, having reference to the form and structure of the various parts, including (*a*) Morphology, the study of the general form of the organs and their development—this will be treated in a series of articles dealing with the great subdivisions of plants (see Angiosperms, Gymnosperms, Pteridophyta, Bryophyta, Algae, Lichens, Fungi and Bacteriology) and the more important organs (see Stem, Leaf, Root, Flower, Fruit); (*b*) Anatomy, the study of internal structure, including minute anatomy or histology (see Plants: *Anatomy*).

2. Cytology (*q.v.*), the intimate structure and behaviour of the cell and its contents—protoplasm, nucleus, &c.

3. Physiology, the study of the life-functions of the entire plant and its organs (see Plants: *Physiology*).

4. Systematic, the arrangement and classification of plants (see Plants: *Classification*).

5. Distribution or Geographical Botany, the consideration of the distribution of plants on the earth's surface (see Plants: *Distribution*).

6. Palaeontology, the study of the fossils found in the various strata of which the earth is composed (see Palaeobotany).

7. Ecology or Oecology, the study of plants in relation to each other and to their environment (see Plants: *Ecology*).

Besides these departments which deal with Botany as a science, there are various applications of botany, such as forestry (see Forests and Forestry), agriculture (*q.v.*), horticulture (*q.v.*), and materia medica (for use in medicine; see the separate articles on each plant).

(A. B. R.)

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1 Morison, *Pradudia Botanica* (1672); *Plantarum Historia Universalis* (1680).

2 Rivinus (Augustus Quirinus) paterno nomine Bachmann, *Introductio genetatis in Rem Herbariam* (Lipsiae, 1690).

3 Tournefort, *Élémens de botanique* (1694); *Institutiones Rei Herbariae* (1700).

BOTANY BAY, an inlet on the coast of Cumberland county, New South Wales, Australia, 5 m. south of the city of Sydney. On its shore is the township of Botany, forming a suburb of Sydney, with which it is connected by a tramway. It was first visited by Captain Cook in 1770, who landed at a spot marked by a monument, and took possession of the territory for the crown. The bay received its name from Joseph Banks, the botanist of the expedition, on account of the variety of its flora. When, on the revolt of the New England colonies, the convict establishments in America were no longer available (see DEPORTATION and NEW SOUTH WALES), the attention of the British government, then under the leadership of Pitt, was turned to Botany Bay; and in 1787 Commodore Arthur Phillip was commissioned to form a penal settlement there. Finding, on his arrival, however, that the locality was ill suited for such a purpose, he removed northwards to the site of the present city of Sydney. The name of Botany Bay seems to have struck the popular fancy, and continued to be used in a general way for any convict establishment in Australia. The transportation of criminals to New South Wales was discontinued in 1840.

BOTHA, LOUIS (1862-), Boer general and statesman, was the son of one of the "Voortrekkers," and was born on the 27th of September 1862 at Greytown (Natal). He saw active service in savage warfare, and in 1887 served as a field-cornet. Subsequently he settled in the Vryheid district, which he represented in the Volksraad of 1897. In the war of 1899 he served at first under Lucas Meyer in northern Natal, but soon rose to higher commands. He was in command of the Boers at the battles of Colenso and Spion Kop, and these victories earned him so great a reputation that on the death of P.J. Joubert, Botha was made commander-in-chief of the Transvaal Boers. His capacity was again demonstrated in the action of Belfast-Dalmanutha (August 23-28, 1900), and after the fall of Pretoria he reorganized the Boer resistance with a view to prolonged guerrilla warfare. In this task, and in the subsequent operations of the war, he was aided by his able lieutenants de la Rey and de Wet. The success of his measures was seen in the steady resistance offered by the Boers to the very close of the three years' war. He was the chief representative of his countrymen in the peace negotiations of 1902, after which, with de Wet and de la Rey, he visited Europe in order to raise funds to enable the Boers to resume their former avocations. In the period of reconstruction under British rule, General Botha, who was still looked upon as the leader of the Boer people, took a prominent part in politics, advocating always measures which he considered as tending to the maintenance of peace and good order and the re-establishment of prosperity in the Transvaal. After the grant of self-government to the Transvaal in 1907, General Botha was called upon by Lord Selborne to form a government, and in the spring of the same year he took part in the conference of colonial premiers held in London. During his visit to England on this occasion General Botha declared the whole-hearted adhesion of the Transvaal to the British empire, and his intention to work for the welfare of the country regardless of racial differences. (See TRANSVAAL: *History*.)

BOTHNIA, GULF OF, the northern part of the Baltic Sea (*q.v.*). The name is preserved from the former territory of Bothnia, of which the western part is now included in Sweden, the eastern in Finland.

BOTHWELL, JAMES HEPBURN, 4TH EARL OF, duke of Orkney and Shetland (*c.* 1536-1578), husband of Mary, queen of Scots, son of Patrick, 3rd earl of Bothwell, and of Agnes, daughter of Henry, Lord Sinclair, was born about 1536. His father, Patrick, the 3rd earl (*c.* 1512-1556), was the only son of Adam, the 2nd earl, who was killed at Flodden, and the grandson of Patrick (d. *c.* 1508), 3rd Lord Hailes and 1st earl of Bothwell. It was this Patrick who laid the foundation of the family fortunes. Having fought against King James III. at the battle of Sauchieburn in 1488, he was rewarded by the new king, James IV., with the earldom of Bothwell, the office of lord high admiral and other dignities. He also received many grants of land, including the lordship of Bothwell, which had been taken from John Ramsay, Lord Bothwell (d. 1513), the favourite of James III.

James Hepburn succeeded in 1556 to his father's titles, lands and hereditary offices, including that of lord high admiral of Scotland. Though a Protestant, he supported the government of Mary of Guise, showed himself violently anti-English, and led a raid into England, subsequently in 1559 meeting the English commissioners and signing articles for peace on the border. The same year he seized £1000 secretly sent by Elizabeth to the lords of the congregation. In retaliation Arran occupied and stripped his castle at Crichton, whereupon Bothwell in November sent Arran a challenge, which the latter declined. In December he was sent by the queen dowager to secure Stirling, and in 1560 was

despatched on a mission to France, visiting Denmark on the way, where he either married or seduced Anne, daughter of Christopher Thorssen, whom he afterwards deserted, and who came to Scotland in 1563 to obtain redress. He joined Mary at Paris in September, and in 1561 was sent by her as a commissioner to summon the parliament; in February he arrived in Edinburgh and was chosen a privy councillor on the 6th of September. He now entered into obligations to keep the peace with his various rivals, but was soon implicated in riots and partisan disorders, and was ordered in December to leave the city. In March 1562, having made up his quarrel with Arran, he was accused of having proposed to the latter a project for seizing the queen, and in May he was imprisoned in Edinburgh castle, whence he succeeded in escaping on the 28th of August. On the 23rd of September he submitted to the queen. Murray's influence, however, being now supreme, he embarked in December for France, but was driven by storms on to Holy Island, where he was detained, and was subsequently, on the 18th of January 1564, seized at Berwick and sent by Elizabeth to the Tower, whence he was soon liberated and proceeded to France. After these adventures he returned to Scotland in March 1565, but withdrew once more before the superior strength of his opponents to France. The same year, however, he was recalled by Mary to aid in the suppression of Murray's rebellion, successfully eluding the ships of Elizabeth sent to capture him. As lieutenant of the Marches he was employed in settling disputes on the border, but used his power to instigate thieving and disorders, and is described by Cecil's correspondents as "as naughty a man as liveth and much given to the most detestable vices," "as false as a devil," "one that the godly of this whole nation hath a cause to curse for ever."[1] In February 1566 Bothwell, in spite of his previous matrimonial engagements—and he had also been united by "handfasting" to Janet Betoun of Cranstoun Riddell—married Jane, daughter of George Gordon, 4th earl of Huntly. Notwithstanding his insulting language concerning Mary and the fact that he was the "stoutest" in refusing mass, he became one of her chief advisers, but his complete ascendancy over her mind and affections dates from the murder of Rizzio on the 9th of March 1566. The queen required a protector, whom she found, not in the feeble Darnley, nor in any of the leaders of the factions, but in the strong, determined earl who had ever been a stanch supporter of the throne against the Protestant party and English influence. In Bothwell also, "the glorious, rash and hazardous young man," romantic, handsome, charming even in his guilt, Mary gained what she lacked in her husband, a lover. He now stood forth as her champion; Mary took refuge with him at Dunbar, presented him, among other estates, with the castle there and the chief lands of the earldom of March, and made him the most powerful noble in the south of Scotland. Her partiality for him increased as her contempt and hatred of Darnley became more confirmed. On the 7th of October he was dangerously wounded, and the queen showed her anxiety for his safety by riding 40 miles to visit him, incurring a severe illness. In November she visited him at Dunbar, and in December took place the conference at Craigmillar at which both were present, and at which the disposal of Darnley was arranged, Bothwell with some others subsequently signing the bond to accomplish his murder. He himself superintended all the preparations, visiting Darnley with Mary on the night of the crime, Sunday, 9th of February 1567, attending the queen on her return to Holyrood for the ball, and riding back to Kirk o' Field to carry out the crime. After the explosion he hurried back to Holyrood and feigned surprise at the receipt of the news half an hour later, ascribing the catastrophe to "the strangest accident that ever chancit, to wit, the fouder (lightning) came out of the luft (sky) and had burnt the king's house."[2]

Bothwell's power was now greater, and the queen's affection for him more ardent than ever. She was reported to have said that she cared not to lose France, England and her own country for him, and would go with him to the world's end in a white petticoat ere she left him.[3] He was gratified with further rewards, and his success was clouded by no stings of conscience or remorse. According to Melville he had designs on the life of the young prince. On the demand of Lennox, Darnley's father, Bothwell was put upon his trial in April, but Lennox, having been forbidden to enter the city with more than six attendants, refused to attend, and Bothwell was declared not guilty. The queen's intention to marry Bothwell, which had been kept a strict secret before the issue of the trial, was now made public. On the 19th of April he obtained the consent and support of the Protestant lords, who signed a bond in his favour. On the 24th he seized Mary's willing person near Edinburgh, and carried her to his castle at Dunbar. On the 3rd of May Bothwell's divorce from his wife was decreed by the civil court, on the ground of his adultery with a maidservant, and on the 7th by the Roman Catholic court on the ground of consanguinity. Archbishop Hamilton, however, who now granted the decree, had himself obtained a papal dispensation for the marriage,[4] and in consequence it is extremely doubtful whether according to the Roman Catholic law Bothwell and Mary were ever husband and wife. On the 12th Bothwell was created duke of Orkney and Shetland and the marriage took place on the 15th according to the Protestant usage, the Roman Catholic rite being performed, according to some accounts, afterwards in addition.[5]

Bothwell's triumph, however, was shortlived. The nobles, both Protestant and Roman Catholic, now immediately united to effect his destruction. In June Mary and Bothwell fled from Holyrood to Borthwick Castle, whence Bothwell, on the place being surrounded by Morton and his followers, escaped to Dunbar, Mary subsequently joining him. Thence they marched with a strong force towards Edinburgh, meeting the lords on the 15th of June at Carberry Hill. Bothwell invited any one of the nobles to single combat, but Mary forbade the acceptance of the challenge. Meanwhile, during the negotiations, the queen's troops had been deserting; a surrender became inevitable, and Bothwell returned to Dunbar, parting from Mary for ever. Subsequently Bothwell left Dunbar for the north, visited Orkney and Shetland, and in July placed himself at the head of a band of pirates, and after eluding all attempts to capture him, arrived at Karm Sound in Norway. Here he was confronted by his first wife or victim, Anne Thorssen, whose claims he satisfied by the gift of a ship and promises of an annuity, and on his identity becoming known he was sent by the authorities to Copenhagen, where he

arrived on the 30th of September. He wrote *Les Affaires du comte de Boduel*, exhibiting himself as the victim of the malice of his enemies, and gained King Frederick II.'s goodwill by an offer to restore the Orkneys and Shetlands to Denmark. In consequence the king allowed him to remain at Copenhagen, and refused all requests for his surrender. In January 1568 he was removed to Malmoe in Sweden. He corresponded frequently with Mary, but there being no hopes whatever of his restoration, and a new suitor being found in the duke of Norfolk, Mary demanded a divorce, on pleas which recall those of Henry VIII. in the matter of Catherine of Aragon. The divorce was finally granted by the pope in September 1570 on the ground of her prenuptial ravishment by Bothwell,[6] and met with no opposition from the latter. After the downfall of Mary, Bothwell's good treatment came to an end, and on the 16th of June 1573 he was removed to the castle of Dragsholm or Adelersborg in Zealand. Here the close and solitary confinement, and the dreary and hopeless inactivity to which he was condemned, proved a terrible punishment for the full-blooded, energetic and masterful Bothwell. He sank into insanity, and died on the 14th of April 1578. He was buried at the church of Faareveille, where a coffin, doubtfully supposed to be his, was opened in 1858. A portrait was taken of the head of the body found therein, now in the museum of the Society of Antiquaries in Scotland. His so-called death-bed confession is not genuine.

He left no lawful descendants; but his nephew, Francis Stewart Hepburn, who, through his father, John Stewart, prior of Coldingham, was a grandson of King James V., and was thus related to Mary, queen of Scots, and the regent Murray, was in 1581 created earl of Bothwell. He was lord high admiral of Scotland, and was a person of some importance at the court of James VI. during the time when the influence of the Protestants was uppermost. He was anxious that Mary Stuart's death should be avenged by an invasion of England, and in 1589 he suffered a short imprisonment for his share in a rising. By this time he had completely lost the royal favour. Again imprisoned, this time on a charge of witchcraft, he escaped from captivity in 1591, and was deprived by parliament of his lands and titles; as an outlaw his career was one of extraordinary lawlessness. In 1591 he attempted to seize Holyrood palace, and in 1593 he captured the king, forcing from him a promise of pardon. But almost at once he reverted to his former manner of life, and, although James failed to apprehend him, he was forced to take refuge in France about 1595. He died at Naples before July 1614. This earl had three sons, but his titles were never restored.

Bibliography.—See the article in the *Dict. of Nat. Biog.* and authorities; *Les Affaires du comte de Boduel* (written January 1568, publ. Bannatyne Club, 1829); "Memoirs of James, Earl of Bothwell," in G. Chalmers's *Life of Mary, Queen of Scots* (1818); *Life of Bothwell*, by F. Schiern (trans. 1880); *Pièces et documents relatifs au comte de Bothwell*, by Prince A. Lobanoff (1856); *Appendix to the Hist. of Scotland*, by G. Buchanan (1721); *Sir James Melville's Memoirs* (Bannatyne Club, 1827); *A Lost Chapter in the Hist. of Mary, Queen of Scots*, by J. Stuart (1874); J.H. Burton's *Hist. of Scotland* (1873); A. Lang's *Hist. of Scotland*, ii. (1902); *Archaeologia*, xxxviii. 308; *Cal. of State Papers, Foreign, Scottish, Venetian*, vii; *Exchequer Rolls of Scotland*, xix. and xx., *Domestic, Border Papers*; *Hist. MSS. Comm., MSS. of Marq. of Salisbury*, i. ii. See also Mary, Queen of Scots.

(P. C. Y.)

1 *Cal. of State Papers, Scottish, i. 679.*

2 *Sir James Melville's Mem. 174.*

3 *Cal. of State Pap., Foreign, 1566-1568*, p. 212.

4 *Hist. MSS. Comm.* Rep. ii. p. 177.

5 *Cal. of State Pap., Scottish*, ii. 333.

6 *Cal. of State Pap., Foreign, 1569-1571*, p. 372.

BOTHWELL, a town of Lanarkshire, Scotland. Pop. of town (1901) 3015; of parish (1901) 45,905. The town lies on the right bank of the Clyde, 9 m. E.S.E. of Glasgow by the North British and Caledonian railways. Owing to its pleasant situation it has become a residential quarter of Glasgow. The choir of the old Gothic church of 1398 (restored at the end of the 19th century) forms a portion of the parish church. Joanna Baillie, the poetess, was born in the manse, and a memorial has been erected in her honour. The river is crossed by a suspension bridge as well as the bridge near which, on the 22nd of June 1679, was fought the battle of Bothwell Bridge between the Royalists, under the duke of Monmouth, and the Covenanters, in which the latter lost 500 men and 1000 prisoners. Adjoining this bridge, on the level north-eastern bank, is the castle that once belonged to James Hamilton of Bothwellhaugh (fl. 1566-1580), the assassin of the regent Murray; and near the present farmhouse the South Calder is spanned by a Roman bridge. The picturesque ruins of Bothwell Castle occupy a conspicuous position on the side of the river, which here takes the bold sweep famed in Scottish song as Bothwell bank. The fortress belonged to Sir Andrew Moray, who fell at Stirling in 1297, and passed by marriage to the Douglases. The lordship was bestowed in 1487 on Patrick Hepburn, 3rd Lord Hailes, 1st earl of Bothwell, who resigned it in 1491 in favour of Archibald Douglas, 5th earl of Angus. It thus reverted to the Douglases and now belongs to the earl of Home, a descendant. The castle is a fine example of Gothic, and mainly consists of a great oblong quadrangle, flanked on the south side by circular towers. At the east end are the remains of the chapel. A dungeon bears the nickname of "Wallace's Beef Barrel." The unpretending

mansion near by was built by Archibald Douglas, 1st earl of Forfar (1653-1712). The parish of Bothwell contains several flourishing towns and villages, all owing their prosperity to the abundance of coal, iron and oil-shale. The principal places, most of which have stations on the North British or Caledonian railway or both, are Bothwell Park, Carfin, Chapelhall, Bellshill (pop. 8786), Holytown, Mossend, Newarthill, Uddingston (pop. 7463), Clydesdale, Hamilton Palace, Colliery Rows and Tennochside.

BOTOCUDOS (from Port. *botoque*, a plug, in allusion to the wooden disks or plugs worn in their lips and ears), the foreign name for a tribe of South American Indians of eastern Brazil, also known as the Aimores or Aimbores. They appear to have no collective tribal name for themselves. Some are called Nac-nanuk or Nac-poruk, "sons of the soil." The name Botocudos cannot be traced much farther back than the writings of Prince Maximilian von Neuwied (*Reise nach Bresilien*, Frankfort-On-Main, 1820). When the Portuguese adventurer Vasco Fernando Coutinho reached the east coast of Brazil in 1535, he erected a fort at the head of Espirito Santo Bay to defend himself against "the Aimores and other tribes." The original home of the tribe comprised most of the present province of Espirito Santo, and reached inland to the headwaters of Rio Grande (Belmonte) and Rio Doce on the eastern slopes of the Serra do Espinhacao, but the Botocudos are now mainly confined to the country between Rio Pardo and Rio Doce, and seldom roam westward beyond Serra dos Aimores into Minas Geraes. It was in the latter district that at the close of the 18th century they came into collision with the whites, who were attracted thither by the diamond fields.

The Botocudos are nomads, wandering naked in the woods and living on forest products. They are below the medium height, but broad-shouldered and remarkable for the muscular development and depth of their chests. Their arms and legs are, however, soft and fleshy, and their feet and hands small. Their features, which vary individually almost as much as those of Europeans, are broad and flat, with prominent brow, high cheek-bones, small bridgeless nose, wide nostrils and slight projection of the jaws. They are longheaded, and their hair is coarse, black and lank. Their colour is a light yellowish brown, sometimes almost approaching white. The general yellow tint emphasizes their Mongolic appearance, which all travellers have noticed. The Botocudos were themselves greatly struck by the Chinese coolies, whom they met in Brazilian seaports, and whom they at once accepted as kinsmen (Henri Hollard, *De l'homme et des races humaines*, Paris, 1853).[1] Some few Botocudos have settled and become civilized, but the great bulk of them, numbering between twelve and fourteen thousand, are still the wildest of savages. During the earlier frontier wars (1790-1820) every effort was made to extirpate them. They were regarded by the Portuguese as no better than wild beasts. Smallpox was deliberately spread among them; poisoned food was scattered in the forests; by such infamous means the coast districts about Rios Doce and Belmonte were cleared, and one Portuguese commander boasted that he had either slain with his own hands or ordered to be butchered many hundreds of them. Their implements and domestic utensils are all of wood; their only weapons are reed spears and bows and arrows. Their dwellings are rough shelters of leaf and bast, seldom 4 ft. high. So far as the language of the Botocudos is known, it would appear that they have no means of expressing the numerals higher than one. Their only musical instrument is a small bamboo nose-flute. They attribute all the blessings of life to the "day-fire" (sun) and all evil to "night-fire" (moon). At the graves of the dead they keep fires burning for some days to scare away evil spirits, and during storms and eclipses arrows are shot into the sky to drive away demons.

The most conspicuous feature of the Botocudos is the *tembeitera*, or wooden plug or disk which is worn in the lower lip and the lobe of the ear. This disk, made of the specially light and carefully dried wood of the barriguda tree (*Chorisia ventricosa*), is called by the natives themselves *emburé*, whence Augustin Saint Hilaire suggests the probable derivation of their name Aimbore (*Voyages dans l'intérieur du Brésil 1816-1821*, Paris, 1830). It is worn only in the under-lip, now chiefly by women, but formerly by men also. The operation for preparing the lip begins often as early as the eighth year, when an initial boring is made by a hard pointed stick, and gradually extended by the insertion of larger and larger disks or plugs, sometimes at last as much as 3 in. in diameter. Notwithstanding the lightness of the wood the *tembeitera* weighs down the lip, which at first sticks out horizontally and at last becomes a mere ring of skin around the wood. Ear-plugs are also worn, of such size as to distend the lobe down to the shoulders. Ear-ornaments of like nature are common in south and even central America, at least as far north as Honduras. When Columbus discovered this latter country during his fourth voyage (1502) he named part of the seaboard *Costa de la Oreja*, from the conspicuously distended ears of the natives. Early Spanish explorers also gave the name *Orejones* or "big-eared" to several Amazon tribes.

See A.R. Wallace, *Travels on the Amazon* (1853-1900); H.H. Bancroft, *Hist. of Pacific States* (San Francisco, 1882), vol. i. p. 211; A.H. Keane, "On the Botocudos" in *Journ. Anthrop. Instit.* vol. xiii. (1884); J.R. Peixoto, *Novos Estudios Craniologicos sobre os Botocuds* (Rio Janeiro, 1882); Prof. C.F. Hartt, *Geology and Physical Geography of Brazil* (Boston, 1870), pp. 577-606.

1 A parallel case is that of the Bashkir soldiers of Orenburg, who formed part of the Russian army sent to put down the Hungarian revolt of 1848, and who recognized their Ugrian kinsmen in the Zeklars and other Magyars settled in the Danube basin.

BOTORI, a Japanese game played at the naval, military and other schools, by two sides of equal number, usually about one hundred, each of which defends a pole about 8 ft. high firmly set in the ground, the poles being about 200 yds. distant from each other. The object of each party is to overthrow the adversaries' pole while keeping their own upright. Pulling, hauling and wrestling are allowed, but no striking or kicking. The players resort to all kinds of massed formations to arrive at the enemies' pole, and frequently succeed in passing over their heads and shoulders one or more comrades, who are thus enabled to reach the pole and bear it down unless pulled off in time by its defenders. A game similar in character is played by the Sophomore and Freshman classes of Amherst College (Massachusetts), called the "Flag-rush." It was instituted at the instance of the faculty to take the place of the traditional "Cane-rush," a general *mêlée* between the two classes for the ultimate possession of a stout walking-stick, which became so rough that students were frequently seriously injured. In the "Flag-rush" a small flag is set upon a padded post about 6 ft. high, and is defended by one class while the other endeavours, as at Botori, to overthrow it. If the flag is not captured or torn down within a certain time the defending side wins.

BOTOSHANI (*Botoşani*), the capital of the department of Botoshani, Rumania; on a small tributary of the river Jijia, and in one of the richest agricultural and pastoral regions of the north Moldavian hills. Pop. (1900) 32,193. Botoshani is commercially important as the town through which goods from Poland and Galicia pass in transit for the south; being situated on a branch railway between Dorohoi and on the main line from Czernowitz to Galatz. It has extensive starch and flour mills; and Botoshani flour is highly prized in Rumania, besides being largely exported to Turkey and the United Kingdom. Botoshani owes its name to a Tatar chief, Batus or Batu Khan, grandson of Jenghiz Khan, who occupied the country in the 13th century. There are large colonies of Armenians and Jews.

BO-TREE, or Bodhi-tree, the name given by the Buddhists of India and Ceylon to the Pipul or sacred wild fig (*Ficus religiosa*). It is regarded as sacred, and one at least is planted near each temple. These are traditionally supposed to be derived from the original one, the Bodhi-tree of Buddhist annals, beneath which the Buddha is traditionally supposed to have attained perfect knowledge. The Bo-tree at the ruined city of Anuradhapura, 80 m. north of Kandy, grown from a branch of the parent-tree sent to Ceylon from India by King Asoka in the 3rd century B.C., is said to have been planted in 288 B.C., and is to this day worshipped by throngs of pilgrims who come long distances to pray before it. Usually a bo-tree is planted on the graves of the Kandy priests.

BOTRYTIS, a minute fungus which appears as a brownish-grey mould on decaying vegetation or on damaged fruits. Under a hand-lens it is seen to consist of tiny, upright, brown stalks which are branched at the tips, each branchlet being crowned with a naked head of pale-coloured spores. It is a very common fungus, growing everywhere in the open or in greenhouses, and can be found at almost any season. It has also a bad record as a plant disease. If it once gains entrance into one of the higher plants, it spreads rapidly, killing the tissues and reducing them to a rotten condition. Seedling pines, lilies and many other cultivated plants are subject to attack by *Botrytis*, Some of the species exist in two other growth-forms, so different in appearance from the *Botrytis* that they have been regarded as distinct plants:—a sclerotium, which is a hard compact mass of fungal filaments, or mycelium, that can retain its vitality for a considerable time in a resting condition; and a stalked *Peziza*, or cup-fungus, which grows out of the sclerotium. The latter is the perfect form of fruit. The *Botrytis* mould is known as the conidial form.

BOTTA, CARLO GIUSEPPE GUGLIELMO (1766-1837), Italian historian, was born at San Giorgio Canavese in Piedmont. He studied medicine at the university of Turin, and obtained his doctor's degree when about twenty years of age. Having rendered himself obnoxious to the government during the political commotions that followed the French Revolution, he was imprisoned for over a year; and on his release in 1795 he withdrew to France, only to return to his native country as a surgeon in the French army, whose progress he followed as far as Venice. Here he joined the expedition to Corfu, from which

he did not return to Italy till 1798. At first he favoured French policy in Italy, contributed to the annexation of Piedmont by France in 1799, and was an admirer of Napoleon; but he afterwards changed his views, realizing the necessity for the union of all Italians and for their freedom from foreign control. After the separation of Piedmont from France in 1814 he retired into private life, but, fearing persecution at home, became a French citizen. In 1817 he was appointed rector of the university of Rouen, but in 1822 was removed owing to clerical influence. Amid all the vicissitudes of his early manhood Botta had never allowed his pen to be long idle, and in the political quiet that followed 1816 he naturally devoted himself more exclusively to literature. In 1824 he published a history of Italy from 1789 to 1814 (4 vols.), on which his fame principally rests; he himself had been an eyewitness of many of the events described. His continuation of Guicciardini, which he was afterwards encouraged to undertake, is a careful and laborious work, but is not based on original authorities and is of small value. Though living in Paris he was in both these works the ardent exponent of that recoil against everything French which took place throughout Europe. A careful exclusion of all Gallicisms, as a reaction against the French influences of the day, is one of the marked features of his style, which is not infrequently impassioned and eloquent, though at the same time cumbrous, involved and ornate. Botta died at Paris in August 1837, in comparative poverty, but in the enjoyment of an extensive and well-earned reputation.

His son, Paul Émile Botta (1802-1870), was a distinguished traveller and Assyrian archaeologist, whose excavations at Khorsabad (1843) were among the first efforts in the line of investigation afterwards pursued by Layard.

The works of Carlo Botta are *Storia naturale e medica dell' Isola di Corfu* (1798); an Italian translation of Born's *Joannis Physiophili specimen monachologiae* (1801); *Souvenirs d'un voyage en Dalmatie* (1802); *Storia della guerra dell' Independenza d'America* (1809); *Camillo*, a poem (1815); *Storia d'Italia dal 1789 al 1814* (1824, new ed., Prato, 1862); *Storia d'Italia in continuazione al Guicciardini* (1832, new ed., Milan, 1878). See C. Dionisiotti, *Vita di Carlo Botta* (Turin, 1867); C. Pavesio, *Carlo Botta e le sue opere storiche* (Florence, 1874); Scipione Botta, *Vita privata di Carlo Botta* (Florence, 1877); A. d'Ancona c O. Bacci, *Manuela della Letteratura Italiana* (Florence, 1894), vol. v. pp. 245 seq.

BOTTESINI, GIOVANNI (1823-1889), Italian contrabassist and musical composer, was born at Crema in Lombardy on the 24th of December 1823. He studied music at the Milan Conservatoire, devoting himself especially to the double-bass, an instrument with which his name is principally associated. On leaving Milan he spent some time in America and also occupied the position of principal double-bass in the theatre at Havana. Here his first opera, *Cristoforo Colombo*, was produced in 1847. In 1849 he made his first appearance in England, playing double-bass solos at one of the Musical Union concerts. After this he made frequent visits to England, and his extraordinary command of his unwieldy instrument gained him great popularity in London and the provinces. Apart from his triumphs as an executant, Bottesini was a conductor of European reputation, and earned some success as a composer, though his work had not sufficient individuality to survive the changes of taste and fashion. He was conductor at the Théâtre des Italiens in Paris from 1855 to 1857, where his second opera, *L'Assedio di Firenze*, was produced in 1856. In 1861 and 1862 he conducted at Palermo, supervising the production of his opera *Marion Delorme* in 1862, and in 1863 at Barcelona. During these years he diversified the toils of conducting by repeated concert tours through the principal countries of Europe. In 1871 he conducted a season of Italian opera at the Lyceum theatre in London, during which his opera *Ali Baba* was produced, and at the close of the year he was chosen by Verdi to conduct the first performance of *Aïda*, which took place at Cairo on 27th December 1871. Bottesini wrote three operas besides those already mentioned: *Il Diavolo della Notte* (Milan, 1859); *Vinciguerra* (Paris, 1870); and *Ero e Leandro* (Turin, 1880), the last named to a libretto by Arrigo Boito, which was subsequently set by Mancinelli. He also wrote *The Garden of Olivet*, a devotional oratorio (libretto by Joseph Bennett), which was produced at the Norwich festival in 1887, a concerto for the double-bass, and numerous songs, and minor instrumental pieces. Bottesini died at Parma on the 7th of July 1889.

BOTTICELLI, SANDRO, properly Alessandro di Mariano dei Filipepi (1444-1510). Florentine painter, was born at Florence in 1444, in a house in the Via Nuova, Borg' Ognissanti. This was the home of his father, Mariano di Vanni dei Filipepi, a struggling tanner. Sandro, the youngest child but one of his parents, derived the name Botticelli, by which he was commonly known, not, as related by Vasari, from a goldsmith to whom he was apprenticed, but from his eldest brother Giovanni, a prosperous broker, who seems to have taken charge of the boy, and who for some reason bore the nickname *Botticello* or Little Barrel. A return made in 1457 by his father describes Sandro as aged thirteen, weak in health, and still at school (if the words *sta al legare* are to be taken as a misspelling of *sta al leggere*, otherwise they might perhaps mean that he was apprenticed either to a jeweller or a bookbinder). One of his elder brothers, Antonio, who afterwards became a bookseller, was at this time in business as a goldsmith and

gold-leaf-beater, and with him Sandro was very probably first put to work. Having shown an irrepressible bent towards painting, he was apprenticed in 1458-1459 to Fra Filippo Lippi, in whose workshop he remained as an assistant apparently until 1467, when the master went to carry out a commission for the decoration with frescoes of the cathedral church of Spoleto. During his apprentice years Sandro was no doubt employed with other pupils upon the great series of frescoes in the choir of the Pieve at Prato upon which his master was for long intermittently engaged. The later among these frescoes in many respects anticipate, by charm of sentiment, animation of movement and rhythmic flutter of draperies, some of the prevailing characteristics of Sandro's own style. One of Sandro's earliest extant pictures, the oblong "Adoration of the Magi" at the National Gallery, London (No. 592, long ascribed in error to Filippino), shows him almost entirely under the influence of his first master. Left in Florence on Fra Filippo's departure to Spoleto, he can be traced gradually developing his individuality under various influences, among which that of the realistic school of the Pollaiuoli is for some time the strongest. From that school he acquired a knowledge of bodily structure and movement, and a searching and expressive precision of linear draughtsmanship, which he could never have learnt from his first master. The Pollaiuolo influence dominates, with some slight admixture of that of Verrocchio, in the fine figure of Fortitude, now in the Uffizi, which was painted by Botticelli for the Mercanzia about 1470; this is one of a series of the seven Virtues, of which the other six, it seems, were executed by Piero Pollaiuolo from the designs of his brother Antonio. The same influence is again very manifest in the two brilliant little pictures at the Uffizi in which the youthful Botticelli has illustrated the story of Judith and Holofernes; in his injured portrait of a man holding a medal of Cosimo de' Medici, No. 1286 at the Uffizi; and in his life-sized "St Sebastian" at Berlin, which we know to have been painted for the church of Sta Maria Maggiore in 1473. Tradition and internal evidence seem also to point to Botticelli's having occasionally helped, in his earliest or Pollaiuolo period, to furnish designs to the school of engravings in Florence which had been founded by the goldsmith Maso Finiguerra.

Some authorities hold that he must have attended for a while the much-frequented workshop of Verrocchio. But the "Fortitude" is the only authenticated early picture in which the Verrocchio influence is really much apparent; the various other pictures on which this opinion is founded, chiefly Madonnas dispersed among the museums of Naples, Florence, Paris and elsewhere, have been shown to be in all probability the work not of Sandro himself, but of an anonymous artist, influenced partly by him and partly by Verrocchio, whose individuality it has been endeavoured to reconstruct under the provisional name of Amico di Sandro. At the same time we know that the young Botticelli stood in friendly relations with some of the pupils in Verrocchio's workshop, particularly with Leonardo da Vinci. Among the many "Madonnas" which bear Botticelli's name in galleries public and private, the earliest which carries the unmistakable stamp of his own hand and invention is that which passed from the Chigi collection at Rome to that of Mrs Gardner at Boston. At the beginning of 1474 he entered into an agreement to work at Pisa, both in the Campo Santo and in the chapel of the Incoronata in the Duomo, but after spending some months in that city abandoned the task, we know not why. Next in the order of his preserved works comes probably the much-injured round of the "Adoration of the Magi" in the National Gallery (No. 1033), long ascribed in error, like the earlier oblong panel of the same subject, to Filippino Lippi. (To about this date is assigned by some the well-known "Assumption of the Virgin surrounded with the heavenly hierarchies," formerly at Hamilton Palace and now in the National Gallery [No. 1126]; but recent criticism has proved that the tradition is mistaken which since Vasari's time has ascribed this picture to Botticelli, and that it is in reality the work of a subordinate painter somewhat similarly named, Francesco Botticini.)

A more mature and more celebrated "Adoration of the Magi" than either of those in the National Gallery is that now in the Uffizi, which Botticelli painted for Giovanni Lami, probably in 1477, and which was originally placed over an altar against the front wall of the church of Sta Maria Novella to the right inside the main entrance. The scene is here less crowded than in some other of the master's representations of the subject, the conception entirely sane and masculine, with none of those elements of bizarre fantasy and over-strained sentiment to which he was sometimes addicted and which his imitators so much exaggerated; the execution vigorous and masterly. The picture has, moreover, special interest as containing lifelike portraits of some of the chief members of the Medici family. Like other leading artists of his time in Florence, Botticelli had already begun to profit by the patronage of this family. For the house of Lorenzo Il Magnifico in the Via Larga he painted a decorative piece of Pallas with lance and shield (not to be confounded with the banner painted with a similar allegoric device of Pallas by Verrocchio, to be carried by Giuliano de' Medici in the famous tournament in 1475 in which he wore the favour of La Bella Simonetta, the wife of his friend Marco Vespucci). This Pallas by Botticelli is now lost, as are several other decorative works in fresco and panel recorded to have been done by him for Lorenzo Il Magnifico between 1475 and Lorenzo's death in 1492. But Sandro's more especial patron, for whom were executed several of his most important still extant works, was another Lorenzo, the son of Pierfrancesco de' Medici, grandson of a natural brother of Cosimo *Pater Patriae*, and inheritor of a vast share of the family estates and interests. For the villa of this younger Lorenzo at Castello Botticelli painted about 1477-1478 the famous picture of "Primavera" or Spring now in the Academy at Florence. The design, inspired by Poliziano's poem the "Giostra," with reminiscences of Lucretius and of Horace (perhaps also, as has lately been suggested, of the late Latin "Mythologikon" of Fulgentius) thrown in, is of an enchanting fantasy, and breathes the finest and most essential spirit of the early Renaissance at Florence. Venus fancifully draped, with Cupid hovering above her, stands in a grove of orange and myrtle and welcomes the approach of Spring, who enters heralded by Mercury, with Flora and Zephyrus gently urging her on. In pictures like this and in the later "Birth of Venus," the Florentine genius, brooding with passion on the little that it really yet knew of the antique, and using frankly and freshly the much that it was daily learning of the truths of bodily structure and action, creates a style

wholly new, in which something of the strained and pining mysticism of the middle ages is intimately and exquisitely blended with the newly awakened spirit of naturalism and the revived pagan delight in bodily form and movement and richness of linear rhythm. In connexion with this and other classic and allegoric pictures by the master, much romantic speculation has been idly spent on the supposition that the chief personages were figured in the likeness of Giuliano de' Medici and Simonetta Vespucci. Simonetta in point of fact died in 1476, Giuliano was murdered in 1478; the web of romance which has been spun about their names in modern days is quite unsubstantial; and there is no reason whatever why Botticelli should have introduced the likenesses of these two supposed lovers (for it is not even certain that they were lovers at all) in pictures all of which were demonstrably painted after the death of one and most of them after the death of both.

The tragedy of Giuliano's assassination by the Pazzi conspirators in 1478 was a public event which certainly brought employment to Botticelli. After the capture and execution of the criminals he was commissioned to paint their effigies hanging by the neck on the walls of the Palazzo del Podestà, above the entrance of what was formerly the Dogana. In the course of Florentine history public buildings had on several previous occasions received a similar grim decoration: the last had been when Andrea del Castagno painted in 1434 the effigies, hanging by the heels, of the chief citizens outlawed and expelled on the return of Cosimo de' Medici. Perhaps from the time of this Pazzi commission may be dated the evidences which are found in some of Botticelli's work of a closer study than heretofore of the virile methods and energetic types of Castagno. His frescoes of the hanged conspirators held their place for sixteen years only, and were destroyed in 1494 in consequence of another revolution in the city's politics. Two years later (1480) he painted in rivalry with Ghirlandaio a grand figure of St Augustine on the choir screen of the Ognissanti; now removed to another part of the church. About the same time we find clear evidence of his contributing designs to the workshops of the "fine-manner" engravers in the shape of a beautiful print of the triumph of Bacchus and Ariadne adapted from an antique sarcophagus (the only example known is in the British Museum), as well as in nineteen small cuts executed for the edition of Dante with the commentary of Landino printed at Florence in 1481 by Lorenzo della Magna. This series of prints was discontinued after canto xix., perhaps because of the material difficulties involved by the use of line engravings for the decoration of a printed page, perhaps because the artist was at this time called away to Rome to undertake the most important commission of his life. Due possibly to the same call is the unfinished condition of a much-damaged, crowded "Adoration of the Magi" by Botticelli preserved in the Uffizi, the design of which seems to have influenced Leonardo da Vinci in his own Adoration (which in like manner remains unfinished) of nearly the same date, also at the Uffizi.

The task with which Botticelli was charged at Rome was to take part with other leading artists of the time (Ghirlandaio, Cosimo Rosselli, Perugino and Pinturicchio) in the decoration of Sixtus IV.'s chapel at the Vatican, the ceiling of which was afterwards destined to be the field of Michelangelo's noblest labours. Internal evidence shows that Sandro and his assistants bore a chief share in the series of papal portraits which decorate the niches between the windows. His share in the decoration of the walls with subjects from the Old and the New Testament consists of three frescoes, one illustrating the history of Moses (several episodes of his early life arranged in a single composition); another the destruction of Korah, Dathan and Abiram; a third the temptation of Christ by Satan (in this case the main theme is relegated to the background, while the foreground is filled with an animated scene representing the ritual for the purification of a leper). On these three frescoes Botticelli laboured for about a year and a half at the height of his powers, and they may be taken as the central and most important productions of his career, though they are far from being the best-known, and from their situation on the dimmed and stained walls of the chapel are by no means easy of inspection. Skill in the interlinking of complicated groups; in the principal actors energy of dramatic action and expression not yet overstrained, as it came to be in the artist's later work; an incisive vigour of portraiture in the personages of the male bystanders; in the faces and figures of the women an equally vital grasp of the model, combined with that peculiar strain of haunting and melancholy grace which is this artist's own; the most expressive care and skill in linear draughtsmanship, the richest and most inventive charm in fanciful costume and decorative colouring, all combine to distinguish them. During this time of his stay in Rome (1481-1482) Botticelli is recorded also to have painted another "Adoration of the Magi," his fifth or sixth embodiment of the same subject; this has been identified, no doubt rightly, with a picture now in the Hermitage gallery at St Petersburg.

Returning to Florence towards the end of 1482, Botticelli worked there for the next ten years, until the death of Lorenzo Il Magnifico in 1492, with but slight variations in manner and sentiment, in the now formed manner of his middle life. Some of the recorded works of this time have perished; but a good many have been preserved, and except in the few cases where the dates of commission and payment can be established by existing records, their sequence can only be conjectured from internal evidence. A scheme of work which he was to have undertaken with other artists in the Sala dei Gigli in the Palazzo Pubblico came to nothing (1483); a set of important mythologic frescoes carried out by him in the vestibule of a villa of Lorenzo Il Magnifico at Spedaletto near Volterra in 1484 has been destroyed by the effects first of damp and then of fire. To 1482-1483 belongs the fine altar-piece of San Barnabo (a Madonna and Child with six saints and four angels), now in the academy at Florence. Very nearly of the same time must be the most popular and most often copied, though very far from the best-preserved, of his works, the round picture of the Madonna with singing angels in the Uffizi, known, from the text written in the open choir-book, as the "Magnificat." Somewhere near this must be placed the beautiful and highly finished drawing of "Abundance," which has passed through the Rogers, Morris Moore and Malcolm collections into the British Museum, as well as a small Madonna in the Poldi-Pezzoli collection at Milan, and the fine full-faced portrait of a young man, probably some pupil or apprentice in the

studio, at the National Gallery (No. 626). For the marriage of Antonio Pucci to Lucrezia Dini in 1483 Botticelli designed, and his pupils or assistants carried out, the interesting and dramatic set of four panels illustrating Boccaccio's tale of Nastagio degl'Onesti, which were formerly in the collection of Mr Barker and are now dispersed. His magnificent and perfectly preserved altar-piece of the Madonna between the two saints John, now in the Berlin gallery, was painted for the Bardi chapel in the church of San Spirito in 1486. In the same year he helped to celebrate the marriage of Lorenzo Tornabuoni with Giovanna degli Albizzi by an exquisite pair of symbolical frescoes, the remains of which, after they had been brought to light from under a coat of whitewash on the walls of the Villa Lemmi, were removed in 1882 to the Louvre. Within a few years of the same date (1485-1488) should apparently be placed that second masterpiece of fanciful classicism done for Lorenzo di Pierfrancesco's villa at Castello, the "Birth of Venus," now in the Uffizi, the design of which seems to have been chiefly inspired by the "Stanze" of Poliziano, perhaps also by the *Pervigilium Veneris*; together with the scarcely less admirable "Mars and Venus" of the National Gallery, conceived in the master's peculiar vein of virile sanity mingled with exquisite caprice; and the most beautiful and characteristic of all his Madonnas, the round of the "Virgin with the Pomegranate" (Uffizi). The fine picture of "Pallas and the Centaur," rediscovered after an occultation of many years in the private apartments of the Pitti Palace, would seem to belong to about 1488, and to celebrate the security of Florentine affairs and the quelling of the spirit of tumult in the last years of the power of the great Lorenzo (1488-1490). "The Annunciation" from the convent of Cestello, now in the Uffizi, shows a design adapted from Donatello, and expressive, in its bending movements and vehement gestures, of that agitation of spirit the signs of which become increasingly perceptible in Botticelli's work from about this time until the end. The great altar-piece at San Marco with its *predelle*, commissioned by the Arte della Seta in 1488 and finished in 1490, with the incomparable ring of dancing and quiring angels encircling the crowned Virgin in the upper sky, is the last of Botticelli's altar-pieces on a great scale. To nearly the same date probably belongs his deeply felt and beautifully preserved small painting of the "Last Communion of St Jerome" belonging to the Marchese Farinola.

In 1490 Botticelli was called to take part with other artists in a consultation as to the completion of the façade of the Duomo, and to bear a share with Alessio Baldovinetti and others in the mosaic decorations of the chapel of San Zenobio in the same church. The death of Lorenzo Il Magnifico in 1492, and the accession to chief power of his worthless son Piero, soon plunged Florence into political troubles, to which were by and by added the profound spiritual agitation consequent upon the preaching and influence of Savonarola. Lorenzo di Pierfrancesco de' Medici, who with his brother Giovanni was in a position of political rivalry against their cousin Piero, continued his patronage of Botticelli; and it was for him, apparently chiefly between the years 1492 and 1495, that the master undertook to execute a set of drawings in illustration of Dante on a far more elaborate and ambitious plan than the little designs for the engraver which had been interrupted in 1481. Eighty-five of these drawings are in the famous manuscript acquired for the Berlin museum at the sale of the Hamilton Palace collection in 1882, and eleven more in the Vatican library at Rome. The series is one of the most interesting that has been preserved by any ancient master; revealing an intimate knowledge of and profound sympathy with the text; full of Botticelli's characteristic poetic yearning and vehemence of expression, his half-childish intensity of vision; exquisite in lightness of touch and in swaying, rhythmical grace of linear composition and design. These gifts were less suited on the whole to the illustration of the Hell than of the later parts of the poem, and in the fiercer episodes there is often some puerility and inadequacy of invention. Throughout the Hell and Purgatory Botticelli maintains a careful adherence to the text, illustrating the several progressive incidents of each canto on a single page in the old-fashioned way. In the Paradise he gives a freer rein to his invention, and his designs become less a literal illustration of the text than an imaginative commentary on it. Almost all interest is centred on the persons of Dante and Beatrice, who are shown us again and again in various phases of ascending progress and rapt contemplation, often with little more than a bare symbolical suggestion of the beatific visions presented to them. Most of the drawings remain in pen outline only over a light preliminary sketch with the lead stylus; all were probably intended to be finished in colour, as a few actually are. To the period of these drawings (1492-1497) would seem to belong the fine and finely preserved small round of the "Virgin and Child with Angels" at the Ambrosiana, Milan, and the famous "Calumny of Apelles" at the Uffizi, inspired no doubt by some contemporary translation of the text by Lucian, and equally remarkable by a certain feverish energy in its sentiment and composition, and by its exquisite finish and richness of execution and detail. Probably the small "St Augustine" in the Uffizi, the injured "Judith with the head of Holofernes" in the Kaufmann collection at Berlin, and the "Virgin and Child with St John," belonging to Mr Heseltine in London, are works of the same period.

Simone di Mariano, a brother of Botticelli long resident at Naples, returned to Florence in 1493 and shared Sandro's home in the Via Nuova. He soon became a devoted follower of Savonarola, and has left a manuscript chronicle which is one of the best sources for the history of the friar and of his movement. Sandro himself seems to have remained aloof from the movement almost until the date of the execution of Savonarola and his two followers in 1498. At least there is clear evidence of his being in the confidence and employ of Lorenzo di Pierfrancesco so late as 1496 and 1497, which he could not possibly have been had he then been an avowed member of the party of the Piagnoni. It was probably the enforced departure of Lorenzo from Florence in 1497 that brought to a premature end the master's great undertaking on the illustration of Dante. After Lorenzo's return, following on the overthrow and death of Savonarola in 1498, we find no trace of any further relations between him and Botticelli, who by that time would seem to have become a declared devotee of the friar's memory and an adherent, like his brother, of the defeated side. During these years of swift political and spiritual revolution in Florence, documents give some glimpses of him: in 1497 as painting in the monastery of Monticelli a

fresco of St Francis which has perished; in the winter of the same year as bound over to keep the peace with, a neighbour living next to the small suburban villa which Sandro held jointly with his brother Simone in the parish of San Sepolcro; in 1499 as paying belated matriculation fees to the gild of doctors and druggists (of which the painters were a branch); and again in 1499 as carrying out some decorative paintings for a member of the Vespucci family. It has been suggested, probably with reason, that portions of these decorations are to be recognized in two panels of dramatic scenes from Roman history, one illustrating the story of Virginia, which has passed with the collection of Senatore Morelli into the gallery at Bergamo, the other a history of Lucretia formerly belonging to Lord Ashburnham, which passed into Mrs Gardner's collection at Boston. These and the few works still remaining to be mentioned are all strongly marked by the strained vehemence of design and feeling characteristic of the master's later years, when he dramatizes his own high-strung emotions in figures flung forward and swaying out of all balance in the vehemence of action, with looks cast agonizingly earthward or heavenward, and gestures of wild yearning or appeal. These characters prevail still more in a small Pietà at the Poldi-Pezzoli gallery, probably a contemporary copy of one which the master is recorded to have painted for the Panciatichi chapel in the church of Sta Maria Maggiore; they are present to a degree even of caricature in the larger and coarser painting of the same subject which bears the master's name in the Munich gallery, but is probably only a work of his school. The mystic vein of religious and political speculation into which Botticelli had by this time fallen has its finest illustration in the beautiful symbolic "Nativity" which passed in succession from the Aldobrandini, the Ottley, and the Fuller Maitland collections into the National Gallery in 1882, with the apocalyptic inscription in Greek which the master has added to make his meaning clear (No. 1034). In a kindred vein is a much-injured symbolic "Magdalene at the foot of the Cross" in private possession at Lyons. Among extant pictures those which from internal evidence we must put latest in the master's career are three panels illustrating the story of St Zenobius, of which one is at Dresden and the other two in the collection of Dr Mond in London. The documentary notices of him after 1500 are few. In 1502 he is mentioned in the correspondence of Isabella d'Este, marchioness of Gonzaga, and in a poem by Ugolino Verino. In 1503-1504 he served on the committee of artists appointed to decide where the colossal David of Michelangelo should be placed. In these and the following years we find him paying fees to the company of St Luke, and the next thing recorded of him is his death, followed by his burial in the Ortaccio or garden burial-ground of the Ognissanti, in May 1510.

The strong vein of poetical fantasy and mystical imagination in Botticelli, to which many of his paintings testify, and the capacity for religious conviction and emotional conversion which made of him an ardent, if belated, disciple of Savonarola, coexisted in him, according to all records, with a strong vein of the laughing humour and love of rough practical and verbal jesting which belonged to the Florentine character in his age. His studio in the Via Nuova is said to have been the resort, not only of pupils and assistants, of whom a number seem to have been at all times working for him, but of a company of more or less idle gossips with brains full of rumour and tongues always wagging. Vasari's account of the straits into which he was led by his absorption in the study of Dante and his adhesion to the sect of Savonarola are evidently much exaggerated, since there is proof that he lived and died, not rich indeed, but possessed of property enough to keep him from any real pinch of distress. The story of his work and life, after having been the subject in recent years of much half-informed study and speculation, has at length been fully elucidated in the work of Mr H.P. Horne cited below,—a masterpiece of documentary research and critical exposition.

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(S. C.)

BÖTTIGER, KARL AUGUST (1760-1835), German archaeologist, was born at Reichenbach on the 8th of June 1760. He was educated at the school of Pforta, and the university of Leipzig. After holding minor educational posts, he obtained in 1791, through the influence of Herder, the appointment of rector of the gymnasium at Weimar, where he entered into a circle of literary men, including Wieland, Schiller, and Goethe. He published in 1803 a learned work, *Sabina, oder Morgenszenen im Putzzimmer einer reichen Römerin*, a description of a wealthy Roman lady's toilette, and a work on ancient art, *Griechische Vasengemälde*. At the same time he assisted in editing the *Journal des Luxus und der Moden*, the *Deutsche Merkur*, and the *London and Paris*. In 1804 he was called to Dresden as superintendent of the studies of the court pages, and received the rank of privy councillor. In 1814 he was made director of studies at the court academy, and inspector of the Museum of Antiquities. He died

at Dresden on the 17th of November 1835. His chief works are:—*Ideen zur Archäologie der Malerei*, i. (1811) (no more published); *Kunstmythologie* (1811); *Vorlesungen und Aufsätze zur Alterthumskunde* (1817); *Amalthea* (1821-1825); *Ideen zur Kunstmythologie* (1826-1836). The *Opuscula et Carmina Latina* were published separately in 1837; with a collection of his smaller pieces, *Kleine Schriften* (1837-1838), including a complete list of his works (56 pages). His biography was written by his son Karl Wilhelm Böttiger (1790-1862), for some time professor of history at Erlangen, and author of several valuable histories (*History of Germany*, *History of Saxony*, *History of Bavaria*, *Universal History of Biographies*).

BOTTLE (Fr. bouteille, from a diminutive of the Lat. *butta*, a flask; cf. Eng. "butt"), a vessel for containing liquids, generally as opposed to one for drinking from (though this probably is not excluded), and with a narrow neck to facilitate closing and pouring. The first bottles were probably made of the skins of animals. In the *Iliad* (iii. 247) the attendants are represented as bearing wine for use in a bottle made of goat's skin. The ancient Egyptians used skins for this purpose, and from the language employed by Herodotus (ii. 121), it appears that a bottle was formed by sewing up the skin and leaving the projection of the leg and foot to serve as a vent, which was hence termed ποδεών. The aperture was closed with a plug or a string. Skin bottles of various forms occur on Egyptian monuments. The Greeks and Romans also were accustomed to use bottles made of skins; and in the southern parts Europe they are still used for the transport of wine. The first of explicit reference to bottles of skin in Scripture occurs in Joshua (ix. 4), where it is said that the Gibeonites took "old sacks upon their asses, and wine-bottles *old and rent and bound up*." The objection to putting "new wine into old bottles" (Matt. ix. 17) is that the skin, already stretched and weakened by use, is liable to burst under the pressure of the gas from new wine. Skins are still most extensively used throughout western Asia for the conveyance and storage of water. It is an error to represent the bottles of the ancient Hebrews as being made exclusively of skins. In Jer. xix. 1 the prophet speaks of "a potter's earthen vessel." The Egyptians (see Egypt: *Art and Archaeology*) possessed vases and bottles of hard stone, alabaster, glass, ivory, bone, porcelain, bronze, silver and gold, and also of glazed pottery or common earthenware. In modern times bottles are usually made of glass (*q.v.*), or occasionally of earthenware. The glass bottle industry has attained enormous dimensions, whether for wine, beer, &c., or mineral waters; and labour-saving machinery for filling the bottles has been introduced, as well as for corking or stoppering, for labelling and for washing them.

Roman Skin Bottles, from specimens at Pompeii and Herculaneum.

BOTTLE-BRUSH PLANTS, a genus of Australian plants, known botanically as *Callistemon*, and belongiug to the myrtle family (Myrtaceae). They take their name from the resemblance of the head of flowers to a bottle-brush. They are well known in cultivation as greenhouse shrubs; the flower owes its beauty to the numerous long thread-like stamens which far exceed the small petals. *Callistemon salignus* is a valuable hard wood.

BOTTLENOSE WHALE (*Hyperoödon rostratus*), a member of the sperm-whale family, which is an inhabitant of the North Atlantic, passing the summer in the Spitzbergen seas and going farther south in winter. It resembles the sperm-whale in possessing a large store of oil in the upper part of the head, which yields spermaceti when refined; on this account, and also for the sake of the blubber, which supplies an oil almost indistinguishable from sperm-oil, this whale became the object of a regular chase in the latter half of the 19th century. In length these whales vary between 20 ft. and 30 ft.; and in colour from black on the upper surface in the young to light brown in old animals, the under-parts being greyish white. There is no notch between the flukes, as in other whales, but the hinder part of the tail is rounded. Bottlenoses feed on cuttle-fishes and squills, and are practically toothless; the only teeth which exist in the adult being a small pair at the front of the lower jaw, concealed beneath the gum during life. Examples have frequently been recorded on the British coasts. In November 1904 a female, 24 ft. long, and a calf 15 ft. long were driven ashore at Whitstable. (See Cetacea.)

BOTTOMRY, a maritime contract by which a ship (or bottom) is hypothecated in security for money borrowed for expenses incurred in the course of her voyage, under the condition that if she arrive at her destination the ship shall be liable for repayment of the loan, together with such premium thereon as may have been agreed for; but that if the ship be lost, the lender shall have no claim against the borrower either for the sum advanced or for the premium. The freight may be pledged as well as the ship, and, if necessary, the cargo also. In some cases the personal obligation of the shipmaster is also included. When money is borrowed on the security of the cargo alone, it is said to be taken up at *respondentia*; but it is now only in rare and exceptional cases that it could be competent to the shipmaster to pledge the cargo, except under a general bottomry obligation, along with the ship and freight. In consideration of the risks assumed by the lender, the bottomry premium (sometimes termed *maritime interest*) is usually high, varying of course with the nature of the risk and the difficulty of procuring funds.

A bottomry contract may be written out in any form which sufficiently shows the conditions agreed on between the parties; but it is usually drawn up in the form of a *bond* which confers a maritime lien (*q.v.*). The document must show, either by express terms or from its general tenor, that the risk of loss is assumed by the lender,—this being the consideration for which the high premium is conceded. The lender may transfer the bond by indorsation, in the same manner as a bill of exchange or bill of lading, and the right to recover its value becomes vested in the indorsees. (See Bond.)

According to the law of England, a bottomry contract remains in force so long as the ship exists *in the form of a ship*, whatever amount of damage she may have sustained. Consequently, the "constructive total loss" which is recognized in marine insurance, when the ship is damaged to such an extent that she is not worth repairing, is not recognized in reference to bottomry, and will not absolve the borrower from his obligation. But if the ship go to pieces, the borrower is freed from all liability under the bottomry contract; and the lender is not entitled to receive any share of the proceeds of such of the ship's stores or materials as may have been saved from the wreck. Money advanced on bottomry is not liable in England for general average losses. If the ship should *deviate* from the voyage for which the funds were advanced, her subsequent loss will not discharge the obligation of the borrower under the bottomry contract. If she should not proceed at all on her intended voyage, the lender is not entitled to recover the bottomry premium in addition to his advance, but only the ordinary rate of interest for the temporary loan. As the bottomry premium is presumed, in every case, to cover the risks incurred by the lender, he is not entitled to charge the borrower with the premium which he may pay for *insurance* of the sum advanced, in addition to that stipulated in the bond.

The contract of bottomry seems to have arisen from the custom of permitting the master of a ship, when in a foreign country, to pledge the ship in order to raise money for repairs, or other extraordinary expenditures rendered necessary in the course of the voyage. Circumstances often arise, in which, without the exercise of this power on the part of the master, it would be impossible to provide means for accomplishing the voyage; and it is better that the master should have authority to burden the ship, and, if necessary, the freight and cargo also, in security for the money which has become requisite, than that the adventure should be defeated by inability to proceed. But the right of the master to pledge the ship or goods must always be created by necessity; if exercised without necessity the contract will be void. Accordingly, the master of a British ship has no power to grant a bottomry bond at a British port, or at any foreign port where he might raise funds on the personal credit of the shipowners. Neither has he any power to pledge the ship or goods for private debts of his own, but only for such supplies as are indispensable for the purposes of the voyage. And in all cases he ought, if possible, to communicate with the owners of the ship, and with the proprietor of the cargo before pledging their property ("The Bonaparte," 1853, 8 Moo. P.C. 473; "The Staffordshire," 1872, L.R. 4 P.C. 194). Increased facility of communication, by telegraph and otherwise, has given additional stringency to this rule, and caused a decline in the practice of giving bottomry bonds.

The bottomry lender must use reasonable diligence to ascertain that a real necessity exists for the loan; but he is not bound to see to the application of the money advanced. If the lender has originally advanced the funds on the personal credit of the owner he is not entitled to require a bottomry obligation. A bond procured from the shipmaster by improper compulsion would be void.

The power of the master to pledge the cargo depends upon there being some reasonable prospect of benefit to it by his so doing. He has no such power except in virtue of circumstances which may oblige him to assume the character of *agent for the cargo*, in the absence of any other party authorized to act on its behalf. Under ordinary circumstances he is not at liberty to pledge the cargo for repairs to the ship. If indeed the goods be of a perishable nature, and if it be impossible to get the ship repaired in sufficient time to obviate serious loss on them by delay, without including them under the bottomry contract, he has power to do so, because it may fairly be assumed, in the case supposed, that the cargo will be benefited by this procedure. The general principle is, that the master must act for the cargo, with a reasonable view to the interests of its proprietors, under the whole circumstances of the case. When he does this his proceedings will be sustained; but should he manifestly prejudice the interests of the cargo by including it under bottomry for the mere purpose of relieving the ship, or of earning the freight, the owners of the cargo will not be bound by the bottomry contract. Any bottomry or respondentia bond may be good in part or bad in part, according as the master may have acted *within*

or *beyond* the scope of his legitimate authority in granting it. If two or more bottomry bonds have been granted at different stages of the voyage, and the value of the property be insufficient to discharge them all, the last-dated bond has the priority of payment, as having furnished the means of preserving the ship, and thereby preventing the total loss of the security for the previous bonds.

When the sum due under a bottomry bond over ship, freight and cargo is not paid at the stipulated time, proceedings may be taken by the bondholder for recovery of the freight and for the sale of the ship; and should the proceeds of these be insufficient to discharge the claim, a judicial sale of the cargo may be resorted to. As a general rule the value of the ship and freight must be exhausted before recourse can be taken against the cargo. A bottomry bond gives no remedy to the lenders against the owners of the ship or cargo personally. The whole liability under it may be met by the surrender of the property pledged, whether the value so surrendered covers the amount of the bond or not. But the owners of the ship, though not liable to the bondholder for more than the value of the ship and freight, may be further liable to the proprietors of the cargo for any sum in excess of the cargo's proper share of the expenses, taken by the bondholder out of the proceeds of the cargo to satisfy the bond after the ship and freight have been exhausted.

The bottomry premium must be ultimately paid by the parties for whose benefit the advances were obtained, as ascertained on the final adjustment of the average expenditures at the port of destination.

The practice of pledging property subject to maritime risks was common among the ancient Greeks, being known as ἔκδοσις or δάνειον (see Demosthenes' speeches *Pro Phormione, Contra Lacritum* and *In Dionysodorum*); it passed into Roman law as *foenus nauticum* or *usura maritima*.

See also LIEN: *Maritime*; and generally Abbott on *Shipping* (14th ed., 1901).

BOTZARIS [BOZZARIS], **MARCO** (*c.* 1788-1823), leader in the War of Greek Independence, born at Suli in Albania, was the second son of Kitzo Botzaris, murdered at Arta in 1809 by order of Ali of Iannina. In 1803, after the capture of Suli by Ali Pasha, Marco, with the remnant of the Suliots, crossed over to the Ionian Islands, where he ultimately took service in an Albanian regiment in French pay. In 1814 he joined the Greek patriotic society known as the *Hetairia Philike*, and in 1820, with other Suliots, made common cause with Ali of Iannina against the Ottomans. On the outbreak of the Greek revolt, he distinguished himself by his courage, tenacity and skill as a partisan leader in the fighting in western Hellas, and was conspicuous in the defence of Missolonghi during the first siege (1822-1823). On the night of the 21st of August 1823 he led the celebrated attack at Karpenisi of 350 Suliots on 4000 Albanians who formed the vanguard of the army with which Mustai Pasha was advancing to reinforce the besiegers. The rout of the Turks was complete; but Botzaris himself fell. His memory is still celebrated in popular ballads in Greece. Marco Botzaris's brother Kosta (Constantine), who fought at Karpenisi and completed the victory, lived to become a general and senator in the Greek kingdom. He died at Athens on the 13th of November 1853. Marco's son, Dimitri Botzaris, born in 1813, was three times minister of war under the kings Otho and George. He died at Athens on the 17th of August 1870.

BOTZEN, or BOZEN (Ital. *Bolzano*), a town in the Austrian province of Tirol, situated at the confluence of the Talfer with the Eisak, and a short way above the junction of the latter with the Adige or Etsch. It is built at a height of 869 ft., and is a station on the Brenner railway, being 58 m. S. of that pass and 35 m. N. of Trent. In 1900 it had a population of 13,632, Romanist and mainly German-speaking, though the Italian element is said to be increasing. Botzen is a Teutonic town amid Italian surroundings. It is well built, and boasts of a fine old Gothic parish church, dating from the 14th and 15th centuries, opposite which a statue was erected in 1889 to the memory of the famous *Minnesänger*, Walther von der Vogelweide, who, according to some accounts, was born (*c.* 1170) at a farm above Waidbruck, to the north of Botzen. Botzen is the busiest commercial town in the German-speaking portion of Tirol, being admirably situated at the junction of the Brenner route from Germany to Italy with that from Switzerland down the Upper Adige valley or the Vintschgau. Hence the transit trade has always been very considerable (it has four large fairs annually), while the local wine is mentioned as early as the 7th century. Lately its prosperity has been increased by the rise into favour as a winter resort of the village of Gries, on the other bank of the Talfer, and now practically a suburb of Botzen.

The *pons Drusi* (probably over the Adige, just below Botzen) is mentioned in the 4th century by the *Peutinger Table*. In the 7th to 8th centuries Botzen was held by a dynasty of Bavarian counts. But in 1027, with the rest of the diocese of Trent, it was given by the emperor Conrad II. to the bishop of Trent. From 1028 onwards it was ruled by local counts, the vassals of the bishops, but after Tirol fell into the hands of the Habsburgers (1363) their power grew at the expense of that of the bishops. In 1381 Leopold granted to the citizens the privilege of having a town council, while in 1462 the bishops resigned all rights of jurisdiction over the town to the Habsburgers, so that its later history is merged in that of Tirol.

BOUCHARDON, EDME (1698-1762), French sculptor, was esteemed in his day the greatest sculptor of his time. Born at Chaumont, he became the pupil of Guillaume Coustou and gained the *prix de Rome* in 1722. Resisting the tendency of the day he was classic in his taste, pure and chaste, always correct, charming and distinguished, a great stickler for all the finish that sand-paper could give. During the ten years he remained at Rome, Bouchardon made a striking bust of Pope Benedict XIII. (1730). In 1746 he produced his first acclaimed masterpiece, “Cupid fashioning a Bow out of the Club of Hercules,” perfect in its grace, but cold in the purity of its classic design. His two other leading *chefs-d’œuvre* are the fountain in the rue de Grenelle, Paris, the first portions of which had been finished and exhibited in 1740, and the equestrian statue of Louis XV., a commission from the city of Paris. This superb work, which, when the model was produced, was declared the finest work of its kind ever produced in France, Bouchardon did not live to finish, but left its completion to Pigalle. It was destroyed during the Revolution.

Among the chief books on the sculptor and his art are *Vie d’Edme Bouchardon*, by le comte de Caylus (Paris, 1762); *Notice sur Edme Bouchardon, sculpteur*, by E. Jolibois (Versailles, 1837); *Notice historique sur Edme Bouchardon*, by J. Carnandet (Paris, 1855); and *French Architects and Sculptors of the 18th Century*, by Lady Dilke (London, 1900).

BOUCHER, FRANÇOIS (1703-1770), French painter, was born in Paris, and at first was employed by Jean François Cars (1670-1739), the engraver, father of the engraver Laurent Cars (1699-1771), to make designs and illustrations for books. In 1727, however, he went to Italy, and at Rome became well known as a painter. He returned to Paris in 1731 and soon became a favourite in society. His picture “Rinaldo and Armida” (1734) is now in the Louvre. He was made inspector of the Gobelins factory in 1755 and court painter in 1765, and was employed by Madame de Pompadour both to paint her portrait and to execute various decorative works. He died in 1770. His Watteau-like style and graceful voluptuousness gave him the title of the Anacreon of painting, but his repute declined until recent years. The Wallace collection, at Hertford House, has some of his finest pictures, outside the Louvre. His etchings were also numerous and masterly.

See Antoine Bret’s notice in the *Nécrologe des hommes célèbres* for 1771, and the monographs by the brothers de Goncourt and Paul Mantz.

BOUCHER, JONATHAN (1738-1804), English divine and philologist, was born in the hamlet of Blencogo, near Wigton, Cumberland, on the 12th of March 1738. He was educated at the Wigton grammar school, and about 1754 went to Virginia, where he became a private tutor in the families of Virginia planters. Among his charges was John Parke Custis, the step-son of George Washington, with whom he began a long and intimate friendship. Returning to England, he was ordained by the bishop of London in March 1762, and at once sailed again for America, where he remained until 1775 as rector of various Virginia and Maryland parishes, including Hanover, King George’s county, Virginia, and St Anne’s at Annapolis, Maryland. He was widely known as an eloquent preacher, and his scholarly attainments won for him the friendship and esteem of some of the ablest scholars in the colonies. During his residence in Maryland he vigorously opposed the “vestry act,” by which the powers and emoluments of the Maryland pastors were greatly diminished. When the struggle between the colonies and the mother country began, although he felt much sympathy for the former, his opposition to any form of obstruction to the Stamp Act and other measures, and his denunciation of a resort to force created a breach between him and his parish, and in a fiery farewell discourse preached after the opening of hostilities he declared that no power on earth should prevent him from praying and shouting “God save the King.” In the succeeding autumn he returned to England, where his loyalism was rewarded by a government pension. In 1784 he became vicar of Epsom in Surrey, where he continued until his death on the 27th of April 1804, becoming known as one of the most eloquent preachers of his day. He was an accomplished writer and scholar, contributed largely to William Hutchinson’s *History of the County of Cumberland* (2 vols., 1704 seq.), and published *A View of the Causes and Consequences of the American Revolution* (1797), dedicated to George Washington, and consisting of thirteen discourses delivered in America between 1763 and 1775. His philological studies, to which the last fourteen years of his life were devoted, resulted in the compilation of “A Glossary of Provincial and Archaic Words,” intended as a supplement to Dr Johnson’s *Dictionary*, but never published except in

part, which finally in 1831 passed into the hands of the English compilers of Webster's *Dictionary*, by whom it was utilized.

His son, Barton Boucher (1794-1865), rector of Fonthill Bishops, Wiltshire, in 1856, was well known as the author of religious tracts, hymns and novels.

BOUCHER DE CRÈVCOEUR DE PERTHES, JACQUES (1788-1868), French geologist and antiquary, was born on the 10th of September 1788 at Rethel, Ardennes, France. He was the eldest son of Jules Armand Guillaume Boucher de Crèvecœur, botanist and customs officer, and of Étienne-Jeanne-Marie de Perthes (whose surname he was authorized by royal decree in 1818 to assume in addition to his father's). In 1802 he entered government employ as an officer of customs. His duties kept him for six years in Italy, whence returning (in 1811) he found rapid promotion at home, and finally was appointed (March 1825) to succeed his father as director of the *douane* at Abbeville, where he remained for the rest of his life, being superannuated in January 1853, and dying on the 5th of August 1868. His leisure was chiefly devoted to the study of what was afterwards called the Stone Age, "antediluvian man," as he expressed it. About the year 1830 he had found, in the gravels of the Somme valley, flints which in his opinion bore evidence of human handiwork; but not until many years afterwards did he make public the important discovery of a worked flint implement with remains of elephant, rhinoceros, &c., in the gravels of Menchecourt. This was in 1846. A few years later he commenced the issue of his monumental work, *Antiquités celtiques et an édiluviennes* (1847, 1857, 1864; 3 vols.), a work in which he was the first to establish the existence of man in the Pleistocene or early Quaternary period. His views met with little approval, partly because he had previously propounded theories regarding the antiquity of man without facts to support them, partly because the figures in his book were badly executed and they included drawings of flints which showed no clear sign of workmanship. In 1855 Dr Jean Paul Rigollot (1810-1873), of Amiens, strongly advocated the authenticity of the flint implements; but it was not until 1858 that Hugh Falconer (*q.v.*) saw the collection at Abbeville and induced Prestwich (*q.v.*) in the following year to visit the locality. Prestwich then definitely agreed that the flint implements were the work of man, and that they occurred in undisturbed ground in association with remains of extinct mammalia. In 1863 his discovery of a human jaw, together with worked flints, in a gravel-pit at Moulin-Quignon near Abbeville seemed to vindicate Boucher de Perthes entirely; but doubt was thrown on the antiquity of the human remains (owing to the possibility of interment), though not on the good faith of the discoverer, who was the same year made an officer of the Legion of Honour together with Quatrefages his champion. Boucher de Perthes displayed activity in many other directions. For more than thirty years he filled the presidential chair of the Société d'Émulation at Abbeville, to the publications of which he contributed articles on a wide range of subjects. He was the author of several tragedies, two books of fiction, several works of travel, and a number of books on economic and philanthropic questions. To his scientific books may be added *De l'homme antédilumen et de ses œuvres* (Paris, 1860).

See Alcius Ledien, *Boucher de Perthes; sa vie, ses œuvres, sa correspondence* (Abbeville, 1885); Lady Prestwich, "Recollections of M. Boucher de Perthes" (with portrait) in *Essays Descriptive and Biographical* (1901).

BOUCHES-DU-RHÔNE, a maritime department of south-eastern France situated at the mouth of the Rhone. Area, 2026 sq. m. Pop. (1906) 765,918. Formed in 1790 from western Provence, it is bounded N. by Vaucluse, from which it is separated by the Durance, E. by Var, W. by Card, and S. by the Mediterranean, along which its seaboard stretches for about 120 m. The western portion consists of the Camargue (*q.v.*), a low and marshy plain enclosed between the Rhone and the Petit-Rhône, and comprising the Rhone delta. A large portion of its surface is covered by lagoons and pools (étangs), the largest of which is the Étang de Vaccarès; to the east of the Camargue is situated the remarkable stretch of country called the Crau, which is strewn with pebbles like the sea-beach; and farther east and north there are various ranges of mountains of moderate elevation belonging to the Alpine system. The Étang de Berre, a lagoon covering an area of nearly 60 sq. m., is situated near the sea to the south-east of the Crau. A few small tributaries of the Rhone and the Durance, a number of streams, such as the Arc and the Touloubre, which flow into the Étang de Berre, and the Huveaune, which finds its way directly to the sea, are the only rivers that properly belong to the department.

Bouches-du-Rhône enjoys the beautiful climate of the Mediterranean coast, the chief drawback being the mistral, the icy north-west wind blowing from the central plateau of France. The proportion of arable land is small, though the quantity has been considerably increased by artificial irrigation and by the draining of marshland. Cereals, of which wheat and oats are the commonest, are grown in the Camargue and the plain of Aries, but they are of less importance than the olive-tree, which is grown largely in the east of the department and supplies the oil-works of Marseilles. The vine is also cultivated, the method of submersion being used as a safeguard against phylloxera. In the cantons of

the north-west large quantities of early vegetables are produced. Of live-stock, sheep alone are raised to any extent. Almonds, figs, capers, mulberry trees and silkworms are sources of considerable profit. Iron is worked, but the most important mines are those of lignite, in which between 2000 and 3000 workmen are employed; the department also produces bauxite, building-stone, lime, cement, gypsum, clay, sand and gravel and marble. The salt marshes employ many workmen, and the amount of sea-salt obtained exceeds in quantity the produce of any other department in France. Marseilles, the capital, is by far the most important industrial town. In its oil-works, soap-works, metallurgical works, shipbuilding works, distilleries, flour-mills, chemical works, tanneries, engineering and machinery works, brick and tile works, manufactories of preserved foods and biscuits, and other industrial establishments, is concentrated most of the manufacturing activity of the department. To these must be added the potteries of the industrial town of Aubagne, the silk-works in the north-west cantons, and various paper and cardboard manufactories, while several of the industries of Marseilles, such as the distilling of oil, metal-founding, shipbuilding and soap-making, are common to the whole of Bouches-du-Rhône. Fishing is also an important industry. Cereals, flour, silk, woollen and cotton goods, wine, brandy, oils, soap, sugar and coffee are chief exports; cereals, oil-seeds, wine and brandy, raw sugar, cattle, timber, silk, wool, cotton, coal, &c., are imported. The foreign commerce of the department, which is principally carried on in the Mediterranean basin, is for the most part concentrated in the capital; the minor ports are Martigues, Cassis and La Ciotat. Internal trade is facilitated by the canal from Aries to Port-de-Bouc and two smaller canals, in all about 35 m. in length. The Rhone and the Petit-Rhône are both navigable within the department.

Bouches-du-Rhône is divided into the three arrondissements of Marseilles, Aix and Arles (33 cantons, 111 communes). It belongs to the archiepiscopal province of Aix, to the region of the XV. army corps, the headquarters of which are at Marseilles, and to the *académie* (educational division) of Aix. Its court of appeal is at Aix. Marseilles, Aix, Arles, La Ciotat, Martigues, Salon, Les Saintes-Maries, St Rémy, Les Baux and Tarascon, the principal places, are separately noticed. Objects of interest elsewhere may be mentioned. Near Saint-Chamas there is a remarkable Roman bridge over the Touloubre, which probably dates from the 1st century B.C. and is thus the oldest in France. It is supported on one semicircular span and has triumphal arches at either end. At Vernègues there are remains of a Roman temple known as the “Maison-Basse.” The famous abbey of Montmajour, of which the oldest parts are the Romanesque church and cloister, is 2½ m. from Arles. At Orgon there are the ruins of a château of the 15th century, and near La Roque d’Anthéron the church and other buildings of the Cistercian abbey of Silvacane, founded in the 12th century.

BOUCHOR, MAURICE (1855-), French poet, was born on the 15th of December 1855 in Paris. He published in succession *Chansons joyeuses* (1874), *Poèmes de l’amour et de la mer* (1875), *Le Faust moderne* (1878) in prose and verse, and *Les Contes parisiens* (1880) in verse. His *Aurore* (1883) showed a tendency to religious mysticism, which reached its fullest expression in *Les Symboles* (1888; new series, 1895), the most interesting of his works. Bouchor (whose brother, Joseph Félix Bouchor, b. 1853, became well known as an artist) was a sculptor as well as a poet, and he designed and worked the figures used in his charming pieces as marionettes, the words being recited or chanted by himself or his friends behind the scenes. These miniature dramas on religious subjects, *Tobie* (1889), *Noël* (1890) and *Sainte Cécile* (1892), were produced in Paris at the Théâtre des Marionnettes. A one-act verse drama by Bouchor, Conte de Noël, was played at the Théâtre Français in 1895, but *Dieu le veut* (1888) was not produced. In conjunction with the musician Julien Tiersot (b. 1857), he made efforts for the preservation of the French folk-songs, and published *Chants populaires pour les écoles* (1897).

BOUCHOTTE, JEAN BAPTISTE NOËL (1754-1840), French minister, was born at Metz on the 25th of December 1754. At the outbreak of the Revolution he was a captain of cavalry, and his zeal led to his being made colonel and given the command at Cambrai. When Dumouriez delivered up to the Austrians the minister of war, the marquis de Beurnonville, in April 1793, Bouchotte, who had bravely defended Cambrai, was called by the Convention to be minister of war, where he remained until the 31st of March 1794. The predominant rôle of the Committee of Public Safety during that period did not leave much scope for the new minister, yet he rendered some services in the organization of the republican armies, and chose his officers with insight, among them Kléber, Masséna, Moreau and Bonaparte. During the Thermidorian reaction, in spite of his incontestable honesty, he was accused by the anti-revolutionists. He was tried by the tribunal of the Eure-et-Loire and acquitted. Then he withdrew from politics, and lived in retirement until his death on the 8th of June 1840.

BOUCICAULT, DION (1822-1890), Irish actor and playwright, was born in Dublin on the 26th of December 1822, the son of a French refugee and an Irish mother. Before he was twenty he was fortunate enough to make an immediate success as a dramatist with *London Assurance*, produced at Covent Garden on the 4th of March 1841, with a cast that included Charles Matthews, William Farren, Mrs Nesbitt and Madame Vestris. He rapidly followed this with a number of other plays, among the most successful of the early ones being *Old Heads and Young Hearts*, *Louis XI.*, and *The Corsican Brothers*. In June 1852 he made his first appearance as an actor in a melodrama of his own entitled *The Vampire* at the Princess's theatre. From 1853 to 1869 he was in the United States, where he was always a popular favourite. On his return to England he produced at the Adelphi a dramatic adaptation of Gerald Griffin's novel, *The Collegians*, entitled *The Colleen Bawn*. This play, one of the most successful of modern times, was performed in almost every city of the United Kingdom and the United States, and made its author a handsome fortune, which he lost in the management of various London theatres. It was followed by *The Octoroon* (1861), the popularity of which was almost as great. Boucicault's next marked success was at the Princess's theatre in 1865 with *Arrah-na-Pogue*, in which he played the part of a Wicklow carman. This, and his admirable creation of Con in his play *The Shaughraun* (first produced at Drury Lane in 1875), won him the reputation of being the best stage Irishman of his time. In 1875 he returned to New York City and finally made his home there, but he paid occasional visits to London, where his last appearance was made in his play, *The Jilt*, in 1886. *The Streets of London* and *After Dark* were two of his late successes as a dramatist. He died in New York on the 18th of September 1890. Boucicault was twice married, his first wife being Agnes Robertson, the adopted daughter of Charles Kean, and herself an actress of unusual ability. Three children, Dion (b. 1859), Aubrey (b. 1868) and Nina, also became distinguished in the profession.

BOUCICAUT, JEAN [Jean le Meingre, called Boucicaut] (*c.* 1366-1421), marshal of France, was the son of another Jean le Meingre, also known as Boucicaut, marshal of France, who died on the 15th of March 1368 (N.S.). At a very early age he became a soldier; he fought in Normandy, in Flanders and in Prussia, distinguishing himself at the battle of Roosebeke in 1382; and then after a campaign in Spain he journeyed to the Holy Land. Boucicaut's great desire appears to have been to fight the Turk, and in 1396 he was one of the French soldiers who marched to the defence of Hungary and shared in the Christian defeat at Nicopolis, where he narrowly escaped death. After remaining for some months a captive in the hands of the sultan, he obtained his ransom and returned to France; then in 1399 he was sent at the head of an army to aid the Eastern emperor, Manuel II., who was harassed by the Turks. Boucicaut drove the enemy from his position before Constantinople and returned to France for fresh troops, but instead of proceeding again to eastern Europe, he was despatched in 1401 to Genoa, who in 1396 had placed herself under the dominion of France. Here he was successful in restoring order and in making the French occupation effective, and he was soon able to turn his attention to the defence of the Genoese possessions in the Mediterranean. The energy which he showed in this direction involved him not only in a quarrel with Janus, king of Cyprus, but led also to a short war with Venice, whose fleet he encountered off Modon in the Archipelago in October 1403. This battle has been claimed by both sides as a victory. Peace was soon made with the republic, and then in 1409, while the marshal was absent on a campaign in northern Italy, Genoa threw off the French yoke, and Boucicaut, unable to reduce her again to submission, retired to Languedoc. He fought at Agincourt, where he was taken prisoner, and died in England. Boucicaut, who was very skilful in the tournament, founded the order of the *Dame blanche à l'écu vert*, a society the object of which was to defend the wives and daughters of absent knights.

There is in existence an anonymous account of Boucicaut's life and adventures, entitled *Livre des faits du bon messire Jean le Meingre dit Boucicaut*, which was published in Paris by T. Godefroy in 1620. See J. Delaville le Roulx, *La France en Orient: expéditions du maréchal Boucicaut* (Paris, 1886).

BOUDIN, EUGÈNE (1824-1898), French painter of the *paysage de mer*, was the son of a pilot. Born at Honfleur he was cabin-boy for a while on board the rickety steamer that plied between Havre and Honfleur across the estuary of the Seine. But before old age came on him, Boudin's father abandoned seafaring, and the son gave it up too, having of course no real vocation for it, though he preserved to his last days much of a sailor's character,—frankness, accessibility, open-heartedness. Boudin the elder now established himself as stationer and frame-maker; this time in the greater seaport town of Havre; and Eugène helped in the little business, and, in stolen hours, produced certain drawings. That was a time at which the romantic outlines of the Norman coast engaged Isabey, and the green wide valleys of the inland country engaged Troyon; and Troyon and Isabey, and Millet too, came to the shop at Havre. Young Boudin found his desire to be a painter stimulated by their influence; his work made a certain progress, and the interest taken in the young man resulted in his being granted for a short term of years by the town of his adoption a pension, that he might study painting. He studied partly in Paris; but whatever individuality he possessed in those years was hidden and covered, rather than disclosed. An

instance of tiresome, elaborate labour—good enough, no doubt, as groundwork, and not out of keeping with what at least was the popular taste of that day—is his “Pardon of Sainte Anne de la Palud,” a Breton scene, of 1858, in which he introduced the young Breton woman who was immediately to become his wife. This conscientious and unmoving picture hangs in the museum of Havre, along with a hundred later, fresher, thoroughly individual studies and sketches, the gift of Boudin’s brother, Louis Boudin, after the painter’s death. Re-established at Honfleur, Boudin was married and poor. But his work gained character and added, to merely academic correctness, character and charm. He was beginning to be himself by 1864 or 1865—that was the first of such periods of his as may be accounted good—and, though not at that time so fully a master of transient effects of weather as he became later, he began then to paint with a success genuinely artistic the scenes of the harbour and the estuary, which no longer lost vivacity by deliberate and too obvious completeness. The war of 1870-71 found Boudin impecunious but great, for then there had well begun the series of freshly and vigorously conceived canvases and panels, which record the impressions of a precursor of the Impressionists in presence of the Channel waters, and of those autumn skies, or skies of summer, now radiant, now uncertain, which hung over the small ports and the rocky or chalk-cliff coasts, over the watering-places, Trouville, Dieppe, and over those larger harbours, with *port* and *avant-port* and *bassin*, of Dunkirk, of Havre. In the war time, Boudin was in Brittany and then in the Low Countries. About 1875-1876 he was at Rotterdam and Bordeaux. That great bird’s-eye vision of Bordeaux which is in the Luxembourg dates from these years, and in these years he was at Rotterdam, the companion of Jongkind, with whom he had so much in common, but whose work, like his, free and fearless and unconventional, can never be said with accuracy to have seriously influenced his own. Doing excellent things continually through all the ’seventies, when he was in late middle age—gaining scope in colour, having now so many notes—faithful no longer wholly to his amazing range of subtle greys, now blithe and silvery, now nobly deep—sending to the Salon great canvases, and to the few enlightened people who would buy them of him the *toile* or panel of most moderate size on which he best of all expressed himself—Boudin was yet not acceptable to the public or to the fashionable dealer. The late ’eighties had to come and Boudin to be elderly before there was a sale for his work at any prices that were in the least substantial. Broadly speaking his work in those very ’eighties was not so good as the labour, essentially delicate and fresh and just, of some years earlier, nor had it always the attractiveness of the impulsive deliverances of some years later, when the inspired sketch was the thing that he generally stopped at. Old age found him strong and receptive. Only in the very last year of his life was there perceptible a positive deterioration. Not very long before it, Boudin, in a visit to Venice, had produced impressions of Venice for which much more was to be said than that they were not Ziem’s. And the deep colouring of the South, on days when the sunshine blazes least, had been caught by him and presented nobly at Antibes and Villefranche. At last, resorting to the south again as a refuge from ill-health, and recognizing soon that the relief it could give him was almost spent, he resolved that it should not be for him, in the words of Maurice Barrès, a “*tombe fleurie*,” and he returned, hastily, weak and sinking, to his home at Deauville, that he might at least die within sight of Channel waters and under Channel skies. As a “marine painter”—more properly as a painter of subjects in which water must have some part, and as curiously expert in the rendering of all that goes upon the sea, and as the painter too of the green banks of tidal rivers and of the long-stretched beach, with crinolined Parisienne noted as ably as the sailor-folk—Boudin stands alone. Beside him others are apt to seem rather theatrical—or if they do not romance they appear, perhaps, to chronicle dully. The pastels of Boudin—summary and economic even in the ’sixties, at a time when his painted work was less free—obtained the splendid eulogy of Baudelaire, and it was no other than Corot who, before his pictures, said to him: “You are the master of the sky.”

See also Gustave Cahen, *Eugène Boudin* (Paris, 1899); Arsène Alexandre, *Essais*; Frederick Wedmore, *Whistler and Others* (1906).

(F. We.)

BOUDINOT, ELIAS (1740-1821), American revolutionary leader, was born at Philadelphia, Pennsylvania, of Huguenot descent, on the 2nd of May 1740. He studied law at Princeton, New Jersey, in the office of Richard Stockton, whose sister Hannah he married in 1762, and in November 1760 he was licensed as a counsellor and attorney-at-law, afterwards practising at Elizabethtown, New Jersey. On the approach of the War of Independence he allied himself with the conservative Whigs. He was a deputy to the provincial congress of New Jersey from May to August 1775, and from May 1777 until July 1778 was the commissary-general of prisoners, with the rank of colonel, in the continental army. He was one of the New Jersey members of the continental congress in 1778 and again from 1781 until 1783, and from November 1782 until October 1783 was president of that body, acting also for a short time, after the resignation of Robert R. Livingston, as secretary for foreign affairs. From 1789 to 1795 he sat as a member of the national House of Representatives, and from 1795 until 1805 he was the director of the United States mint at Philadelphia. He took an active part in the founding of the American Bible Society in 1816, of which he became the first president. He was a trustee and a benefactor of the college of New Jersey (afterwards Princeton University). In reply to Thomas Paine’s *Age of Reason*, he published the *Age of Revelation* (1790); he also published a volume entitled *A Star in the West, or a Humble Attempt to Discover the Long Lost Ten Tribes of Israel* (1816), in which he endeavours to prove that the American Indians may be the ten lost tribes. Boudinot died at Burlington, New Jersey, on the 24th of October 1821.

See *The Life, Public Services, Addresses and Letters of Elias Boudinot*, edited by J.J. Boudinot (Boston and New York, 1896).

BOUÉ, AMI (1794-1881), Austrian geologist, was born at Hamburg on the 16th of March 1794, and received his early education there and in Geneva and Paris. Proceeding to Edinburgh to study medicine at the university, he came under the influence of Robert Jameson, whose teachings in geology and mineralogy inspired his future career. Boué was thus led to make geological expeditions to various parts of Scotland and the Hebrides, and after taking his degree of M.D. in 1817 he settled for some years in Paris. In 1820 he issued his *Essai géologique sur l'Écosse*, in which the eruptive rocks in particular were carefully described. He travelled much in Germany, Austria and southern Europe, studying various geological formations, and becoming one of the pioneers in geological research; he was one of the founders of the Société Géologique de France in 1830, and was its president in 1835. In 1841 he settled in Vienna, and became naturalized as an Austrian. He died on the 21st of November 1881. To the Imperial Academy of Sciences at Vienna he communicated important papers on the geology of the Balkan States (1859-1870), and he also published *Mémoires géologiques et paléontologiques* (Paris, 1832) and *La Turquie d'Europe; observations sur la géographie, la géologie, l'histoire naturelle, &c.* (Paris, 1840).

BOUFFLERS, LOUIS FRANÇOIS, Duc de, comte de Cagny (1644-1711), marshal of France, was born on the 10th of January 1644. He entered the army and saw service in 1663 at the siege of Marsal, becoming in 1669 colonel of dragoons. In the conquest of Lorraine (1670) he served under Marshal de Créqui. In Holland he served under Turenne, frequently distinguishing himself by his skill and bravery; and when Turenne was killed by a cannon-shot in 1675 he commanded the rear-guard during the retreat of the French army. He was already a brigadier, and in 1677 he became *maréchal de camp*. He served throughout the campaigns of the time with increasing distinction, and in 1681 became lieutenant-general. He commanded the French army on the Moselle, which opened the War of the League of Augsburg with a series of victories; then he led a corps to the Sambre, and reinforced Luxemburg on the eve of the battle of Fleurus. In 1691 he acted as lieutenant-general under the king in person; and during the investment of Mons he was wounded in an attack on the town. He was present with the king at the siege of Namur in 1692, and took part in the victory of Steinkirk. For his services he was raised in 1692 to the rank of marshal of France, and in 1694 was made a duke. In 1694 he was appointed governor of French Flanders and of the town of Lille. By a skilful manoeuvre he threw himself into Namur in 1695, and only surrendered to his besiegers after he had lost 8000 of his 13,000 men. In the conferences which terminated in the peace of Ryswick he had a principal share. During the following war, when Lille was threatened with a siege by Marlborough and Eugene, Boufflers was appointed to the command, and made a most gallant resistance of three months. He was rewarded and honoured by the king for his defence of Lille, as if he had been victorious. It was indeed a species of triumph; his enemy, appreciating his merits, allowed him to dictate his own terms of capitulation. In 1708 he was made a peer of France. In 1709, when the affairs of France were threatened with the most urgent danger, Boufflers offered to serve under his junior, Villars, and was with him at the battle of Malplaquet. Here he displayed the highest skill, and after Villars was wounded he conducted the retreat of the French army without losing either cannon or prisoners. He died at Fontainebleau on the 22nd of August 1711.

See F...., *Vie du Mal. de Boufflers* (Lille, 1852), and Père Delarue's and Père Poisson's *Oraisons funèbres du Mal. B.* (1712).

BOUFFLERS, STANISLAS JEAN, Chevalier de (1737-1815), French statesman and man of letters, was born near Nancy on the 31st of May 1738. He was the son of Louis François, marquis de Boufflers. His mother, Marie Catherine de Beauveau Craon, was the mistress of Stanislas Leszczynski, and the boy was brought up at the court of Lunéville. He spent six months in study for the priesthood at Saint Sulpice, Paris, and during his residence there he put in circulation a story which became extremely popular, *Aline, reine de Golconde*. Boufflers did not, however, take the vows, as his ambitions were military. He entered the order of the Knights of Malta, so that he might be able to follow the career of arms without sacrificing the revenues of a benefice he had received in Lorraine from King Stanislas. After serving in various campaigns he reached the grade of *maréchal de camp* in 1784, and in the next year was sent to West Africa as governor of Senegal. He proved an excellent administrator, and did what he could to mitigate the horrors of the slave trade; and he interested himself in opening up the

material resources of the colony, so that his departure in 1787 was regarded as a real calamity by both colonists and negroes. The *Mémoires secrets* of Bachaumont give the current opinion that Boufflers was sent to Senegal because he was in disgrace at court; but the real reason appears to have been a desire to pay his debts before his marriage with Mme de Sabran, which took place soon after his return to France. Boufflers was admitted to the Academy in 1788, and subsequently became a member of the states-general. During the Revolution he found an asylum with Prince Henry of Prussia at Rheinsberg. At the Restoration he was made joint-librarian of the Bibliothèque Mazarine. His wit and his skill in light verse had won him a great reputation, and he was one of the idols of the Parisian salons. His paradoxical character was described in an epigram attributed to Antoine de Rivarol, "*abbé libertin, militaire philosophe, diplomate chansonnier, émigré patriote, républicain courtisan*." He died in Paris on the 18th of January 1815.

His *Œuvres complètes* were published under his own supervision in 1803. A selection of his stories in prose and verse was edited by Eugène Asse in 1878; his *Poésies* by O. Uzanne in 1886; and the *Correspondance inédite de la comtesse de Sabran et du chevalier de Boufflers* (1778-1788), by E. de Magnieu and Henri Prat in 1875.

BOUGAINVILLE, LOUIS ANTOINE DE (1729-1811), French navigator, was born at Paris on the 11th of November 1729. He was the son of a notary, and in early life studied law, but soon abandoned the profession, and in 1753 entered the army in the corps of musketeers. At the age of twenty-five he published a treatise on the integral calculus, as a supplement to De l'Hôpital's treatise, *Des infiniment petits*. In 1755 he was sent to London as secretary to the French embassy, and was made a member of the Royal Society. In 1756 he went to Canada as captain of dragoons and aide-de-camp to the marquis de Montcalm; and having distinguished himself in the war against England, was rewarded with the rank of colonel and the cross of St Louis. He afterwards served in the Seven Years' War from 1761 to 1763. After the peace, when the French government conceived the project of colonizing the Falkland Islands, Bougainville undertook the task at his own expense. But the settlement having excited the jealousy of the Spaniards, the French government gave it up to them, on condition of their indemnifying Bougainville. He was then appointed to the command of the frigate "La Boudeuse" and the transport "L'Etoile," and set sail in December 1766 on a voyage of discovery round the world. Having executed his commission of delivering up the Falkland Islands to the Spanish, Bougainville proceeded on his expedition, and touched at Buenos Aires. Passing through the Straits of Magellan, he visited the Tuamotu archipelago, and Tahiti, where the English navigator Wallis had touched eight months before. He proceeded across the Pacific Ocean by way of the Samoan group, which he named the Navigators Islands, the New Hebrides and the Solomon Islands. His men now suffering from scurvy, and his vessels requiring refitting, he anchored at Buru, one of the Moluccas, where the governor of the Dutch settlement supplied his wants. It was the beginning of September, and the expedition took advantage of the easterly monsoon, which carried them to Batavia. In March 1769 the expedition arrived at St Malo, with the loss of only seven out of upwards of 200 men. Bougainville's account of the voyage (Paris, 1771) is written with simplicity and some humour. After an interval of several years, he again accepted a naval command and saw much active service between 1779 and 1782. In the memorable engagement of the 12th of April 1782, in which Rodney defeated the comte de Grasse, near Martinique, Bougainville, who commanded the "Auguste," succeeded in rallying eight ships of his own division, and bringing them safely into St Eustace. He was created *chef d'escadre*, and on re-entering the army, was given the rank of *maréchal de camp*. After the peace he returned to Paris, and obtained the place of associate of the Academy. He projected a voyage of discovery towards the north pole, but this did not meet with support from the French government. Bougainville obtained the rank of vice-admiral in 1791; and in 1792, having escaped almost miraculously from the massacres of Paris, he retired to his estate in Normandy. He was chosen a member of the Institute at its formation, and returning to Paris became a member of the Board of Longitude. In his old age Napoleon I. made him a senator, count of the empire, and member of the Legion of Honour. He died at Paris on the 31st of August 1811. He was married and had three sons, who served in the French army.

Bougainville's name is given to the largest member of the Solomon Islands, which belongs to Germany; and to the strait which divides it from the British island of Choiseul. It is also applied to the strait between Mallicollo and Espiritu Santo Islands of the New Hebrides group, and the South American climbing plant *Bougainvillea*, often cultivated in greenhouses, is named after him.

BOUGHTON, GEORGE HENRY (1834-1905), Anglo-American painter, was born in England, but his parents went to the United States in 1839, and he was brought up at Albany, N.Y. He studied art in Paris in 1861-62, and subsequently lived mainly in London; he was much influenced by Frederick Walker, and the delicacy and grace of his pictures soon made his reputation. He was elected an A.R.A. in 1879, and R.A. in 1896, and a member of the National Academy of Design in New York in 1871. His

pictures of Dutch life and scenery were especially characteristic; and his subject-pictures, such as the “Return of the Mayflower” and “The Scarlet Letter,” were very popular in America.

BOUGIE, a seaport of Algeria, chief town of an arrondissement in the department of Constantine, 120 m. E. of Algiers. The town, which is defended by a wall built since the French occupation, and by detached forts, is beautifully situated on the slope of Mount Guraya. Behind it are the heights of Mounts Babor and Tababort, rising some 6400 ft. and crowned with forests of pinsapo fir and cedar. The most interesting buildings in the town are the ancient forts, Borj-el-Ahmer and Abd-el-Kader, and the kasbah or citadel, rectangular in form, flanked by bastions and towers, and bearing inscriptions stating that it was built by the Spaniards in 1545. Parts of the Roman wall exist, and considerable portions of that built by the Hammadites in the 11th century. The streets are very steep, and many are ascended by stairs. The harbour, sheltered from the east by a breakwater, was enlarged in 1897-1902. It covers 63 acres and has a depth of water of 23 to 30 ft. Bougie is the natural port of Kabylia, and under the French rule its commerce—chiefly in oils, wools, hides and minerals—has greatly developed; a branch railway runs to Beni Mansur on the main line from Constantine to Oran. Pop. (1906) of the town, 10,419; of the commune, 17,540; of the arrondissement, which includes eight communes, 37,711.

Bougie, if it be correctly identified with the Saldae of the Romans, is a town of great antiquity, and probably owes its origin to the Carthaginians. Early in the 5th century Genseric the Vandal surrounded it with walls and for some time made it his capital. En-Nasr (1062-1088), the most powerful of the Berber dynasty of Hammad, made Bougie the seat of his government, and it became the greatest commercial centre of the North African coast, attaining a high degree of civilization. From an old MS. it appears that as early as 1068 the heliograph was in common use, special towers, with mirrors properly arranged, being built for the purpose of signalling. The Italian merchants of the 12th and 13th centuries owned numerous buildings in the city, such as warehouses, baths and churches. At the end of the 13th century Bougie passed under the dominion of the Hafsides, and in the 15th century it became one of the strongholds of the Barbary pirates. It enjoyed partial independence under amirs of Hafside origin, but in January 1510 was captured by the Spaniards under Pedro Navarro. The Spaniards strongly fortified the place and held it against two attacks by the corsairs Barbarossa. In 1555, however, Bougie was taken by Salah Rais, the pasha of Algiers. Leo Africanus, in his *Africae descriptio*, speaks of the “magnificence” of the temples, palaces and other buildings of the city in his day (*c.* 1525), but it appears to have fallen into decay not long afterwards. When the French took the town from the Algerians in 1833 it consisted of little more than a few fortifications and ruins. It is said that the French word for a candle is derived from the name of the town, candles being first made of wax imported from Bougie.

BOUGUER, PIERRE (1698-1758), French mathematician, was born on the 16th of February 1698. His father, John Bouguer, one of the best hydrographers of his time, was regius professor of hydrography at Croisic in lower Brittany, and author of a treatise on navigation. In 1713 he was appointed to succeed his father as professor of hydrography. In 1727 he gained the prize given by the Académie des Sciences for his paper “On the best manner of forming and distributing the masts of ships”; and two other prizes, one for his dissertation “On the best method of observing the altitude of stars at sea,” the other for his paper “On the best method of observing the variation of the compass at sea.” These were published in the *Prix de l’Académie des Sciences*. In 1729 he published *Essai d’optique sur la gradation de la lumière*, the object of which is to define the quantity of light lost by passing through a given extent of the atmosphere. He found the light of the sun to be 300 times more intense than that of the moon, and thus made some of the earliest measurements in photometry. In 1730 he was made professor of hydrography at Havre, and succeeded P.L.M. de Maupertuis as associate geometer of the Académie des Sciences. He also invented a heliometer, afterwards perfected by Fraunhofer. He was afterwards promoted in the Academy to the place of Maupertuis, and went to reside in Paris. In 1735 Bouguer sailed with C.M. de la Condamine for Peru, in order to measure a degree of the meridian near the equator. Ten years were spent in this operation, a full account of which was published by Bouguer in 1749, *Figure de la terre déterminée*. His later writings were nearly all upon the theory of navigation. He died on the 15th of August 1758.

The following is a list of his principal works:—*Traité d’optique sur la gradation de la lumière* (1729 and 1760); *Entretiens sur la cause d’inclinaison des orbites des planètes* (1734); *Traité de navire, &c.* (1746, 4to); *La Figure de la terre déterminée, &c.* (1749), 4to; *Nouveau traité de navigation, contenant la théorie et la pratique du pilotage* (1753); *Solution des principaux problèmes sur la manoeuvre des vaisseaux* (1757); *Opérations faites pour la vérification du degré du méridien entre Paris et Amiens*, par Mess. Bouguer, Camus, Cassini et Pingré(1757).

See J.E. Montucla, *Histoire des mathématiques* (1802).

BOUGUEREAU, ADOLPHE WILLIAM (1825-1905), French painter, was born at La Rochelle on the 30th of November 1825. From 1843 till 1850 he went through the course of training at the École des Beaux-Arts, and in 1850 divided the Grand Prix de Rome scholarship with Baudry, the subject set being "Zenobia on the banks of the Araxes." On his return from Rome in 1855 he was employed in decorating several aristocratic residences, deriving inspiration from the frescoes which he had seen at Pompeii and Herculaneum, and which had already suggested his "Idyll" (1853). He also began in 1847 to exhibit regularly at the Salon. "The Martyr's Triumph," the body of St Cecilia borne to the catacombs, was placed in the Luxembourg after being exhibited at the Paris Exhibition of 1855; and in the same year he exhibited "Fraternal Love," a "Portrait" and a "Study." The state subsequently commissioned him to paint the emperor's visit to the sufferers by the inundations at Tarascon. In 1857 Bouguereau received a first prize medal. Nine of his panels executed in wax-painting for the mansion of M. Bartholomy were much discussed—"Love," "Friendship," "Fortune," "Spring," "Summer," "Dancing," "Arion on a Sea-horse," a "Bacchante" and the "Four Divisions of the Day." He also exhibited at the Salon "The Return of Tobit" (now in the Dijon gallery). While in antique subjects he showed much grace of design, in his "Napoleon," a work of evident labour, he betrayed a lack of ease in the treatment of modern costume. Bouguereau subsequently exhibited "Love Wounded" (1859), "The Day of the Dead" (at Bordeaux), "The First Discord" (1861, in the Club at Limoges), "The Return from the Fields" (a picture in which Théophile Gautier recognized "a pure feeling for the antique"), "A Fawn and Bacchante" and "Peace"; in 1863 a "Holy Family," "Remorse," "A Bacchante teasing a Goat" (in the Bordeaux gallery); in 1864 "A Bather" (at Ghent), and "Sleep"; in 1865 "An Indigent Family," and a portrait of Mme Bartholomy; in 1866 "A First Cause," and "Covetousness," with "Philomela and Procne"; and some decorative work for M. Montlun at La Rochelle, for M. Emile Péreire in Paris, and for the churches of St Clotilde and St Augustin; and in 1866 the large painting of "Apollo and the Muses on Olympus," in the Great Theatre at Bordeaux. Among other works by this artist may be mentioned "Between Love and Riches" (1869), "A Girl Bathing" (1870), "In Harvest Time" (1872), "Nymphs and Satyrs" (1873), "Charity" and "Homer and his Guide" (1874), "Virgin and Child," "Jesus and John the Baptist," "Return of Spring" (which was purchased by an American collector, and was destroyed by a fanatic who objected to the nudity), a "Pietà" (1876), "A Girl defending herself from Love" (1880), "Night" (1883), "The Youth of Bacchus" (1884), "Biblis" (1885), "Love Disarmed" (1886), "Love Victorious" (1887), "The Holy Women at the Sepulchre" and "The Little Beggar Girls" (1890), "Love in a Shower" and "First Jewels" (1891). To the Exhibition of 1900 were contributed some of Bouguereau's best-known pictures. Most of his works, especially "The Triumph of Venus" (1856) and "Charity," are popularly known through engravings. "Prayer," "The Invocation" and "Sappho" have been engraved by M. Thirion, "The Golden Age" by M. Annetombe. Bouguereau's pictures, highly appreciated by the general public, have been severely criticized by the partisans of a freer and fresher style of art, who have reproached him with being too content to revive the formulas and subjects of the antique. At the Paris Exhibition of 1867 Bouguereau took a third-class medal, in 1878 a medal of honour, and the same again in the Salon of 1885. He was chosen by the Society of French Artists to be their vice-president, a post he filled with much energy. He was made a member of the Legion of Honour in 1856, an officer of the Order 26th of July 1876, and commander 12th of July 1885. He succeeded Isidore Pils as member of the Institute, 8th of January 1876. He died on the 20th of August 1905.

See Ch. Vendryes, *Catalogue illustré des œuvres de Bouguereau* (Paris, 1885); Jules Claretie, *Peintres et sculpteurs contemporains* (Paris, 1874); P.G. Hamerton, *French Painters; Artistes modernes: dictionnaire illustré des beaux-arts* (1885); "W. Bouguereau," *Portfolio* (1875); Émile Bayard, "William Bouguereau," *Monde moderne* (1897).

BOUHOURS, DOMINIQUE (1628-1702), French critic, was born in Paris in 1628. He entered the Society of Jesus at the age of sixteen, and was appointed to read lectures on literature in the college of Clermont at Paris, and on rhetoric at Tours. He afterwards became private tutor to the two sons of the duke of Longueville. He was sent to Dunkirk to the Romanist refugees from England, and in the midst of his missionary occupations published several books. In 1665 or 1666 he returned to Paris, and published in 1671 *Les Entretiens d'Ariste et d'Eugène*, a critical work on the French language, printed five times at Paris, twice at Grenoble, and afterwards at Lyons, Brussels, Amsterdam, Leiden, &c. The chief of his other works are *La Manière de bien penser sur les ouvrages d'esprit* (1687), *Doutes sur la langue française* (1674), *Vie de Saint Ignace de Loyola* (1679), *Vie de Saint François Xavier* (1682), and a translation of the New Testament into French (1697). His practice of publishing secular books and works of devotion alternately led to the *mot*, *"qu'il servait le monde et le ciel par semestre."* Bouhours died at Paris on the 27th of May 1702.

See Georges Doucieux, *Un Jésuite homme de lettres au dix-septième siècle: Le père Bouhours* (1886). For a list of Bouhours' works see Backer and Sommervogel, *Bibliothèque de la Compagnie de Jésus*, i. pp. 1886 et seq.

BOUILHET, LOUIS HYACINTHE (1822-1869), French poet and dramatist, was born at Cany, Seine Inférieure, on the 27th of May 1822. He was a schoolfellow of Gustave Flaubert, to whom he dedicated his first work, *Méloenis* (1851), a narrative poem in five cantos, dealing with Roman manners under the emperor Commodus. His volume of poems entitled *Fossiles* attracted considerable attention, on account of the attempt therein to use science as a subject for poetry. These poems were included also in *Festons et astragales* (1859). As a dramatist he secured a success with his first play, *Madame de Montarcy* (1856), which ran for seventy-eight nights at the Odéon; and *Hélène Peyron* (1858) and *L'Oncle Million* (1860) were also favourably received. But of his other plays, some of them of real merit, only the *Conjuration d'Amboise* (1866) met with any great success. Bouilhet died on the 18th of July 1869, at Rouen. Flaubert published his posthumous poems with a notice of the author, in 1872.

See also Maxime du Camp, *Souvenirs littéraires* (1882); and H. de la Ville de Mirmont, *Le Poète Louis Bouilhet* (1888).

BOUILLÉ, FRANÇOIS CLAUDE AMOUR, Marquis de (1739-1800), French general. He served in the Seven Years' War, and as governor in the Antilles conducted operations against the English in the War of American Independence. On his return to France he was named governor of the Three Bishoprics, of Alsace and of Franche-Comté. Hostile to the Revolution, he had continual quarrels with the municipality of Metz, and brutally suppressed the military insurrections at Metz and Nancy, which had been provoked by the harsh conduct of certain noble officers. Then he proposed to Louis XVI. to take refuge in a frontier town where an appeal could be made to other nations against the revolutionists. When this project failed as a result of Louis XVI.'s arrest at Varennes, Bouillé went to Russia to induce Catherine II. to intervene in favour of the king, and then to England, where he died in 1800, after serving in various royalist attempts on France. He left *Mémoires sur la Révolution française depuis son origine jusqu'à la retraite du duc de Brunswick* (Paris, 1801).

BOUILLON, formerly the seat of a dukedom in the Ardennes, now a small town in the Belgian province of Luxemburg. Pop. (1904) 2721. It is most picturesquely situated in the valley under the rocky ridge on which are still the very well preserved remains of the castle of Godfrey of Bouillon (*q.v.*), the leader of the first crusade. The town, 690 ft. above the sea, but lying in a basin, skirts both banks of the river Semois which is crossed by two bridges. The stream forms a loop round and almost encircles the castle, from which there are beautiful views of the sinuous valley and the opposite well-wooded heights. The whole effect of the grim castle, the silvery stream and the verdant woods makes one of the most striking scenes in Belgium. In the 8th and 9th centuries Bouillon was one of the castles of the counts of Ardenne and Bouillon. In the 10th and 11th centuries the family took the higher titles of dukes of Lower Lorraine and Bouillon. These dukes all bore the name of Godfrey (Godefroy) and the fifth of them was the great crusader. He was the son of Eustace, count of Boulogne, which has led many commentators into the error of saying that Godfrey of Bouillon was born at the French port, whereas he was really born in the castle of Baisy near Genappe and Waterloo. His mother was Ida d'Ardenne, sister of the fourth Godfrey ("the Hunchback"), and the successful defence of the castle when a mere youth of seventeen on her behalf was the first feat of arms of the future conqueror of Jerusalem. This medieval fortress, strong by art as well as position before the invention of modern artillery, has since undergone numerous sieges. In order to undertake the crusade Godfrey sold the castle of Bouillon to the prince bishop of Liége, and the title of duke of Bouillon remained the appendage of the bishopric till 1678, or for 580 years. The bishops appointed "châtelains," one of whom was the celebrated "Wild Boar of the Ardennes," William de la Marck. His descendants made themselves quasi-independent and called themselves princes of Sedan and dukes of Bouillon, and they were even recognized by the king of France. The possession of Bouillon thenceforward became a constant cause of strife until in 1678 Louis XIV. garrisoned it under the treaty of Nijmwegen. From 1594 to 1641 the duchy remained vested in the French family of La Tour d'Auvergne, one of whom (Henry, viscount of Turenne and marshal of France) had married in 1591 Charlotte de la Marck, the last of her race. In 1676 the duke of Créquy seized it in the name of Louis XIV., who in 1678 gave it to Godefroy Marie de La Tour d'Auvergne, whose descendants continued in possession till 1795. Bouillon remained French till 1814, and Vauban called it "the key of the Ardennes." In 1760 the elder Rousseau established here the famous press of the Encyclopaedists. In 1814-1815, before the decrees of the Vienna Congress were known, an extraordinary attempt was made by Philippe d'Auvergne of the British navy, the cousin and adopted son of the last duke, to revive the ancient duchy of Bouillon. The people of Bouillon freely recognized him, and Louis XVIII. was well pleased with the arrangement, but the congress assigned Bouillon to the Netherlands. Napoleon III. on his way to Germany after Sedan slept one night in the little town, which is a convenient centre for visiting that battlefield.

BOUILLOTTE, a French game of cards, very popular during the Revolution, and again for some years from 1830. Five, four or three persons may play; a piquet pack is used, from which, in case five play, the sevens, when four the knaves, and when three the queens also, are omitted. Counters or chips, as in poker, are used. Before the deal each player "antes" one counter, after which each, the "age" passing, may "raise" the pot; those not "seeing the raise" being obliged to drop out. Three cards are dealt to each player, and a thirteenth, called the *retourne*, when four play, turned up. Each player must then bet, call, raise or drop out. When a call is made the hands are shown and the best hand wins. The hands rank as follows: *brélan carré*, four of a kind, one being the *retourne*; *simple brélan*, three of a kind, ace being high; *brélan favori*, three of a kind, one being the *retourne*. When no player holds a *brélan* the hand holding the greatest number of pips wins, ace counting 11, and court cards 10.

BOUILLY, JEAN NICOLAS (1763-1842), French author, was born near Tours on the 24th of January 1763. At the outbreak of the Revolution he held office under the new government, and had a considerable share in the organization of primary education. In 1799 he retired from public life to devote himself to literature. His numerous works include the musical comedy, *Pierre le Grand* (1790), for Grétry's music, and the opera, *Les Deux Journées* (1800), music by Cherubini; also *L'Abbé de l'épée* (1800), and some other plays; and *Causeries d'un vieillard* (1807), *Contes à ma fille* (1809), and *Les Adieux du vieux conteur* (1835). His *Léonore* (1798) formed the basis of the libretto of the *Fidelio* of Beethoven. Bouilly died in Paris on the 14th of April 1842.

See Bouilly, *Mes récapitulations* (3 vols., 1836-1837); E. Legouvé, *Soixante ans de souvenir* (lère partie, 1886).

BOULAINVILLIERS, HENRI, Comte de (1658-1722), French political writer, was born at St Saire in Normandy in 1658. He was educated at the college of Juilly, and served in the army until 1697. He wrote a number of historical works (published after his death), of which the most important were the following: *Histoire de l'ancien gouvernement de la France* (La Haye, 1727); *État de la France, avec des mémoires sur l'ancien gouvernement* (London, 1727); *Histoire de la pairie de France* (London, 1753); *Histoire des Arabes* (1731). His writings are characterized by an extravagant admiration of the feudal system. He was an aristocrat of the most pronounced type, attacking absolute monarchy on the one hand and popular government on the other. He was at great pains to prove the pretensions of his own family to ancient nobility, and maintained that the government should be entrusted solely to men of his class. He died in Paris on the 23rd of January 1722.

BOULANGER, the name of several French artists:—Jean (1606-1660), a pupil of Guido Reni at Bologna, who had an academy at Modena; his cousin Jean (1607-1680), a celebrated line-engraver; the latter's son Matthieu, another engraver; Louis (1806-1867), a subject-painter, the friend of Victor Hugo, and director of the imperial school of art at Dijon; the best-known, Gustave Rodolphe Clarence (1824-1888), a pupil of Paul Delaroche, a notable painter of Oriental and Greek and Roman subjects, and a member of the Institute (1882); and Clément (1805-1842), a pupil of Ingres.

BOULANGER, GEORGE ERNEST JEAN MARIE (1837-1891), French general, was born at Rennes on the 29th of April 1837. He entered the army in 1856, and served in Algeria, Italy, Cochin-China and the Franco-German War, earning the reputation of being a smart soldier. He was made a brigadier-general in 1880, on the recommendation of the duc d'Aumale, then commanding the VII. army corps, and Boulanger's expressions of gratitude and devotion on this occasion were remembered against him afterwards when, as war minister in M. Freycinet's cabinet, he erased the name of the due d'Aumale from the army list, as part of the republican campaign against the Orleanist and Bonapartist princes. In 1882 his appointment as director of infantry at the war office enabled him to make himself conspicuous as a military reformer; and in 1884 he was appointed to command the army occupying Tunis, but was recalled owing to his differences of opinion with M. Cambon, the political resident. He returned to Paris, and began to take part in politics under the aegis of M. Clémenceau and the Radical party; and in

January 1886, when M. Freycinet was brought into power by the support of the Radical leader, Boulanger was given the post of war minister.

By introducing genuine reforms for the benefit of officers and common soldiers alike, and by laying himself out for popularity in the most pronounced fashion—notably by his fire-eating attitude towards Germany in April 1887 in connexion with the Schnaebele frontier incident—Boulanger came to be accepted by the mob as the man destined to give France her revenge for the disasters of 1870, and to be used simultaneously as a tool by all the anti-Republican intriguers. His action with regard to the royal princes has already been referred to, but it should be added that Boulanger was taunted in the Senate with his ingratitude to the duc d'Aumale, and denied that he had ever used the words alleged. His letters containing them were, however, published, and the charge was proved. Boulanger fought a bloodless duel with the baron de Lareinty over this affair, but it had no effect at the moment in dimming his popularity, and on M. Freycinet's defeat in December 1886 he was retained by M. Goblet at the war office. M. Clémenceau, however, had by this time abandoned his patronage of Boulanger, who was becoming so inconveniently prominent that, in May 1887, M. Goblet was not sorry to get rid of him by resigning. The mob clamoured for their "brav' général," but M. Rouvier, who next formed a cabinet, declined to take him as a colleague, and Boulanger was sent to Clermont-Ferrand to command an army corps. A Boulangist "movement" was now in full swing. The Bonapartists had attached themselves to the general, and even the comte de Paris encouraged his followers to support him, to the dismay of those old-fashioned Royalists who resented Boulanger's treatment of the duc d'Aumale. His name was the theme of the popular song of the moment—"C'est Boulanger qu'il nous faut"; the general and his black horse became the idol of the Parisian populace; and he was urged to play the part of a plebiscitary candidate for the presidency.

The general's vanity lent itself to what was asked of it; after various symptoms of insubordination had shown themselves, he was deprived of his command in 1888 for twice coming to Paris without leave, and finally on the recommendation of a council of inquiry composed of five generals, his name was removed from the army list. He was, however, almost at once elected to the chamber for the Nord, his political programme being a demand for a revision of the constitution. In the chamber he was in a minority, since genuine Republicans of all varieties began to see what his success would mean, and his actions were accordingly directed to keeping the public gaze upon himself. A popular hero survives many deficiencies, and neither his failure as an orator nor the humiliation of a discomfiture in a duel with M. Floquet, then an elderly civilian, sufficed to check the enthusiasm of his following. During 1888 his personality was the dominating feature of French politics, and, when he resigned his seat as a protest against the reception given by the chamber to his revisionist proposals, constituencies vied with one another in selecting him as their representative. At last, in January 1889, he was returned for Paris by an overwhelming majority. He had now become an open menace to the parliamentary Republic. Had Boulanger immediately placed himself at the head of a revolt he might at this moment have effected the *coup d'état* which the intriguers had worked for, and might not improbably have made himself master of France; but the favourable opportunity passed. The government, with M. Constans as minister of the interior, had been quietly taking its measures for bringing a prosecution against him, and within two months a warrant was signed for his arrest. To the astonishment of his friends, on the 1st of April he fled from Paris before it could be executed, going first to Brussels and then to London. It was the end of the political danger, though Boulangist echoes continued for a little while to reverberate at the polls during 1889 and 1890. Boulanger himself, having been tried and condemned *in absentia* for treason, in October 1889 went to live in Jersey, but nobody now paid much attention to his doings. The world was startled, however, on the 30th of September 1891 by hearing that he had committed suicide in a cemetery at Brussels by blowing out his brains on the grave of his mistress, Madame de Bonnemains (*née* Marguerite Crouzet), who had died in the preceding July.

See also the article France: History; and Verly, *Le Général Boulanger et la conspiration monarchique* (Paris, 1893).

(H. Ch.)

BOULAY DE LA MEURTHE, ANTOINE JACQUES CLAUDE JOSEPH, Comte (1761-1840), French politician and magistrate, son of an agricultural labourer, was born at Chamousey (Vosges) on the 19th of February 1761. Called to the bar at Nancy in 1783, he presently went to Paris, where he rapidly acquired a reputation as a lawyer and a speaker. He supported the revolutionary cause in Lorraine, and fought at Valmy (1792) and Wissembourg (1793) in the republican army. But his moderate principles brought suspicion on him, and during the Terror he had to go into hiding. He represented La Meurthe in the Council of Five Hundred, of which he was twice president, but his views developed steadily in the conservative direction. Fearing a possible renewal of the Terror, he became an active member of the plot for the overthrow of the Directory in November 1799. He was rewarded by the presidency of the legislative commission formed by Napoleon to draw up the new constitution; and as president of the legislative section of the council of state he examined and revised the draft of the civil code. In eight years of hard work as director of a special land commission he settled the titles of land acquired by the French nation at the Revolution, and placed on an unassailable basis the rights of the proprietors who had bought this land from the government. He received the grand cross of the Legion of Honour and the title of count, was a member of Napoleon's privy council, but was never in high favour at court. After

Waterloo he tried to obtain the recognition of Napoleon II. He was placed under surveillance at Nancy, and later at Halberstadt and Frankfort-on-Main. He was allowed to return to France in 1819, but took no further active part in politics, although he presented himself unsuccessfully for parliamentary election in 1824 and 1827. He died in Paris on the 4th of February 1840. He published two books on English history—*Essai sur les causes qui, en 1649, amenèrent en Angleterre l'établissement de la république* (Paris, 1799), and *Tableau politique des regnes de Charles II et Jacques II, derniers rois de la maison de Stuart* (The Hague, 1818)—which contained much indirect criticism of the Directory and the Restoration governments. He devoted the last years of his life to writing his memoirs, which, with the exception of a fragment on the *Théorie constitutionnelle de Sieyès* (1836), remained unpublished.

His elder son, Comte Henri Georges Boulay de la Meurthe (1797-1858), was a constant Bonapartist, and after the election of Louis Napoleon to the presidency, was named (January 1849) vice-president of the republic. He zealously promoted popular education, and became in 1842 president of the society for elementary instruction.

BOULDER, a city and the county-seat of Boulder county, Colorado, U.S.A., about 30 m. N.W. of Denver. Pop. (1890) 3330; (1900) 6150 (693 foreign-born); (1910) 9539. It is served by the Union Pacific, the Colorado & Southern, and the Denver, Boulder & Western railways; the last connects with the neighbouring mining camps, and affords fine views of mountain scenery. Boulder lies about 5300 ft. above the sea on Middle Boulder Creek, a branch of the St Vrain river about 30 m. from its confluence with the Platte, and has a beautiful situation in the valley at the foot of the mountains. The state university of Colorado, established at Boulder by an act of 1861, was opened in 1877; it includes a college of liberal arts, school of medicine (1883), school of law (1892), college of engineering (1893), graduate school, college of commerce (1906), college of education (1908), and a summer school (1904), and has a library of about 42,000 volumes. There are a fine park of 2840 acres, the property of the city, and three beautiful cañons near Boulder. At the southern limits, in a beautiful situation 400 ft. above the city, are the grounds of an annual summer school, the Colorado Chautauqua. The climate is beneficial for those afflicted with bronchial and pulmonary troubles; the average mean annual temperature for eleven years ending with 1907 was 51° F. There are medicinal springs in the vicinity. The water-works are owned and operated by the city, the water being obtained from lakes at the foot of the Arapahoe Peak glacier in the Snowy Range, 20 m. from the city. The surrounding country is irrigated, and successfully combines agriculture and mining. There are ore sampling works and brick-making establishments. Oil and natural gas abound in the vicinity; there are oil refineries in the city; and in Boulder county, especially at Nederland, 18 m. south-west, and at Eldora, about 22 m. south-west of the city, has been obtained since 1900 most of the tungsten mined in the United States; the output in 1907 was valued at about $520,000. The first settlement near the site of Boulder was made in the autumn of 1858. Placer gold was discovered on an affluent of Boulder Creek in January 1859. The town was laid out and organized in February 1859, and a city charter was secured in 1871 and another in 1882.

BOULDER (short for "boulder-stone," of uncertain origin; cf. Swed. *bullersten*, a large stone which causes a noise of rippling water in a stream, from *bullra*, to make a loud noise), a large stone, weathered or water-worn; especially a geological term for a large mass of rock transported to a distance from the formation to which it belongs. Similarly, in mining, a mass of ore found at a distance from the lode.

BOULDER CLAY, in geology, a deposit of clay, often full of boulders, which is formed in and beneath glaciers and ice-sheets wherever they are found, but is in a special sense the typical deposit of the Glacial Period in northern Europe and America. Boulder clay is variously known as "till" or "ground moraine" (Ger. *Blocklehme*, *Geschiebsmergel* or *Grundmoräne*; Fr. *argile à blocaux*, *moraine profonde*; Swed. *Krosstenslera*). It is usually a stiff, tough clay devoid of stratification; though some varieties are distinctly laminated. Occasionally, within the boulder clay, there are irregular lenticular masses of more or less stratified sand, gravel or loam. As the boulder clay is the result of the abrasion (direct or indirect) of the older rocks over which the ice has travelled, it takes its colour from them; thus, in Britain, over Triassic and Old Red Sandstone areas the clay is red, over Carboniferous rocks it is often black, over Silurian rock it may be buff or grey, and where the ice has passed over chalk the clay may be quite white and chalky (chalky boulder clay). Much boulder clay is of a bluish-grey colour where unexposed, but it becomes brown upon being weathered.

The boulders are held within the clay in an irregular manner, and they vary in size from mere pellets up to masses many tons in weight. Usually they are somewhat oblong, and often they possess a flat side or "sole"; they may be angular, sub-angular, or well rounded, and, if they are hard rocks, they frequently bear grooves and scratches caused by contact with other rocks while held firmly in the moving ice. Like the clay in which they are borne, the boulders belong to districts over which the ice has travelled; in some regions they are mainly limestones or sandstones; in others they are granite, basalts, gneisses, &c.; indeed, they may consist of any hard rock. By the nature of the contained boulders it is often possible to trace the path along which a vanished ice-sheet moved; thus in the Glacial drift of the east coast of England many Scandinavian rocks can be recognized.

With the exception of foraminifera which have been found in the boulder clay of widely separated regions, fossils are practically unknown; but in some maritime districts marine shells have been incorporated with the clay. See Glacial Period; and Glacier.

BOULĒ (Gr. βουλή, literally "will," "advice"; hence a "council"), the general term in ancient Greece for an advisory council. In the loose Homeric state, as in all primitive societies, there was a council of this kind, probably composed of the heads of families, *i.e.* of the leading princes or nobles, who met usually on the summons of the king for the purpose of consultation. Sometimes, however, it met on its own initiative, and laid suggestions before the king. It formed a means of communication between the king and the freemen assembled in the Agora. In Dorian states this aristocratic form of government was retained (for the Spartan Council of Elders see Gerousia). In Athens the ancient council was called the Boule until the institution of a democratic council, or committee of the Ecclesia, when, for purposes of distinction, it was described as "the Boulē on the Areopagus," or, more shortly, "the Areopagus" (*q.v.*). It must be clearly understood that the second, or Solonian Boule, was entirely different from the Areopagus which represented the Homeric Council of the King throughout Athenian history, even after the "mutilation" carried out by Ephialtes. Further, it is, as will appear below, a profound mistake to call the second Boule a "senate." There is no real analogy between the Roman senate and the Athenian council of Five Hundred.

Before describing the Athenian Boule, the only one of its kind of which we have even fairly detailed information, it is necessary to mention that councils existed in other Greek states also, both oligarchic and democratic. A Boulē was in the first place a necessary part of a Greek oligarchy; the transition from monarchy to oligarchy was nominally begun by the gradual transference of the powers of the monarch to the Boule of nobles. Further, in the Greek democracy, the larger democratic Boule was equally essential. The general assembly of the people was utterly unsuited to the proper management of state affairs in all their minutiae. We therefore find councils of both kinds in almost all the states of Greece. (1) At Corinth we learn that there was an oligarchic council of unknown numbers presided over by eight leaders (Nicol. Damasc. *Frag.* 60). It was probably like the old Homeric council, except that its constitution did not depend on a birth qualification, but on a high census. This was natural in Corinth where, according to Herodotus (ii. 167), mercantile pursuits bore no stigma. (2) From an inscription we learn that the Athenians, in imposing a constitution on Erythrae (about 450 B.C.), included a council analogous to their own. (3) In Elis (Thuc. v. 47) there was an aristocratic council of ninety, which was superseded by a popular council of six hundred (471). (4) Similarly in Argos there were an aristocratic council of eighty and later a popular council of much larger size (Thuc. v. 47). Councils are also found at (5) Rhodes, (6) Megalopolis (democratic), (7) Corcyra (democratic), (Thuc. iii. 70). Of these seven the most instructive is that of Erythrae, which proves that in the 5th century the Council of Five Hundred was so efficient in Athens that a similar body was imposed at Erythrae (and probably in the other tributary cities).

The Boulē at Athens. History.—The origin of the second Boulē, or Council of Four Hundred, at Athens is involved in obscurity. In the Aristotelian *Constitution of Athens* (*c.* 4), it is stated that Draco established a council of 401, and that he transferred to it some of the functions of the Council of Areopagus (*q.v.*). It is, however, generally held (see Draco) that this statement is untrue, and that it was Solon who first established the council as a part of the constitution. Thirdly, it has been held that the council was not invented either by Draco or by Solon, but was of older and unknown origin. Fourthly, it has also been maintained by some recent writers that no Boulē existed before Cleisthenes. The principal evidence for this view is the omission of any reference to the Boulē in one of the earliest Athenian inscriptions, that relating to Salamis (Hicks and Hill, No. 4), where in place of the customary formula of a later age, ἔδοξε τῇ βουλῇ καὶ τῷ δήμῳ, we have the formula ἔδοχσεν τῷ δήμῳ. This argument is far from conclusive, and it is clear from the *Constitution* (*c.* 20) that the resistance of the Boulē to Cleomenes and Isagoras was anterior to the legislation of Cleisthenes (*i.e.* that the Boulē in question was the Solonian and not the Cleisthenian). On the whole it is reasonable to conclude that it was Solon who invented the Boulē to act as a semi-democratic check upon the democracy, whose power he was increasing at the expense of the oligarchs by giving new powers to the people in the Ecclesia and the Dicasteries. Practically nothing is known of the operations of this council until the struggle between Isagoras and Cleisthenes (Herod, v. 72). Solon's council had been based on the four Ionic tribes. When Cleisthenes created the new ten tribes in order to destroy the local influence of dominant families and to give the country demes a share in government, he changed the Solonian council into a body of 500

members, 50 from each tribe. This new body (see below) was the keystone of the Cleisthenean democracy, and may be said in a sense to have embodied the principle of local representation. After Cleisthenes, the council remained unaltered till 306 B.C., when, on the addition of two new tribes named after Antigonus and his son, Demetrius Poliorcetes, its numbers were increased to 600. In A.D. 126-127 the old number of 500 was restored. A council of 750 members is mentioned in an inscription of the early 3rd century A.D., and about A.D. 400 the number of councillors had fallen to 300.

Constitution and Functions.—(*a*) Under Solon the council consisted of 400 members, 100 from each of the four Ionic tribes. It is certain that all classes were eligible except the Thētes, but the method of appointment is not known. Three suggestions have been made, (1) that each tribe chose its representatives, (2) that they were chosen by lot from qualified citizens in rotation, (3) that the combined method of selection by lot from a larger number of elected candidates was employed. According to the passage in Plutarch's *Solon* the functions of this body were from the first *probouleutic* (*i.e.* it prepared the business for the Ecclesia). Others hold that this function was not assigned to it until the Cleisthenean reforms. When we consider, however, the double danger of leaving the Ecclesia in full power, and yet under the presidency of the aristocratic archons, it seems probable that the probouleutic functions were devised by Solon as a method of maintaining the balance. On this hypothesis the Solonian Boulē was from the first what it certainly was later, a *committee* of the Ecclesia, *i.e.* not a "senate." It may be regarded as certain that the system of Prytaneis was the invention of Cleisthenes, not of Solon. (*b*) Under Cleisthenes the council reached its full development as a democratic representative body. Its actual organization is still uncertain, but it may be inferred that it became gradually a more strictly self-existent body than the Solonian council. Every full citizen of thirty years of age was eligible, and, unlike other civil offices, it was permissible to serve twice, but not more than twice (*Ath. Pol.* c. 62). It may be regarded as certain, although our evidence is derived from inscriptions which date from the 3rd century B.C., that from the first the Bouleutae were appointed by the demes, in numbers proportionate to the size of the deme, and that from the first also the method of sortition was employed. For each councillor chosen by lot, a substitute was chosen in case of death or disgrace. After nomination each had to pass before the old council an examination in which the whole of his private life was scrutinized. After this, the councillors had to take an oath that they (1) would act according to the laws, (2) would give the best advice in their power, and (3) would carry out the examination of their successors in an impartial spirit. As symbols of office they wore wreaths; they received payment originally at the rate of one drachma a day,[1] at the end of the 4th century of five obols a day. At the end of the year of office each councillor had to render an account of his work, and if the council had done well the people voted crowns of honour. Within its own sphere the council exercised disciplinary control over its members by the device known as *Ecphyllophoria*; it could provisionally suspend a member, pending a formal trial before the whole council assembled *ad hoc*. The council had further a complete system of scribes or secretaries (*grammateis*), private treasury officials, and a paid herald who summoned the Boule and the Ecclesia. The meetings took place generally in the council hall (*Bouleuterion*), but on special occasions in the theatre, the stadium, the dockyards, the Acropolis or the Theseum. They were normally public, the audience being separated by a barrier, but on occasions of peculiar importance the public was excluded.

Solon's council.

Cleisthenes' council.

The Ecclesia, owing to its size and constitution, was unable to meet more than three or four times a month; the council, on the other hand, was in continuous session, except on feast days. It was impossible that the Five Hundred should all sit every day, and, therefore, to facilitate the despatch of business, the system of Prytaneis was introduced, probably by Cleisthenes. By this system the year was divided into ten equal periods. During each of these periods the council was represented by the fifty councillors of one of the ten tribes, who acted as a committee for carrying on business for a tenth of the year. Each of these committees was led by a president (*Epistates*), who acted as chairman of the Boule and the Ecclesia also, and a third of its numbers lived permanently during their period of office in the Tholos (Dome) or Skias, a round building where they (with certain other officials and honoured citizens) dined at the public expense. In 378-377 B.C. (or perhaps in the archonship of Eucleides, 403) the presidency of the Ecclesia was transferred to the *Epistates of the Proedri*, the *Proedri* being a body of nine chosen by lot by the Epistates of the Prytaneis from the remaining nine tribes. It was the duty of the Boule (*i.e.* the Prytany which was for the time in session) to prepare all business for the consideration of the Ecclesia. Their recommendation (προβούλευμα) was presented to the popular assembly (for procedure, see Ecclesia), which either passed it as it stood or made amendments subject to certain conditions. It must be clearly understood that the recommendation of the council had no intrinsic force until by the votes of the Ecclesia it passed into law as a psephism. But in addition to this function, the Council of the Five Hundred had large administrative and judicial control. (1) It was before the council that the Poletae arranged the farming of public revenues, the receipt of tenders for public works and the sale of confiscated property; further, it dealt with defaulting collectors (ἐκλόγεις), exacted the debts of private persons to the state, and probably drew up annual estimates. (2) It supervised the treasury payments of the Apodectae ("Receivers") and the "Treasurers of the God." (3) From Demosthenes (*In Androt.*) it is clear that it had to arrange for the provision of so many triremes per annum and the award of the trierarchic crown. (4) It arranged for the maintenance of the cavalry and the special levies from the demes. (5) It heard certain cases of *eisangelia* (impeachment) and had the right to fine up to 500 drachmas, or hand the case over to the Heliaea. The cases which it tried were mainly prosecutions for crimes against the state (*e.g.* treason, conspiracy, bribery). In later times it acted mainly as a court of first instance. Subsequently (*Ath. Pol.* c. 45) its powers were limited and an appeal was allowed to the popular courts. (6) The council presided over the *dokimasia* (consideration of fitness) of the magistrates; this examination, which was originally

Prytaneis.

concerned with a candidate's moral and physical fitness, degenerated into a mere inquiry into his politics. (7) In foreign affairs the council as the only body in permanent session naturally received foreign envoys and introduced them to the Ecclesia. Further, the Boulē;, with the Strategi ("Generals"), took treaty oaths, after the Ecclesia had decided on the terms. The Xenophontic *Politeia* states that the council of the 5th century was "concerned with war," but in the 4th century it chiefly supervised the docks and the fleet. On two occasions at least the council was specially endowed with full powers; Demosthenes (*De Fals. Leg.* p. 389) states that the people gave it full powers to send ambassadors to Philip, and Andocides (*De Myst.* 14 foil.) states that it had full power to investigate the affair of the mutilation of the Hermae on the night before the sailing of the Sicilian Expedition.

It will be seen that this democratic council was absolutely essential to the working of the Athenian state. Without having any final legislative authority, it was a necessary part of the legislative machinery, and it may be regarded as certain that a large proportion of its recommendations were passed without alteration or even discussion by the Ecclesia. The Boulē was, therefore, in the strict sense a committee of the Ecclesia, and was immediately connected with a system of sub-committees which exercised executive functions.

BIBLIOGRAPHY.—With this article compare ECCLESIA, STRATEGUS, ARCHON, DRACO, SOLON, CLEISTHENES, where collateral information is given. Besides the chief histories of Greece (Grote, ed. 1907, Meyer &c.), see Gilbert, *Constitutional Antiquities* (Eng. trans. by E.J. Brooks and T. Nicklin, 1895); J.B. Bury, *History of Greece* (1900); A.H.J. Greenidge *Handbook of Greek Constitutional History* (1896); J.E. Sandys' edition of the *Constitution of Athens*; Boeckh, *Die Staatshaushaltung der Athener* (1886); Schumann, *Griechische Altertümer* (1897-1902); Busolt, *Die griechischen Staats- und Rechtsaltertümer* (1902). See also H. Swoboda, *Die griechischen Volksbeschlüsse* (1890); Szanto, *Das griechische Bürgerrecht* (1892); Perrot, *Essai sur le droit public d'Athènes* (1869). It should be observed that all works published before 1891 are so far useless that they are without the information contained in the *Constitution of Athens* (*q.v.*). See also GREEK LAW.

(J. M. M.)

1 The institution of pay for the councillors may safely be ascribed to Pericles although we have no direct evidence of it before 411 B.C. (Thuc. viii. 69; see PERICLES).

BOULEVARD (a Fr. word, earlier *boulevart*, from Dutch or Ger. *Bollwerk*, cf. Eng. "bulwark"), originally, in fortification, an earthwork with a broad platform for artillery. It came into use owing to the width of the gangways in medieval walls being insufficient for the mounting of artillery thereon. The boulevard or bulwark was usually an earthen outwork mounting artillery, and so placed in advance as to prevent the guns of a besieger from battering the foot of the main walls. It was as a rule circular. Semicircular *demi-boulevards* were often constructed round the bases of the old masonry towers with the same object. In modern times the word is most frequently used to denote a promenade laid out on the site of a former fortification, and, by analogy, a broad avenue in a town planted with rows of trees.

BOULLE, ANDRÉ CHARLES (1642-1732), French cabinet-maker, who gave his name to a fashion of inlaying known as Boulle or Buhl work. The son of Jean Boulle, a member of a family of *ébénistes* who had already achieved distinction—Pierre Boulle, who died *c.* 1636, was for many years *tourneur et menuisier du roy des cabinets d'ébène*,—he became the most famous of his name and was, indeed, the second cabinet-maker—the first was Jean Macé—who has acquired individual renown. That must have begun at a comparatively early age, for at thirty he had already been granted one of those lodgings in the galleries of the Louvre which had been set apart by Henry IV. for the use of the most talented of the artists employed by the crown. To be admitted to these galleries was not only to receive a signal mark of royal favour, but to enjoy the important privilege of freedom from the trammels of the trade gilds. Boulle was given the deceased Jean Macé's own lodging in 1672 by Louis XIV. upon the recommendation, of Colbert, who described him as "*le plus habile ébéniste de Paris*," but in the patent conferring this privilege he is described also as "chaser, gilder and maker of marqueterie." Boulle appears to have been originally a painter, since the first payment to him by the crown of which there is any record (1669) specifies "ouvrages de peinture." He was employed for many years at Versailles, where the mirrored walls, the floors of "wood mosaic," the inlaid panelling and the pieces in marqueterie in the Cabinet du Dauphin were regarded as his most remarkable work. These rooms were long since dismantled and their contents dispersed, but Boulle's drawings for the work are in the Musée des Arts Décoratifs. His royal commissions were, indeed, innumerable, as we learn both from the *Comptes des bâtiments* and from the correspondence of Louvois. Not only the most magnificent of French monarchs, but foreign princes and the great nobles and financiers of his own country crowded him with commissions, and the *mot* of the abbé de Marolles, "*Boulle y tourne en ovale*," has become a stock quotation in the literature of French cabinet-making. Yet despite his distinction, the facility with which he worked, the high prices he obtained, and his workshops full of clever craftsmen, Boulle

appears to have been constantly short of money. He did not always pay his workmen, clients who had made considerable advances failed to obtain the fine things they had ordered, more than one application was made for permission to arrest him for debt under orders of the courts within the asylum of the Louvre, and in 1704 we find the king giving him six months' protection from his creditors on condition that he used the time to regulate his affairs or "ce scra la derniére grâce que sa majesté lui fera là-dessus." Twenty years later one of his sons was arrested at Fontainebleau and kept in prison for debt until the king had him released. In 1720 his finances were still further embarrassed by a fire which, beginning in another atelier, extended to his twenty workshops and destroyed most of the seasoned materials, appliances, models and finished work of which they were full. The salvage was sold and a petition for pecuniary help was sent to the regent, the result of which does not appear. It would seem that Boulle was never a good man of business, but, according to his friend Mariette, many of his pecuniary difficulties were caused by his passion for collecting pictures, engravings and other objects of art—the inventory of his losses in the fire, which exceeded £40,000 in amount, enumerates many old masters, including forty-eight drawings by Raphael and the manuscript journal kept by Rubens in Italy. He attended every sale of drawings and engravings, borrowed at high interest to pay for his purchases, and when the next sale took place, fresh expedients were devised for obtaining more money. Collecting was to Boulle a mania of which, says his friend, it was impossible to cure him. Thus he died in 1732, full of fame, years and debts. He left four sons who followed in his footsteps in more senses than one—Jean Philippe (born before 1690, dead before 1745), Pierre Benoit (d. 1741), Charles André (1685-1749) and Charles Joseph (1688-1754). Their affairs were embarrassed throughout their lives, and the three last are known to have died in debt.

All greatness is the product of its opportunities, and the elder Boulle was made by the happy circumstances of his time. He was born into a France which was just entering upon the most brilliant period of sumptuary magnificence which any nation has known in modern times. Louis XIV., so avid of the delights of the eye, by the reckless extravagance of his example turned the thoughts of his courtiers to domestic splendours which had hitherto been rare. The spacious palaces which arose in his time needed rich embellishment, and Boulle, who had not only inherited the rather flamboyant Italian traditions of the late Renaissance, but had *ébénisterie* in his blood, arose, as some such man invariably does arise, to gratify tastes in which personal pride and love of art were not unequally intermingled. He was by no means the first Frenchman to practise the delightful art of marqueterie, nor was he quite the inventor of the peculiar type of inlay which is chiefly associated with his name; but no artist, before or since, has used these motives with such astonishing skill, courage and surety. He produced pieces of monumental solidity blazing with harmonious colour, or gleaming with the sober and dignified reticence of ebony, ivory and white metal. The Renaissance artists chiefly employed wood in making furniture, ornamenting it with gilding and painting, and inlaying it with agate, cornelian, lapis-lazuli, marble of various tints, ivory, tortoise-shell, mother-of-pearl and various woods. Boulle improved upon this by inlaying brass devices into wood or tortoise-shell, which last he greatly used according to the design he had immediately in view, whether flowers, scenes, scrolls, &c.; to these he sometimes added enamelled metal. Indeed the use of tortoise-shell became so characteristic that any furniture, however cheap and common, which has a reddish *fond* that might by the ignorant be mistaken for inlay, is now described as "Buhl"—the name is the invention of the British auctioneer and furniture-maker. In this process the brass is thin, and, like the ornamental wood or tortoise-shell, forms a veneer. In the first instance the production of his work was costly, owing to the quantity of valuable material that was cut away and wasted, and, in addition, the labour lost in separately cutting for each article or copy of a pattern. By a subsequent improvement Boulle effected an economy by gluing together various sheets of material and sawing through the whole, so that an equal number of figures and matrices were produced at one operation. Boulle adopted from time to time various plans for the improvement of his designs. He placed gold-leaf or other suitable material under the tortoise-shell to produce such effect as he required; he chased the brass-work with a graver for a like purpose, and, when the metal required to be fastened down with brass pins or nails, these were hammered flat and disguised by ornamental chasing. He also adopted, in relief or in the round, brass feet, brackets, edgings, and other ornaments of appropriate design, partly to protect the corners and edges of his work, and partly for decoration. He subsequently used other brass mountings, such as claw-feet to pedestals, or figures in high or low relief, according to the effect he desired to produce. These mounts in the pieces that undoubtedly come from Boulle's *atelier* are nearly always of the greatest excellence. They were cast in the rough—the tools of the chaser gave them their sharpness, their minute finish, their jewel-like smoothness.

Unhappily it is by no means easy, even for the expert, to declare the authenticity of a commode, a bureau, or a table in the manner of Boulle and to all appearance from his workshops. His sons unquestionably carried on the traditions for some years after his death, and his imitators were many and capable. A few of the more magnificent pedigree-pieces are among the world's mobiliary treasures. There are, for instance, the two famous *armoires*, which fetched £12,075 at the Hamilton Palace sale; the marqueterie commodes, enriched with bronze mounts, in the Bibliotheque Mazarine; various cabinets and commodes and tables in the Louvre, the Musée Cluny and the Mobilier National; the marriage coffers of the dauphin which were in the San Donato collection. There are several fine authenticated pieces in the Wallace collection at Hertford House, together with others consummately imitated, probably in the Louis Seize period. On the rare occasions when a pedigree example comes into the auction-room, it invariably commands a high price; but there can be little doubt that the most splendid and sumptuous specimens of Boulle are diminishing in number, while the second and third classes of his work are perhaps becoming more numerous. The truth is that this wonderful work, with its engraved or inlaid designs of Bérain, its myriads of tiny pieces of ivory and copper, ebony and tortoise-shell, all kept together with glue and tiny chased nails, and applied very often to a rather soft,

white wood, is not meet to withstand the ravages of time and the variations of the atmosphere. Alternate heat and humidity are even greater enemies of inlaid furniture than time and wear—such delicate things are rarely much used, and are protected from ordinary chances of deterioration. There is consequently reason to rejoice when a piece of real artistry in furniture finds its final home in a museum, where a degree of warmth is maintained which, however distressing it may be to the visitor, at least preserves the contents from one of the worst enemies of the collector.

(J. P.-B.)

BOULOGNE, or Boullongne, the name of a family of French painters. Louis (1609-1674), who was one of the original members of the Academy of Painting and Sculpture (1648), became celebrated under Louis XIV. His traditions were continued by his children: Genevieve (1645-1708), who married the sculptor Jacques Clerion; Madeleine (1646-1710), whose work survives in the *Trophies d'armes* at Versailles; Bon (1649-1717), a successful teacher and decorative artist; and Louis the younger (1654-1733), who copied Raphael's cartoons for the Gobelins tapestry, and besides taking a high place as a painter was also a designer of medals.

BOULOGNE-SUR-MER, a fortified seaport of northern France and chief town of an arrondissement in Pas-de-Calais, situated on the shore of the English Channel at the mouth of the river Liane, 157 m. N.N.W. of Paris on the Northern railway, and 28 m. by sea S.E. of Folkestone, Kent. Pop. (1906) 49,636. Boulogne occupies the summit and slopes of a ridge of hills skirting the right bank of the Liane; the industrial quarter of Capécure extends along the opposite bank, and is reached by two bridges, while the river is also crossed by a double railway viaduct. The town consists of two parts, the Haute Ville and the Basse Ville. The former, situated on the top of the hill, is of comparatively small extent, and forms almost a parallelogram, surrounded by ramparts of the 13th century, and, outside them, by boulevards, and entered by ancient gateways. In this part are the law court, the château and the hotel de ville (built in the 18th century), and a belfry tower of the 13th and 17th centuries is in the immediate neighbourhood. In the château (13th century) now used as barracks, the emperor Napoleon III was confined after the abortive insurrection of 1840. At some distance north-west stands the church of Notre-Dame, a well-known place of pilgrimage, erected (1827-1866) on the site of an old building destroyed in the Revolution, of which the extensive crypt still remains. The modern town stretches from the foot of the hill to the harbour, along which it extends, terminating in an expanse of sandy beach frequented by bathers, and provided with a bathing establishment and casino. It contains several good streets, some of which are, however, very steep. A main street, named successively rue de la Lampe, St Nicolas and Grande rue, extends from the bridge across the Liane to the promenade by the side of the ramparts. This is intersected first by the Quai Gambetta, and farther back by the rue Victor Hugo and the rue Nationale, which contain the principal shops. The public buildings include several modern churches, two hospitals and a museum with collections of antiquities, natural history, porcelain, &c. Connected with the museum is a public library with 75,000 volumes and a number of valuable manuscripts, many of them richly illuminated. There are English churches in the town, and numerous boarding-schools intended for English pupils. Boulogne is the seat of a sub-prefect, and has tribunals of first instance and of commerce, a board of trade-arbitrators, a chamber of commerce and a branch of the Bank of France. There are also communal colleges, a national school of music, and schools of hydrography, commerce and industry. Boulogne has for a long time been one of the most anglicized of French cities; and in the tourist season a continuous stream of English travellers reach the continent at this point.

The harbour is formed by the mouth of the Liane. Two jetties enclose a channel leading into the river, which forms a tidal basin with a depth at neap-tides of 24 ft. Alongside this is an extensive dock, and behind it an inner port. There is also a tidal basin opening off the entrance channel. The depth of water in the river-harbour is 33 ft. at spring-tide and 24 ft. at neap-tide; in the sluice of the dock the numbers are 29½ and 23½ respectively. The commerce of Boulogne consists chiefly in the importation of jute, wool, woven goods of silk and wool skins, threads, coal, timber, and iron and steel, and the exportation of wine, woven goods, table fruit, potatoes and other vegetables, skins, motor-cars, forage and cement. The average annual value of the exports in the five years 1901-1905 was £10,953,000 (£11,704,000 in the years 1896-1900), and of the imports £6,064,000 (£7,003,000 in the years 1896-1900). From 1901 to 1905 the annual average of vessels entered, exclusive of fishing-smacks, was 2735, tonnage 1,747,699; and cleared 2750, tonnage 1,748,297. The total number of passengers between Folkestone and Boulogne in 1906 was 295,000 or 49% above the average for the years 1901-1905. These travelled by the steamers of the South-Eastern & Chatham railway company. The liners of the Dutch-American, Hamburg-American and other companies also call at the port. In the extent and value of its fisheries Boulogne is exceeded by no seaport in France. The most important branch is the herring-fishery; next in value is the mackerel. Large quantities of fresh fish are transmitted to Paris by railway, but an abundant supply is reserved to the town itself. The fishermen live for the most part in a separate quarter called La

Beurrière, situated in the upper part of the town. In 1905 the fisheries of Boulogne and the neighbouring village of Étaples employed over 400 boats and 4500 men, the value of the fish taken being estimated at £1,025,000. Among the numerous industrial establishments in Boulogne and its environs may be mentioned foundries, cement-factories, important steel-pen manufactories, oil-works, dye-works, fish-curing works, flax-mills, saw-mills, and manufactories of cloth, fireproof ware, chocolate, boots and shoes, and soap. Shipbuilding is also carried on.

Among the objects of interest in the neighbourhood the most remarkable is the Colonne de la Grande Armée, erected on the high ground above the town, in honour of Napoleon I., on occasion of the projected invasion of England, for which he here made great preparations. The pillar, which is of the Doric order, 166 ft. high, is surmounted by a statue of the emperor by A.S. Bosio. Though begun in 1804, the monument was not completed till 1841. On the edge of the cliff to the east of the port are some rude brick remains of an old building called Tour d'Ordre, said to be the ruins of a tower built by Caligula at the time of his intended invasion of Britain.

Boulogne is identified with the *Gessoriacum* of the Romans, under whom it was an important harbour. It is suggested that it was the *Portus Itius* where Julius Caesar assembled his fleet (see Itius Portus). At an early period it began to be known as *Bononia*, a name which has been gradually modified into the present form. The town was destroyed by the Normans in 882, but restored about 912. During the Carolingian period Boulogne was the chief town of a countship that was for long the subject of dispute between Flanders and Ponthieu. From the year 965 it belonged to the house of Ponthieu, of which Godfrey of Bouillon, the first king of Jerusalem, was a scion. Stephen of Blois, who became king of England in 1135, had married Mahaut, daughter and heiress of Eustace, count of Boulogne. Their daughter Mary married Matthew of Alsace (d. 1173), and her daughter Ida (d. 1216) married Renaud of Dammartin. Of this last marriage was issue Mahaut, countess of Boulogne, wife of Philip Hurepel (d. 1234), a son of King Philip Augustus. To her succeeded the house of Brabant, issue of Mahaut of Boulogne, sister of Ida, and wife of Henry I. of Brabant; and then the house of Auvergne, issue of Alice, daughter of Henry I. of Brabant, inherited the Boulonnais. It remained in the possession of descendants of these families until Philip the Good, duke of Burgundy, seized upon it in 1419. In 147 7 Louis XI. of France reconquered it, and reunited it to the French crown, giving Lauraguais as compensation to Bertrand IV. de la Tour, count of Auvergne, heir of the house of Auvergne. To avoid doing homage to Mary of Burgundy, suzerain of the Boulonnais and countess of Artois, Louis XI declared the countship of Boulogne to be held in fee of Our Lady of Boulogne. In 1544 Henry VIII.— more successful in this than Henry III. had been in 1347—took the town by siege; but it was restored to France in 1550. From 1566 to the end of the 18th century it was the seat of a bishopric.

BOULOGNE-SUR-SEINE, a town of northern France, in the department of Seine, on the right bank of the Seine, S.W. of Paris and immediately outside the fortifications. Pop. (1906) 49,412. The town has a Gothic church of the 14th and 15th centuries (restored in 1863) founded in honour of Notre-Dame of Boulogne-sur-Mer. To this fact is due the name of the place, which was previously called Menus-lès-St Cloud. Laundrying is extensively carried on as well as the manufacture of metal boxes, soap, oil and furniture, and there are numerous handsome residences. For the neighbouring Bois de Boulogne see Paris.

BOULTON, MATTHEW (1728-1809), English manufacturer and engineer, was born on the 3rd of September 1728, at Birmingham, where his father, Matthew Boulton the elder, was a manufacturer of metal articles of various kinds. To this business he succeeded on his father's death in 1759, and in consequence of its growth removed his works in 1762 from Snowhill to what was then a tract of barren heath at Soho, 2 mi. north of Birmingham. Here he undertook the manufacture of artistic objects in metal, as well as the reproduction of oil paintings by a mechanical process in which he was associated with Francis Eginton (1737-1805), who subsequently achieved a reputation as a worker in stained or enamelled glass. About 1767, Boulton, who was finding the need of improving the motive power for his machinery, made the acquaintance of James Watt, who on his side appreciated the advantages offered by the Soho works for the development of his steam-engine. In 1772 Watt's partner, Dr John Roebuck, got into financial difficulties, and Boulton, to whom he owed £1200, accepted the two-thirds share in Watt's patent held by him in satisfaction of the debt. Three years later Boulton and Watt formally entered into partnership, and it was mainly through the energy and self-sacrifice of the former, who devoted all the capital he possessed or could borrow to the enterprise, that the steam-engine was at length made a commercial success. It was also owing to Boulton that in 1775 an act of parliament was obtained extending the term of Watt's 1769 patent to 1799. In 1800 the two partners retired from the business, which they handed over to their sons, Matthew Robinson Boulton and James Watt junior. In 1788 Boulton turned his attention to coining machinery, and erected at Soho a complete plant with which he struck coins for the Sierra Leone and East India companies and for Russia, and in 1797

produced a new copper coinage for Great Britain. In 1797 he took out a patent in connexion with raising water on the principle of the hydraulic ram. He died at Birmingham on the 18th of August 1809.

BOUND, or BOUNDARY (from O. Fr. *bonde*, Med. Lat. *bodena* or *butina*, a frontier line), that which serves to indicate the limit or extent of land. It is usually defined by a certain mark, such as a post, ditch, hedge, dyke, wall of stones, &c., though on the other hand it may have to be ascertained by reference to a plan or by measurement. In law, the exact boundary of land is always a matter of evidence; where no evidence is available, the court acts on presumption. For example, the boundary of land on opposite sides of a road, whether public or private, is presumed to be the middle line of the road. Where two fields are separated by a hedge and ditch the boundary line will run between the hedge and the ditch. Boundaries of parishes, at common law, depended upon ancient and immemorial custom, and in many parishes great care was taken to perpetuate the boundaries of the parish by perambulations from time to time. The confusion of local boundaries in England was the subject of several commissions and committees in the 19th century, and much information will be found in their reports (1868, 1870, 1873, 1888). The Local Government Act 1888, ss. 50-63, contains provisions for the alteration of local areas.

BOUNDS, BEATING THE, an ancient custom still observed in many English parishes. In former times when maps were rare it was usual to make a formal perambulation of the parish boundaries on Ascension day or during Rogation week. The latter is in the north of England still called “Gang Week” or “Ganging Days” from this “ganging” or procession. The priest of the parish with the churchwardens and the parochial officials headed a crowd of boys who, armed with green boughs, beat with them the parish border-stones. Sometimes the boys were themselves whipped or even violently bumped on the boundary-stones to make them remember. The object of taking boys was obviously to ensure that witnesses to the boundaries should survive as long as possible. In England the custom is as old as Anglo-Saxon days, as it is mentioned in laws of Alfred and Aethelstan. It is thought that it may have been derived from the Roman Terminalia, a festival celebrated on the 22nd of February in honour of Terminus, the god of landmarks, to whom cakes and wine were offered, sports and dancing taking place at the boundaries. In England a parish-ale or feast was always held after the perambulation, which assured its popularity, and in Henry VIII.’s reign the occasion had become an excuse for so much revelry that it attracted the condemnation of a preacher who declared “these solemne and accustomable processions and supplications be nowe growen into a right foule and detestable abuse.” Beating the bounds had a religious side in the practice which originated the term Rogation, the accompanying clergy being supposed to beseech (*rogare*) the divine blessing upon the parish lands for the ensuing harvest. This feature originated in the 5th century, when Mamercus, bishop of Vienne, instituted special prayers and fasting and processions on these days. This clerical side of the parish bounds-beating was one of the religious functions prohibited by the Injunctions of Queen Elizabeth; but it was then ordered that the perambulation should continue to be performed as a quasi-secular function, so that evidence of the boundaries of parishes, &c. might be preserved (Gibson, *Codex juris Ecclesiastici Anglicani* (1761) pp. 213-214). Bequests were sometimes made in connexion with bounds-beating. Thus at Leighton Buzzard on Rogation Monday, in accordance with the will of one Edward Wilkes, a London merchant who died in 1646, the trustees of his almshouses accompanied the boys. The will was read and beer and plum rolls distributed. A remarkable feature of the bequest was that while the will is read one of the boys has to stand on his head.

BOUNTY (through O. Fr. *bontet*, from Lat. *bonitas*, goodness), a gift or gratuity; more usually, a premium paid by a government to encourage some branch of production or industry, as in England in the case of the bounty on corn, first granted in 1688 and abolished in 1814, the herring-fishery bounties, the bounties on sail-cloth, linen and other goods. It is admitted that the giving of bounties is generally impolitic, though they may sometimes be justified as a measure of state. The most striking modern example of a bounty was that on sugar (*q.v.*). Somewhat akin to bounties are the subsidies granted to shipping (*q.v.*) by many countries. Bounties or, as they may equally well be termed, grants are often given, more especially in new countries, for the destruction of beasts of prey; in the United States and some other countries, bounties have been given for tree-planting; France has given bounties to encourage the Newfoundland fisheries.

Bounty was also the name given to the money paid to induce men to enlist in the army or navy, and, in the United Kingdom, to the sum given on entering the militia reserve. During the American Civil War,

many recruits joined solely for the sake of the bounty offered, and afterwards deserted; they were called “bounty-jumpers.” The term bounty was also applied in the English navy to signify money payable to the officers and crew of a ship in respect of services on particular occasions.

Queen Anne’s Bounty (*q.v.*) is a fund applied for the augmentation of poor livings in the established church.

King’s Bounty is a grant made by the sovereign of his royal bounty to those of his subjects whose wives are delivered of three or more children at a birth.

BOURBAKI, CHARLES DENIS SAUTER (1816-1897), French general, was born at Pau on the 22nd of April 1816, the son of a Greek colonel who died in the War of Independence in 1827. He entered St Cyr, and in 1836 joined the Zouaves, becoming lieutenant of the Foreign Legion in 1838, and aide-de-camp to King Louis Philippe. It was in the African expedition that he first came to the front. In 1842 he was captain in the Zouaves; 1847, colonel of the Turcos; in 1850, lieutenant-colonel of the 1st Zouaves; 1851, colonel; 1854, brigadier-general. In the Crimean War he commanded a portion of the Algerian troops; and at the Alma, Inkerman and Sevastopol Bourbaki’s name became famous. In 1857 he was made general of division, commanding in 1859 at Lyons. His success in the war with Italy was only second to that of MacMahon, and in 1862 he was proposed as a candidate for the vacant Greek throne, but declined the proffered honour. In 1870 the emperor entrusted him with the command of the Imperial Guard, and he played an important part in the fighting round Metz.

A curious incident of the siege of Metz is connected with Bourbaki’s name. A man who called himself Regnier,[1] about the 21st of September, appeared at Hastings, to seek an interview with the refugee empress Eugénie, and failing to obtain this he managed to get from the young prince imperial a signed photograph with a message to the emperor Napoleon. This he used, by means of a safe-conduct from Bismarck, as credentials to Marshal Bazaine, to whom he presented himself at Metz, telling him on the empress’s alleged authority that peace was about to be signed and that either Marshal Canrobert or General Bourbaki was to go to Hastings for the purpose. Bourbaki at once went to England, with Prussian connivance, as though he had a recognized mission, only to discover from the empress at Hastings that a trick had been played on him; and as soon as he could manage he returned to France. He offered his services to Gambetta and received the command of the Northern Army, but was recalled on the 19th of November and transferred to the Army of the Loire. In command of the hastily-trained and ill-equipped Army of the East, Bourbaki made the attempt to raise the siege of Belfort, which, after the victory of Villersexel, ended in the repulse of the French in the three days’ battle of the Lisaine. Other German forces under Manteuffel now closed upon Bourbaki, and he was eventually driven over the Swiss frontier with the remnant of his forces (see Franco-German War). His troops were in the most desperate condition, owing to lack of food; and out of 150,000 men under him when he started, only 84,000 escaped from the Germans into Swiss territory. Bourbaki himself, rather than submit to the humiliation of a probable surrender, on the 26th of January 1871 delegated his functions to General Clinchant, and in the night fired a pistol at his own head, but the bullet, owing to a deviation of the weapon, was flattened against his skull and his life was saved. General Clinchant carried Bourbaki into Switzerland, and he recovered sufficiently to return to France. In July 1871 he again took the command at Lyons, and subsequently became military governor. In 1881, owing to his political opinions, he was placed on the retired list. In 1885 he was an unsuccessful candidate for the senate. He died on the 27th of September 1897. A patriotic Frenchman and a brilliant soldier and leader, Bourbaki, like some other French generals of the Second Empire whose training had been obtained in Africa, was found wanting in the higher elements of command when the European conditions of 1870 were concerned.

1 The whole Regnier affair remained a mystery; the man himself— who on following Bourbaki to England made the impression on Lord Granville (see the *Life of Lord Granville*, by Lord Fitzmaurice, ii. 61) of being a “swindler” but honestly wishing to serve the empress—was afterwards mixed up in the Humbert frauds of 1902-1903; he published his own version of the affair in 1870 in a pamphlet, *Quel est votre nom?* It has been suspected that on the part either of Bazaine or of the German authorities some undisclosed intrigue was on foot.

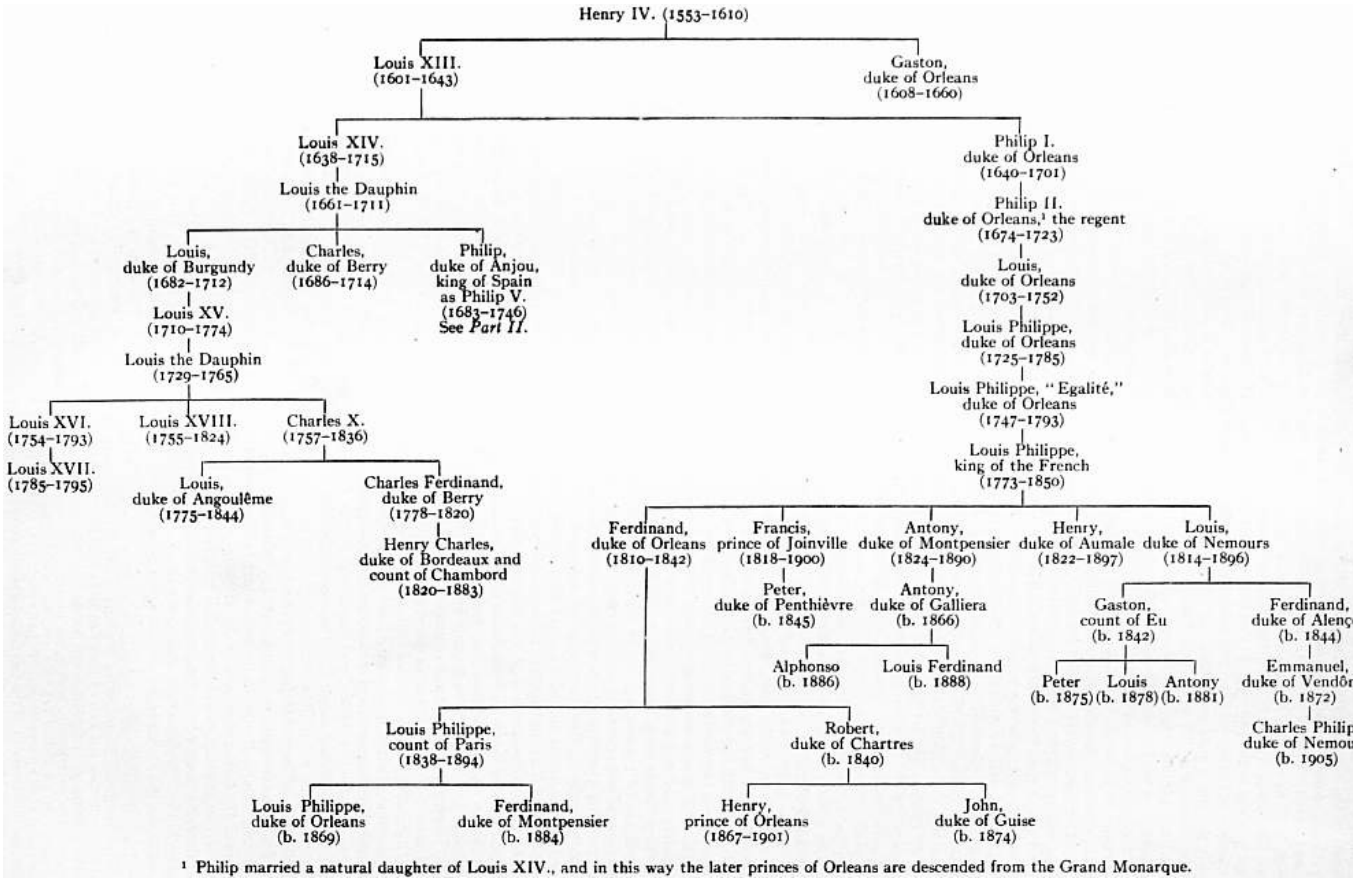
BOURBON. The noble family of Bourbon, from which so many European kings have sprung, took its name from Bourbon l’Archambault, chief town of a lordship which in the 10th century was one of the largest baronies of the kingdom of France. The limits of the lordship, which was called the Bourbonnais, were approximately those of the modern department of Allier, being on the N. the Nivernais and Berry, on the E. Burgundy and Lyonnais, on the S. Auvergne and Marche and on the W. Berry. The first of the long line of Bourbons known in history was Adhémar or Aimar, who was invested with the barony towards the close of the 9th century. Matilda, heiress of the first house of Bourbon, brought this lordship to the family of Dampierre by her marriage, in 1196, with Guy of Dampierre, marshal of

Champagne (d. 1215). In 1272 Beatrix, daughter of Agnes of Bourbon-Dampierre, and her husband John of Burgundy, married Robert, count of Clermont, sixth son of Louis IX. (St Louis) of France. The elder branches of the family had become extinct, and their son Louis became duke of Bourbon in 1327. In 1488 the line of his descendants ended with Jean II., who died in that year. The whole estates passed to Jean's brother Pierre, lord of Beaujeu, who was married to Anne, daughter of Louis XI. Pierre died in 1503, leaving only a daughter, Suzanne, who, in 1505, married Charles de Montpensier, heir of the Montpensier branch of the Bourbon family. Charles, afterwards constable of France, who took the title of duke of Bourbon on his marriage, was born in 1489, and at an early age was looked upon as one of the finest soldiers and gentlemen in France. With the constable ended the direct line from Pierre I., duke of Bourbon (d. 1356). But the fourth in descent from Pierre's brother, Jacques, count of La Marche, Louis, count of Vendôme and Chartres (d. 1446), became the ancestor of the royal house of Bourbon and of the noble families of Condé, Conti and Montpensier. The fourth in direct descent from Louis of Vendôme was Antoine de Bourbon, who in 1548 married Jeanne d'Albret, heiress of Navarre, and became king of Navarre in 1554. Their son became king of France as Henry IV. Henry was succeeded by his son, Louis XIII., who left two sons, Louis XIV., and Philip, duke of Orleans, head of the Orleans branch. Louis XIV.'s son, the dauphin, died before his father, and left three sons, one of whom died without issue. Of the others the elder, Louis of Burgundy, died in 1712, and his only surviving son became Louis XV. The younger, Philip, duke of Anjou, became king of Spain, and founded the Spanish branch of the Bourbon family. Louis XV. was succeeded by his grandson, Louis XVI., who perished on the scaffold. At the restoration the throne of France was occupied by Louis XVIII., brother of Louis XVI., who in turn was succeeded by his brother Charles X. The second son of Charles X., the duc de Berry, left a son, Henri Charles Ferdinand Marie Dieudonné d'Artois, duc de Bordeaux, and comte de Chambord (*q.v.*). From Louis XIV.'s brother, Philip, descended another claimant of the throne. Philip's son was the regent Orleans, whose great-grandson, "Philippe Égalité," perished on the scaffold in 1793. Égalité's son, Louis Philippe, was king of the French from 1830 to 1848; his grandson, Louis Philippe, comte de Paris (1838-1894), inherited on the death of the comte de Chambord the rights of that prince to the throne of France, and was called by the royalists Philip VII. He had a son, Louis Philippe Robert, duc d'Orléans, called by his adherents Philip VIII.

Spanish Branch.—Philip, duke of Anjou, grandson of Louis XIV., became king of Spain as Philip V., in 1700. He was succeeded in 1746 by his son Ferdinand VI., who died in 1759 without family, and was followed by his brother Charles III. Charles III.'s eldest son became Charles IV. of Spain in 1788, while his second son, Ferdinand, was made king of Naples in 1759. Charles IV. was deposed by Napoleon, but in 1814 his son, Ferdinand VII., again obtained his throne. Ferdinand was succeeded by his daughter Isabella, who in 1870 abdicated in favour of her son, Alphonso XII. (d. 1885). Alphonso's posthumous son became king of Spain as Alphonso XIII. Ferdinand's brother, Don Carlos (d. 1855), claimed the throne in 1833 on the ground of the Salic law, and a fierce war raged for some years in the north of Spain. His son Don Carlos, count de Montemolin (1818-1861), revived the claim, but was defeated and compelled to sign a renunciation. The nephew of the latter, Don Carlos Maria Juan Isidor, duke of Madrid, for some years carried on war in Spain with the object of attaining the rights contended for by the Carlist party.

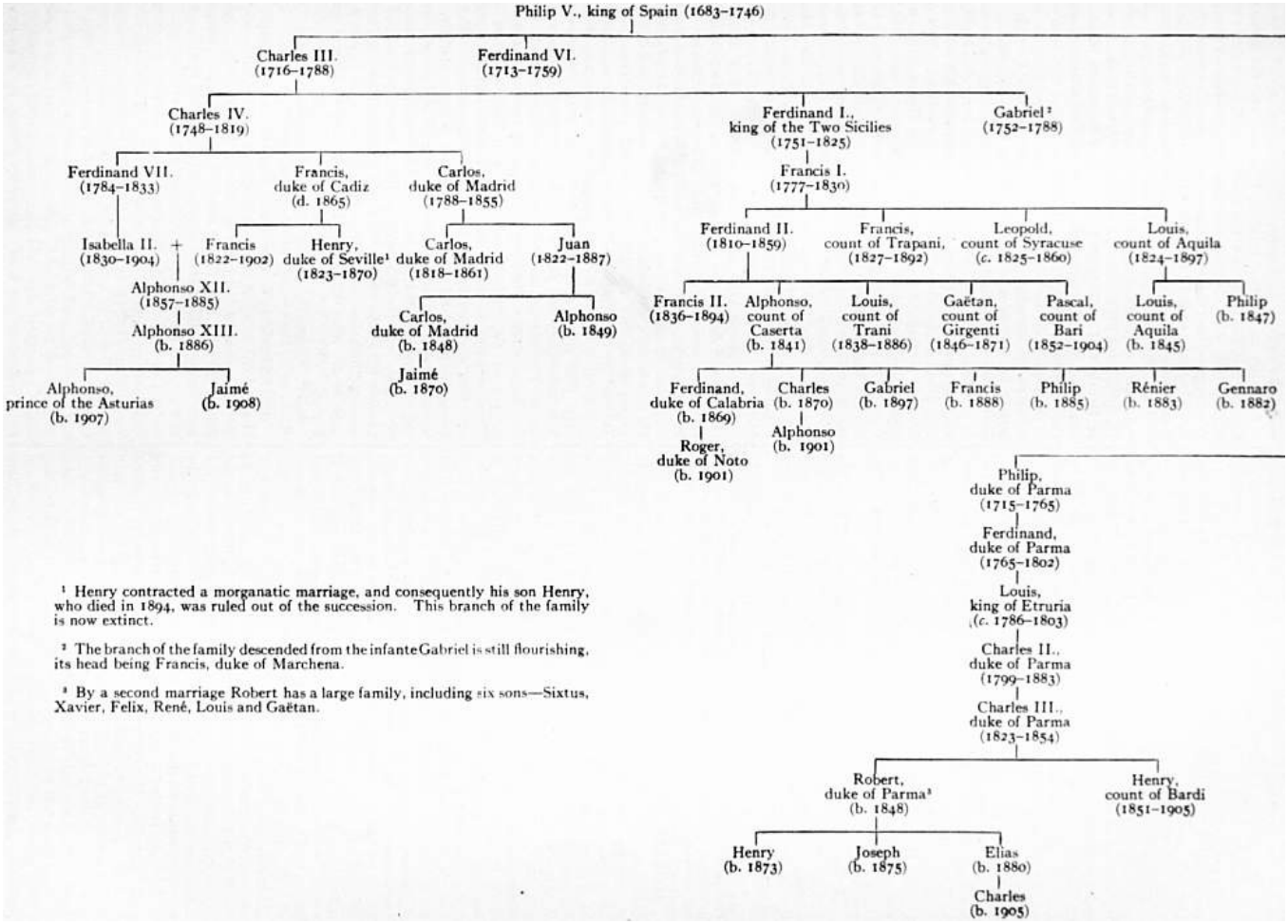
GENEALOGICAL TABLE OF THE HOUSE OF BOURBON

I. *The French Bourbons.*



[1] Philip married a natural daughter of Louis XIV., and in this way the later princes of Orleans are descended from the Grand Monarque.

II. *The Spanish and Italian Bourbons.*



[1] Henry contracted a morganatic marriage, and consequently his son Henry, who died in 1894, was ruled out of the succession. This branch of the family is now extinct.

[2] The branch of the family descended from the infante Gabriel is still flourishing, its head being Francis, duke of Marchena.

[3] By a second marriage Robert has a large family, including six sons—Sixtus, Xavier, Felix, René, Louis and Gaëtan.

Neapolitan Branch.—The first Bourbon who wore the crown of Naples was Charles III. of Spain, who on his succession to the Spanish throne in 1759, resigned his kingdom of Naples to his son Ferdinand. Ferdinand was deposed by Napoleon, but afterwards regained his throne, and took the title of Ferdinand I., king of the Two Sicilies. In 1825 he was succeeded by his son Francis, who in turn was succeeded in 1830 by his son Ferdinand II. Ferdinand II. died in 1859, and in the following year his

successor Francis II. was deprived of his kingdom, which was incorporated into the gradually-uniting Italy.

Duchies of Lucca and Parma.—In 1748 the duchy of Parma was conferred on Philip, youngest son of Philip V. of Spain. He was succeeded by his son Ferdinand in 1765. Parma was ceded to France in 1801, Ferdinand's son Louis being made king of Etruria, but the French only took possession of the duchy after Ferdinand's death in 1802. Louis's son Charles Louis was forced to surrender Etruria to France in 1807, and he was given the duchy of Lucca by the congress of Vienna in 1815. In 1847, on the death of Marie Louise, widow of Napoleon, who had received Parma and Piacenza in accordance with the terms of the treaty of Paris of 1814, Charles Louis succeeded to the duchies as Charles II., at the same time surrendering Lucca to Tuscany. In 1849 he abdicated in favour of his son, Charles III., who married a daughter of the duke of Berry, and was assassinated in 1854, being succeeded by his son Robert. In 1860 the duchies were annexed by Victor Emmanuel to the new kingdom of Italy.

Bastard Branches.—There are numerous bastard branches of the family of Bourbon, the most famous being the Vendôme branch, descended from Caesar, natural son of Henry IV., and the Maine and Toulouse branches, descended from the two natural sons of Louis XIV. and Madame de Montespan.

See Coiffier de Moret, *Histoire du Bourbonnais et des Bourbons* (2 vols., 1824); Berand, *Histoire des sires et ducs de Bourbon* (1835); Désormeaux, *Histoire de la maison de Bourbon* (5 vols., 1782-1788); Achaintre, *Histoire généalogique et chronologique de la maison royale de Bourbon* (2 vols., 1825-1826); and Dussieux, *Généalogie de la maison de Bourbon* (1872).

BOURBON, CHARLES, Duke of (1490-1527), constable of France, second son of Gilbert, count of Montpensier and dauphin of Auvergne, was born on the 17th of February 1490, his mother being a Gonzaga. In 1505 he married Suzanne, heiress of Peter II., duke of Bourbon, by Anne of France, daughter of King Louis XI., and assumed the title of duke of Bourbon. The addition of this duchy to the numerous duchies, countships and other fiefs which he had inherited on the death of his elder brother Louis in 1501, made him at the age of fifteen the wealthiest noble in Europe. He gained his first military experience in the Italian campaigns of Louis XII., taking part in the suppression of the Genoese revolt (1507) and contributing to the victory over the Venetians at Agnadello (May 14, 1509). Shortly after the accession of Francis I. Bourbon received the office of constable of France, and for his brilliant services at the battle of Marignano (September 1515) he was made governor of the Milanese, which he succeeded in defending against an attack of the emperor Maximilian. But dissensions arose between Francis and the constable. Grave, haughty and taciturn, Bourbon was but ill suited to the levities of the court, and his vast wealth and influence kindled in the king a feeling of resentment, if not of fear. The duke was recalled from the government of the Milanese; his official salary and the sums he had borrowed for war expenses remained unpaid; and in the campaign in the Netherlands against the emperor Charles V. the command of the vanguard, one of the most cherished prerogatives of the constables, was taken from him. The death of his wife without surviving issue, on the 28th of April 1521, afforded the mother of the king, Louise of Savoy, a means to gratify her greed, and at the same time to revenge herself on Bourbon, who had slighted her love. A suit was instituted at her instance against the duke in the parlement of Paris, in which Louise, as grand-daughter of Charles, duke of Bourbon (d. 1456), claimed the female and some of the male fiefs of the duchy of Bourbon, while the king claimed those fiefs which were originally appanages, as escheating to the crown, and other claims were put forward. Before the parlement was able to arrive at a decision, Francis handed over to his mother a part of the Bourbon estates, and ordered the remainder to be sequestrated.

Smarting under these injuries, Bourbon, who for some time had been coquetting with the enemies of France, renewed his negotiations with the emperor and Henry VIII. of England. It was agreed that the constable should raise in his own dominions an armed force to assist the emperor in an invasion of France, and should receive in return the hand of Eleonora, queen dowager of Portugal, or of another of the emperor's sisters, and an independent kingdom comprising his own lands together with Dauphiné and Provence. He was required, too, to swear fidelity to Henry VIII. as king of France. But Bourbon's plans were hampered by the presence of the French troops assembling for the invasion of Italy, and for this reason he was unable to effect a junction with the emperor's German troops from the east. News of the conspiracy soon reached the ears of Francis, who was on his way to take command of the Italian expedition. In an interview with Bourbon at Moulins the king endeavoured to persuade him to accompany the French army into Italy, but without success. Bourbon remained at Moulins for a few days, and after many vicissitudes escaped into Italy. The joint invasion of France by the emperor and his ally of England had failed signally, mainly through lack of money and defects of combination. In the spring of 1524, however, Bourbon at the head of the imperialists in Lombardy forced the French across the Sesia (where the chevalier Bayard was mortally wounded) and drove them out of Italy. In August 1524 he invested Marseilles, but being unable to prevent the introduction of supplies by Andrea Doria, the Genoese admiral in the service of Francis, he was forced to raise the siege and retreat to the Milanese. He took part in the battle of Pavia (1525), where Francis was defeated and taken prisoner. But Bourbon's troops were clamouring for pay, and the duke was driven to extreme measures to satisfy their demands. Cheated of his kingdom and his bride after the treaty of Madrid (1526), Bourbon had been offered the duchy of Milan by way of compensation. He now levied contributions from the

townsmen, and demanded 20,000 ducats for the liberation of the chancellor Girolamo Morone (d. 1529), who had been imprisoned for an attempt to realize his dream of an Italy purged of the foreigner. But the sums thus raised were wholly inadequate. In February 1527 Bourbon's army was joined by a body of German mercenaries, mostly Protestants, and the combined forces advanced towards the papal states. Refusing to recognize the truce which the viceroy of Naples had concluded with Pope Clement VII., Bourbon hastened to put into execution the emperor's plan of attaching Clement to his side by a display of force. But the troops, starving and without pay, were in open mutiny, and Spaniards and Lutherans alike were eager for plunder. On the 5th of May 1527 the imperial army appeared before the walls of Rome. On the following morning Bourbon attacked the Leonine City, and while mounting a scaling ladder fell mortally wounded by a shot, which Benvenuto Cellini in his *Life* claims to have fired. After Bourbon's death his troops took and sacked Rome.

See E. Armstrong, *Charles V.* (London, 1902); *Cambridge Mod. Hist.* vol. ii., bibliography to chaps. i. ii. and iii.

BOURBON-LANCY, a watering-place of east-central France in the department of Saône-et-Loire, on a hill about 2 m. from the right bank of the Loire and on the Borne, 52 m. S.S.E. of Nevers by rail. Pop. (1906) town, 1896; commune, 4266. The town possesses thermal springs, resorted to in the Roman period, and ancient baths and other remains have been found. The waters, which are saline and ferruginous, are used for drinking and bathing, in cases of rheumatism, &c. Their temperature varies from 117° to 132° F. Cardinal Richelieu, Madame de Sévigné, James II. of England, and other celebrated persons visited the springs in the 17th and 18th centuries. The town has a well-equipped bathing establishment, a large hospital, and a church of the 11th and 12th centuries (used as an archaeological museum), and there are ruins of an old stronghold on a hill overlooking the town. A belfry pierced by a gateway of the 15th century and houses of the 15th and 16th centuries also remain. The industries of the town include the manufacture of farm implements.

In the middle ages Bourbon-Lancy was an important stronghold and a fief of the Bourbon family, from the name of a member of which the suffix to its name is derived.

BOURBON L'ARCHAMBAULT, a town of central France in the department of Allier, on the Burge, 16 m. W. of Moulins by rail. Pop. (1906) 2306. The town has thermal springs known in Roman times, which are used in cases of scrofula and rheumatism. The bathing-establishment is owned by the state. A church dating from the 12th century, and ruins of a castle of the dukes of Bourbon (13th and 15th centuries), including a cylindrical keep, are of interest. There are a military and a civil hospital in the town. Stone is quarried in the vicinity. Bourbon (*Aquae Borvonis* or *Bormonis*) was anciently the capital of the Bourbonnais and gave its name to the great Bourbon family. The affix Archambault is the name of one of its early lords.

BOURBONNE-LES-BAINS, a town of eastern France, in the department of Haute-Marne, 35½ m. by rail E.N.E. of Langres. Pop. (1906) 3738. It is much frequented on account of its hot saline springs, which were known to the Romans under the name *Aquae Borvonis*. The heat of these springs varies from 110° to 156° F. The waters are used in cases of lymphatic affections, scrofula, rheumatism, wounds, &c. The principal buildings are a church of the 12th century, the state bathing-establishment and the military hospital; there are also the remains of a castle. Timber-sawing and plaster manufacture are carried on in the town. In the neighbourhood are the buildings of the celebrated Cistercian abbey of Morimond.

BOURCHIER, ARTHUR (1864-), English actor, was born in Berkshire in 1864, and educated at Eton and Christ Church, Oxford. At the university he became prominent as an amateur actor in connexion with the O.U.A.D.C., which he founded, and in 1889 he joined Mrs Langtry as a professional. He also acted with Charles Wyndham at the Criterion, and was for a while in Daly's company in America. In 1894 he married the actress Violet Vanbrugh, elder sister of the no less well-known actress

Irene Vanbrugh, and he and his wife subsequently took the leading parts under his management of the Garrick theatre. Both as tragedian and comedian Mr Bourchier took high rank on the London stage, and his career as actor-manager was remarkable for the production of a number of successful modern plays, by Mr Sutro and others.

BOURCHIER, THOMAS (*c.* 1404-1486), English archbishop, lord chancellor and cardinal, was a younger son of William Bourchier, count of Eu (d. 1420), and through his mother, Anne, a daughter of Thomas of Woodstock, duke of Gloucester, was a descendant of Edward III. One of his brothers was Henry, earl of Essex (d. 1483), and his grand-nephew was John, Lord Berners, the translator of Froissart. Educated at Oxford and then entering the church, he obtained rapid promotion, and after holding some minor appointments he became bishop of Worcester in 1434. In the same year he was chancellor of the university of Oxford, and in 1443 he was appointed bishop of Ely; then in April 1454 he was made archbishop of Canterbury, becoming lord chancellor of England in the following March. Bourchier's short term of office as chancellor coincided with the opening of the Wars of the Roses, and at first he was not a strong partisan, although he lost his position as chancellor when Richard, duke of York, was deprived of power in October 1456. Afterwards, in 1458, he helped to reconcile the contending parties, but when the war was renewed in 1459 he appears as a decided Yorkist; he crowned Edward IV. in June 1461, and four years later he performed a similar service for the queen, Elizabeth Woodville. In 1457 Bourchier took the chief part in the trial of Reginald Pecock, bishop of Chichester, for heresy; in 1467 he was created a cardinal; and in 1475 he was one of the four arbitrators appointed to arrange the details of the treaty of Picquigny between England and France. After the death of Edward IV. in 1483 Bourchier persuaded the queen to allow her younger son, Richard, duke of York, to share his brother's residence in the Tower of London; and although he had sworn to be faithful to Edward V. before his father's death, he crowned Richard III. in July 1483. He was, however, in no way implicated in the murder of the young princes, and he was probably a participant in the conspiracies against Richard. The third English king crowned by Bourchier was Henry VII., whom he also married to Elizabeth of York in January 1486. The archbishop died on the 30th of March 1486 at his residence, Knole, near Sevenoaks, and was buried in Canterbury cathedral.

See W.F. Hook, *Lives of the Archbishops of Canterbury* (1860-1884).

BOURDALOUE, LOUIS (1632-1704), French Jesuit and preacher, was born at Bourges on the 20th of August 1632. At the age of sixteen he entered the Society of Jesus, and was appointed successively professor of rhetoric, philosophy and moral theology, in various colleges of the Order. His success as a preacher in the provinces determined his superiors to call him to Paris in 1669 to occupy for a year the pulpit of the church of St Louis. Owing to his eloquence he was speedily ranked in popular estimation with Corneille, Racine, and the other leading figures of the most brilliant period of Louis XIV.'s reign. He preached at the court of Versailles during the Advent of 1670 and the Lent of 1672, and was subsequently called again to deliver the Lenten course of sermons in 1674, 1675, 1680 and 1682, and the Advent sermons of 1684, 1689 and 1693. This was all the more noteworthy as it was the custom never to call the same preacher more than three times to court. On the revocation of the Edict of Nantes he was sent to Languedoc to confirm the new converts in the Catholic faith, and he had extraordinary success in this delicate mission. Catholics and Protestants were unanimous in praising his fiery eloquence in the Lent sermons which he preached at Montpellier in 1686. Towards the close of his life he confined his ministry to charitable institutions, hospitals and prisons, where his sympathetic discourses and conciliatory manners were always effective. He died in Paris on the 13th of May 1704. His peculiar strength lay in his power of adapting himself to audiences of every kind, and throughout his public career he was highly appreciated by all classes of society. His influence was due as much to his saintly character and to the gentleness of his manners as to the force of his reasoning. Voltaire said that his sermons surpassed those of Bossuet (whose retirement in 1669, however, practically coincided with Bourdaloue's early pulpit utterances); and there is little doubt that their simplicity and coherence, and the direct appeal which they made to hearers of all classes, gave them a superiority over the more profound sermons of Bossuet. Bourdaloue may be with justice regarded as one of the greatest French orators, and many of his sermons have been adopted as text-books in schools.

Bibliography.—The only authoritative source for the Sermons is the edition of Père Bretonneau (14 vols., Paris, 1707-1721, followed by the *Pensées*, 2 vols., 1734). There has been much controversy both as to the authenticity of some of the sermons in this edition and as to the text in general. It is, however, generally agreed that the changes confessedly made by Bretonneau were merely formal. Other editions not based on Bretonneau are inferior; some, indeed, are altogether spurious (*e.g.* that of Abbé Sicard, 1810). Among critical works are: Anatole Feugère, *Bourdaloue, sa prédication et son temps* (Paris, 1874); Adrien Lézat, *Bourdaloue, théologien et orateur* (Paris, 1874); P.M. Lauras, *Bourdaloue, sa vie et ses œuvres* (2 vols., Paris, 1881); Abbé Blampignon, *Étude sur Bourdaloue* (Paris, 1886); Henri Chérot, *Bourdaloue inconnu* (Paris, 1898), and *Bourdaloue, sa correspondance et ses correspondans* (Paris,

1898-1904); L. Pauthe, *Bourdaloue* (*les maîtres de la chaire au XVII^e siècle*) (Paris, 1900); E. Griselle, *Bourdaloue, histoire critique de sa prédication* (2 vols., Paris, 1901), *Sermons inédits; bibliographie, &c.* (Paris, 1901), *Deux sermons inédits sur le royaume de Dieu* (Lille and Paris, 1904); Ferdinand Castets, *Bourdaloue, la vie et la prédication d'un religieux au XVII^e siècle*, and *La Revue Bourdaloue* (Paris, 1902-1904); C.H. Brooke, *Great French Preachers* (sermons of Bourdaloue and Bossuet, London, 1904); F. Brunetière, "L'Éloquence de Bourdaloue," in *Revue des deux mondes* (August 1904), a general inquiry into the authenticity of the sermons and their general characteristics.

BOURDON, FRANÇOIS LOUIS (d. 1797), known as Bourdon de l'Oise, French revolutionist, was *procureur* at the parlement of Paris. He ardently embraced the revolutionary doctrines and took an active part in the insurrection of the 10th of August 1792. Representing the department of the Oise in the Convention, he voted for the immediate death of the king. He accused the Girondists of relations with the court, then turned against Robespierre, who had him expelled from the Jacobin club for his conduct as commissioner of the Convention with the army of La Rochelle. On the 9th Thermidor he was one of the deputies delegated to aid Barras to repress the insurrection made by the commune of Paris in favour of Robespierre. Bourbon then became a violent reactionary, attacking the former members of the Mountain and supporting rigorous measures against the rioters of the 12th Germinal and the 1st Prairial of the year III. In the council of Five Hundred, Bourdon belonged to the party of "Clichyens," composed of disguised royalists, against whom the directors made the *coup d'état* of the 18th Fructidor. Bourdon was arrested and deported to French Guiana, where he died soon after his arrival.

BOURG-EN-BRESSE, a town of eastern France, capital of the department of Ain, and formerly capital of the province of Bresse, 36 m. N.N.E. of Lyons by the Paris-Lyon railway. Pop. (1906) town, 13,916; commune, 20,045. Bourg is situated at the western base of the Jura, on the left bank of the Reyssouze, a tributary of the Saône. The chief of the older buildings is the church of Notre-Dame (16th century), of which the façade belongs to the Renaissance; other parts of the church are Gothic. In the interior there are stalls of the 16th century. The other public buildings, including a handsome prefecture, are modern. The hôtel de ville contains a library and the Lorin museum with a collection of pictures, while another museum has a collection of the old costumes and ornaments characteristic of Bresse. Among the statues in the town there is one of Edgar Quinet (1803-1875), a native of Bourg. Bourg is the seat of a prefect and of a court of assizes, and has a tribunal of first instance, a tribunal and a chamber of commerce, and a branch of the Bank of France. Its educational establishments include lycées for boys and girls, and training colleges. The manufactures consist of iron goods, mineral waters, tallow, soap and earthenware, and there are flour mills and breweries; and there is considerable trade in grain, cattle and poultry. The church of Brou, a suburb of Bourg, is of great artistic interest. Marguerite of Bourbon, wife of Philibert II. of Savoy, had intended to found a monastery on the spot, but died before her intention could be carried into effect. The church was actually built early in the 16th century by her daughter-in-law Marguerite of Austria, wife of Philibert le Beau of Savoy, in memory of her husband. The exterior, especially the façade, is richly ornamented, but the chief interest lies in the works of art in the interior, which date from 1532. The most important are the three mausoleums with the marble effigies of Marguerite of Bourbon, Philibert le Beau, and Marguerite of Austria. All three are remarkable for perfection of sculpture and richness of ornamentation. The rood loft, the oak stalls, and the reredos in the chapel of the Virgin are masterpieces in a similar style.

Roman remains have been discovered at Bourg, but little is known of its early history. Raised to the rank of a free town in 1250, it was at the beginning of the 15th century chosen by the dukes of Savoy as the chief city of the province of Bresse. In 1535 it passed to France, but was restored to Duke Philibert Emmanuel, who later built a strong citadel, which afterwards withstood a six months' siege by the soldiers of Henry IV. The town was finally ceded to France in 1601. In 1814 the inhabitants, in spite of the defenceless condition of their town, offered resistance to the Austrians, who put the place to pillage.

BOURGEOIS, LÉON VICTOR AUGUSTE (1851-), French statesman, was born at Paris on the 21st of May 1851, and was educated for the law. After holding a subordinate office (1876) in the department of public works, he became successively prefect of the Tarn (1882) and the Haute-Garonne (1885), and then returned to Paris to enter the ministry of the interior. He became prefect of police in November 1887, at the critical moment of President Grévy's resignation. In the following year he entered the chamber, being elected deputy for the Marne, in opposition to General Boulanger, and joined the radical left. He was under-secretary for home affairs in the Floquet ministry of 1888, and

resigned with it in 1889, being then returned to the chamber for Reims. In the Tirard ministry, which succeeded, he was minister of the interior, and subsequently, on the 18th of March 1890, minister of public instruction in the cabinet of M. de Freycinet, a post for which he had qualified himself by the attention he had given to educational matters. In this capacity he was responsible in 1890 for some important reforms in secondary education. He retained his office in M. Loubet's cabinet in 1892, and was minister of justice under M. Ribot at the end of that year, when the Panama scandals were making the office one of peculiar difficulty. He energetically pressed the Panama prosecution, so much so that he was accused of having put wrongful pressure on the wife of one of the defendants in order to procure evidence. To meet the charge he resigned in March 1893, but again took office, and only retired with the rest of the Freycinet ministry. In November 1895 he himself formed a cabinet of a pronouncedly radical type, the main interest of which was attached to its fall, as the result of a constitutional crisis arising from the persistent refusal of the senate to vote supply. The Bourgeois ministry appeared to consider that popular opinion would enable them to override what they claimed to be an unconstitutional action on the part of the upper house; but the public was indifferent and the senate triumphed. The blow was undoubtedly damaging to M. Bourgeois's career as an *homme de gouvernement*. As minister of public instruction in the Brisson cabinet of 1898 he organized courses for adults in primary education. After this short ministry he represented his country with dignity and effect at the Hague peace congress, and in 1903 was nominated a member of the permanent court of arbitration. He held somewhat aloof from the political struggles of the Waldeck-Rousseau and Combes ministries, travelling considerably in foreign countries. In 1902 and 1903 he was elected president of the chamber. In 1905 he replaced the due d'Audiffret-Pasquier as senator for the department of Marne, and in May 1906 became minister of foreign affairs in the Sarrien cabinet. He was responsible for the direction of French diplomacy in the conference at Algeciras.

BOURGEOIS, a French word, properly meaning a freeman of a *bourg* or borough in France; later the term came to have the wider significance of the whole class lying between the *ouvriers* or workmen and the nobility, and is now used generally of the trading middle-class of any country. In printing, the word (pronounced burjoice′) is used of a type coming in size between longprimer and brevier; the derivation is supposed to be from the name of a French printer, otherwise unknown.

BOURGES, a city of central France, chief town of the department of Cher, 144 m. S. of Paris on the Orléans railway between Vierzon and Nevers. Pop. (1906) town, 34,581; commune, 44,133. Bourges is built amidst flat and marshy country on an eminence limited on three sides by the waters of the Canal Of Berry, the Yèvre, the Auron, and other smaller streams with which they unite at this point. The older part of the town with its narrow streets and old houses forms a centre, to the south and east of which lie important engineering suburbs. Flourishing nurseries and market-gardens are situated in the marshy ground to the north and north-east. Bourges preserves portions of the Roman ramparts of the 4th century, which are for the most part built into the houses of the old quarter. They measure considerably less in circumference than the fortifications of the 13th century, remains of which in the shape of ruined walls and towers are still to be seen. The summit of the rise on which the city is built is crowned by the cathedral of St Étienne, one of the most important in France. Begun at the end of the 12th century, it was not completed till the 16th century, to which period belong the northernmost of the two unfinished towers flanking the façade and two of its five elaborately sculptured portals. The interior, which has double aisles, the inner aisles of remarkable height, and no transepts, contains, among many other works of art, magnificent stained glass of the 13th century. Beneath the choir there is a crypt of Romanesque construction, where traces of the Roman fosses are to be found; the two lateral portals are also survivals of a Romanesque church. The Jardin de l'Archevêché, a pleasant terrace-garden, adjoins the choir of the cathedral. Bourges has many fine old houses. The hôtel Lallemant and the hôtel Cujas (now occupied by the museum) are of the Renaissance period. The hôtel de Jacques Cœur, named after the treasurer of Charles VII. and now used as the law-court, is of still greater interest, though it has been doubted whether Jacques Cœur himself inhabited it. The mansion is in the Renaissance style, but two towers of the Roman fortifications were utilized in the construction of the south-western façade (see HOUSE, Plate II. figs. 7 and 8). Its wings surround a courtyard into which three staircase turrets project; one of these leads to a chapel, the ceiling of which is decorated by fine frescoes.

Bourges is the seat of an archbishopric, a court of appeal, a court of assizes and a prefect; and is the headquarters of the VIII. army corps. It has tribunals of first instance and of commerce, a board of trade-arbitrators, and a chamber of commerce, and a branch of the Bank of France. Its educational institutions include an ecclesiastical seminary, a lycée for boys, and a college for girls, training colleges, and a school of industrial art. The industrial activity of Bourges depends primarily on its gunpowder and ammunition factories, its cannon-foundry and gun-carriage works. These all belong to the government, and, together with huge magazines, a school of pyrotechnics, and an artillery school, lie in the east of the town. The suburb of Mazières has large iron and engineering works, and there are manufactories of

anvils, edge-tools, biscuits, woollen goods, oil-cloth, boots and shoes, fertilizers, brick and tile works, breweries, distilleries, tanneries, saw-mills and dye-works. The town has a port on the canal of Berry, and does a considerable trade in grain, wine, vegetables, hemp and fruit.

Bourges occupies the site of the Gallic town of *Avaricum*, capital of the Bituriges, mentioned by Caesar as one of the most important of all Gaul. In 52 B.C., during the war with Vercingetorix, it was completely destroyed by the Roman conqueror, but under Augustus it rose again into importance, and was made the capital of Aquitania Prima. About A.D. 250 it became the seat of a bishop, the first occupant of the see being Ursinus. Captured by the Visigoths about 475, it continued in their possession till about 507. In the middle ages it was the capital of Berry. During the English occupation of France in the 15th century it became the residence of Charles VII., who thus acquired the popular title of "king of Bourges." In 1463 a university was founded in the city by Louis XI., which continued for centuries to be one of the most famous in France, especially in the department of jurisprudence. On many occasions Bourges was the seat of ecclesiastical councils—the most important being the council of 1438, in which the Pragmatic Sanction of the Gallican church was established, and that of 1528, in which the Lutheran doctrines were condemned.

BOURGET, PAUL CHARLES JOSEPH (1852-), French novelist and critic, was born at Amiens on the 2nd of September 1852. His father, a professor of mathematics, was afterwards appointed to a post in the college at Clermont-Ferrand. Here Bourget received his early education. He afterwards studied at the Lycée Louis-le-Grand and at the École des Hautes Études. In 1872-1873 he produced a volume of verse, *Au bord de la mer*, which was followed by others, the last, *Les Aveux*, appearing in 1882. Meanwhile he was making a name in literary journalism, and in 1883 he published *Essais de psychologic contemporaine*, studies of eminent writers first printed in the *Nouvelle Revue*, and now brought together. In 1884 Bourget paid a long visit to England, and there wrote his first published story (*L'Irréparable*). *Cruelle Énigme* followed in 1885; and *André Cornelis* (1886) and *Mensonges* (1887) were received with much favour. *Le Disciple* (1889) showed the novelist in a graver attitude; while in 1891 *Sensations d'Italie*, notes of a tour in that country, revealed a fresh phase of his powers. In the same year appeared the novel *Cœur de femme*, and *Nouveaux Pastels*, types of the characters of men, the sequel to a similar gallery of female types (*Pastels*, 1890). His later novels include *La Terre promise* (1892); *Cosmopolis* (1892), a psychological novel, with Rome as a background; *Une Idylle tragique* (1896); *La Duchesse bleue* (1897); *Le Fantôme* (1901); *Les Deux Sœurs* (1905); and some volumes of shorter stories—*Complications sentimentales* (1896), the powerful *Drames de famille* (1898), *Un Homme fort* (1900), *L'Étape* (1902), a study of the inability of a family raised too rapidly from the peasant class to adapt itself to new conditions. This powerful study of contemporary manners was followed by *Un Divorce* (1904), a defence of the Roman Catholic position that divorce is a violation of natural laws, any breach of which inevitably entails disaster. *Études et portraits*, first published in 1888, contains impressions of Bourget's stay in England and Ireland, especially reminiscences of the months which he spent at Oxford; and *Outre-Mer* (1895), a book in two volumes, is his critical journal of a visit to the United States in 1893. He was admitted to the Academy in 1894, and in 1895 was promoted to be an officer of the Legion of Honour, having received the decoration of the order ten years before.

As a writer of verse Bourget was merely trying his wings, and his poems, which were collected in two volumes(1885-1887), are chiefly interesting for the light which they throw upon his mature method and the later products of his art. It was in criticism that his genius first found its true bent. The habit of close scientific analysis which he derived from his father, the sense of style produced by a fine ear and moulded by a classical education, the innate appreciation of art in all its forms, the taste for seeing men and cities, the keen interest in the oldest not less than the newest civilizations, and the large tolerance not to be learned on the *boulevard*—all these combined to provide him with a most uncommon equipment for the critic's task. It is not surprising that the *Sensations d'ltalie* (1891), and the various psychological studies, are in their different ways scarcely surpassed throughout the whole range of literature. Bourget's reputation as a novelist has long been assured. Deeply impressed by the singular art of Henry Beyle (Stendhal), he struck out on a new course at a moment when the realist school reigned without challenge in French fiction. His idealism, moreover, had a character of its own. It was constructed on a scientific basis, and aimed at an exactness, different from, yet comparable to, that of the writers who were depicting with an astonishing faithfulness the environment and the actions of a person or a society. With Bourget observation was mainly directed to the secret springs of human character. At first his purpose seemed to be purely artistic, but when *Le Disciple* appeared, in 1889, the preface to that remarkable story revealed in him an unsuspected fund of moral enthusiasm. Since then he has varied between his earlier and his later manner, but his work in general has been more seriously conceived. From first to last he has painted with a most delicate brush the intricate emotions of women, whether wronged, erring or actually vicious; and he has described not less happily the ideas, the passions and the failures of those young men of France to whom he makes special appeal.

Bourget has been charged with pessimism, and with undue delineation of one social class. The first charge can hardly be sustained. The lights in his books are usually low; there is a certain lack of gaiety, and the characters move in a world of disenchantment. But there is no despair in his own outlook upon human destiny as a whole. As regards the other indictment, the early stories sometimes dwell to excess on the mere framework of opulence; but the pathology of moral irresolution, of complicated affairs of

the heart, of the ironies of friendship, in which the writer revels, can be more appropriately studied in a cultured and leisured society than amid the simpler surroundings of humbler men and women. The style of all Bourget's writings is singularly graceful. His knowledge of the literature of other lands gives it a greater flexibility and a finer allusiveness than most of his contemporaries can achieve. The precision by which it is not less distinguished, though responsible for a certain over-refinement, and for some dull pages of the novels, is an almost unmixed merit in the critical essays. As a critic, indeed, either of art or letters, Bourget leaves little to be desired. If he is not in the very first rank of novelists, if his books display more ease of finished craftsmanship than joy in spontaneous creation, it must be remembered that the supreme writers of fiction have rarely succeeded as he has in a different field.

See also C. Lecigne, *L'Évolution morale et religieuse de M. Paul Bourget* (1903); Sargeret, *Les Grands Convertis* (1906). His *Oeuvres complètes* began to appear in a uniform edition in 1899.

BOURIGNON, ANTOINETTE (1616-1680), Flemish mystic, was born at Lille on the 13th of January 1616. From an early age she was under the influence of religion, which took in course of time a mystical turn. Undertaking the work of a reformer, she visited France, Holland, England and Scotland. Her religious enthusiasm, peculiarity of views and disregard of all sects raised both zealous persecutors and warm adherents. On her death at Franeker, Friesland, on the 30th of October 1680, she left a large number of followers, who, however, dwindled rapidly away; but in the early 18th century her influence revived in Scotland sufficiently to call forth several denunciations of her doctrines in the various Presbyterian general assemblies of 1701, 1709 and 1710. So far as appears from her writings and contemporary records, she was a visionary of the ordinary type, distinguished only by the audacity and persistency of her pretensions.

Her writings, containing an account of her life and of her visions and opinions, were collected by her disciple, Pierre Poiret (19 vols., Amsterdam, 1679-1686), who also published her life (2 vols., 1679). For a critical account see Hauck, *Realencyklopädie* (Leipzig, 1897), and *Étude sur Antoinette Bourignon*, by M. E. S. (Paris, 1876). Three of her works at least have been translated into English:— *An Abridgment of the Light of the World* (London, 1786); *A Treatise of Solid Virtue* (1699); *The Restoration of the Gospel Spirit* (1707)

BOURKE, a town of Cowper county, New South Wales, Australia, 503 m. by rail N.W. from Sydney. Pop. (1901) 2614. It is situated on the south bank, and at the head of the ordinary winter navigation, of the Darling river. Very rich copper ore exists in the district in great abundance. Bourke is the centre of a large sheep-farming area, and the annual agricultural show is one of the best in the colony. On the west side of the Darling, 3 m. distant, is the small town of North Bourke, and at Pera, 10 m. distant, is an important irrigation settlement.

BOURMONT, LOUIS AUGUSTE VICTOR, Comte de Ghaisne de (1773-1846), marshal of France, entered the *Gardes Françaises* of the royal army shortly before the Revolution, emigrated in 1789, and served with Condé and the army of the *émigrés* in the campaigns of 1792 and 1793, subsequently serving as chief of staff to Scépeaux, the royalist leader, in the civil war in lower Anjou (1794-1796). Bourmont, excepted from the amnesty of April 1796, fled into Switzerland, but soon afterwards, having been made by Louis XVIII. a *maréchal de camp* and a knight of St Louis, he headed a fresh insurrection, which after some preliminary successes collapsed (1799-1800). He then made his submission to the First Consul, married, and lived in Paris; but his thinly veiled royalism caused his arrest a few months later, and he remained a prisoner for more than three years, finally escaping to Portugal in 1804. Three years later the French army under General Junot invaded Portugal, and Bourmont offered his services to Junot, who made him chief of staff of a division. He returned to France with Junot after the convention of Cintra, and was promptly re-arrested. He was soon released, however, on Junot's demand, and was commissioned as an officer in the imperial army. He served in Italy for a time, then went on the staff of the viceroy Eugène (Beauharnais), whom he accompanied in the Moscow campaign. He was taken prisoner in the retreat, but escaped after a time and rejoined the French army. His conspicuous courage at the battle of Lützen in 1813 led Napoleon to promote him general of brigade, and in 1814 his splendid defence of Nogent (February 13) earned him the rank of general of division. At the first Restoration Bourmont was naturally employed by the Bourbons, to whose service he had devoted his life, but he rejoined Napoleon on his return from Elba. On the eve of the campaign of 1815, and at the urgent request of Count Gérard, he was given a divisional command in the army of the north. On the

first day of the Waterloo campaign Bourmont went over to the enemy. It is not probable that he gave information of French movements to the allies, but the best that can be said in exculpation of his treachery is that his old friends and comrades, the royalists of Anjou, were again in insurrection, and that he felt that he must lead them. He made no attempt to defend his conduct, and acted as the accuser of Marshal Ney. A year later he was given command of a division of the royal guard; and in 1823 he held an important position in the army which, under the command of the duc d'Angoulême, invaded Spain. He commanded the whole army in Spain for a time in 1824, became minister of war in 1829, and in 1830 was placed in command of the Algiers expedition. The landing of the French and the capture of Algiers were directed by him with complete success, and he was rewarded with the *bâton* of marshal. But the revolution of 1830 put an end to his command, and, refusing to take the oath to Louis Philippe, he was forced to resign. In 1832 Marshal Bourmont took part in the rising of the duchesse de Berri, and on its failure retired to Portugal. Here, as always, on the side of absolutism, he commanded the army of Dom Miguel during the civil war of 1833-1834, and after the victory of the constitutional party he retired to Rome. At the amnesty of 1840 he returned to France. He died at the château of Bourmont on the 27th of October 1846.

Charles de Bourmont, a son of the marshal, wrote several pamphlets in vindication of his father's career.

BOURNE, VINCENT (1695-1747), English classical scholar, familiarly known as "Vinny" Bourne, was born at Westminster in 1695. In 1710 he became a scholar at Westminster school, and in 1714 entered Trinity College, Cambridge. He graduated in 1717, and obtained a fellowship three years later. Of his afterlife exceedingly little is known. It is certain that he passed the greater portion of it as usher in Westminster school. He died on; the 2nd of December 1747. During his lifetime he published three editions of his Latin poems, and in 1772 there appeared a very handsome quarto volume containing all Bourne's pieces, but also some that did not belong to him. The Latin poems are remarkable not only for perfect mastery of all linguistic niceties, but for graceful expression and genuine poetic feeling. A number of them are translations of English poems, and it is not too much to say that the Latin versions almost invariably surpass the originals. Cowper, an old pupil of Bourne's, Beattie and Lamb have combined in praise of his wonderful power of Latin versification.

See an edition (1840) of his *Poemata*, with a memoir by John Mitford.

BOURNE, or Bourn, a market town in the S. Kesteven or Stamford parliamentary division of Lincolnshire, England; lying in a fenny district 95 m. N. by W. from London. Pop. of urban district (1901) 4361. The Stamford-Sleaford branch of the Great Northern railway here crosses the Saxby-Lynn joint line of the Great Northern and Midland companies. The church of St Peter and St Paul is Norman and Early English with later insertions; it is part of a monastic church belonging to a foundation of Augustinian canons of 1138, of which the other buildings have almost wholly disappeared. Trade is principally agricultural. Bourne is famous through its connexion with the ardent opponent of William the Conqueror, Hereward the Wake. Of his castle very slight traces remain. Bourne was also the birthplace of the Elizabethan statesman Cecil, Lord Burghley. The Red Hall, which now forms part of the railway station buildings, belonged to the family of Digby, of whom Sir Everard Digby was executed in 1606 for his connexion with the Gunpowder Plot.

BOURNE (southern form of burn, Teutonic *born, brun, burna*), an intermittent stream frequent in chalk and limestone country where the rock becomes saturated with winter rain, that slowly drains away until the rock becomes dry, when the stream ceases. A heavy rainfall will cause streams to run in winter from the saturated soil. These are the winter bournes that have given name to several settlements upon Salisbury Plain, such as Winterbourne Gunning. The "bourne" may also be a permanent "burn," but the word is usually applied to an intermittent stream. (2) (From the Fr. *borne*), a boundary; the first use of the word in English is in Lord Ferrers' translation of Forrest, 1523; the figurative meaning of limit, end or final destination comes from Shakespeare's Hamlet, "the undiscovered country, from whose bourne no traveller returns."

BOURNEMOUTH, a municipal and county borough and watering-place of Hampshire, England, in the parliamentary borough of Christchurch, 107½ m. S.W. by W. from London by the London & South-Western railway. Pop. (1901) 59,762. It is beautifully situated on Poole Bay. Considerable sandstone cliffs rise from the sandy beach, and are scored with deep picturesque dells or chines. The town itself lies in and about the valley of the Bourne stream. Its sheltered situation and desirable winter climate began to attract notice about 1840; in 1855 a national sanatorium for consumptive patients was erected by subscription; a pier was opened in 1861, and in 1870 railway communication was afforded. The climate is remarkably equable, being relatively warm in winter and cool in summer; the average temperature in July is 61.7° F., and in January 40.3°. The town contains numerous handsome buildings, including municipal buildings, churches, various places of entertainment, sanatoria and hospitals, a public library and a science and art school. Its suburbs have greatly extended along the sea front, and the beautiful chines of Boscombe, Alum and Branksome have attracted a large number of wealthy residents. There are piers at the town itself and at Boscombe, and the bathing is excellent. The parks, gardens and drives are extensive and pleasant. A service of electric tramways is maintained, notable as being the first system installed in England with a combination of the trolley and conduit principles of supplying current. There are golf links in Meyrick and Queen's parks, both laid out by the corporation, which has in other ways studied the entertainment of visitors. The two railway stations are the Central and West, and through communications with the north are maintained by the Somerset & Dorset and Midland, and the Great Western and Great Central railways. The town, which is of wholly modern and remarkably rapid growth (for in the middle of the 19th century the population was less than 1000), was incorporated in 1890, and became a county borough in 1900. The corporation consists of a mayor, 11 aldermen and 33 councillors. Area, 5769 acres.

BOURNONITE, a mineral species, a sulphantimonite of lead and copper with the formula $PbCuSbS_3$. It is of some interest on account of the twinning and the beautiful development of its crystals. It was first mentioned by Philip Rashleigh in 1797 as "an ore of antimony," and was more completely described by the comte de Bournon in 1804, after whom it was named: the name given by Bournon himself (in 1813) was endellione, since used in the form endellionite, after the locality in Cornwall where the mineral was first found. The crystals are orthorhombic, and are generally tabular in habit owing to the predominance of the basal pinacoid (*c*); numerous smooth bright faces are often developed on the edges and corners of the crystals. An un-twinned crystal is represented in fig. 1. Usually, however, the crystals are twinned, the twin-plane being a face of the prism (*m*); the angle between the faces of this prism being nearly a right angle (86° 20′), the twinning gives rise to cruciform groups (fig. 2), and when it is often repeated the group has the appearance of a cog-wheel, hence the name *Rädelerz* (wheel-ore) of the Kapnik miners. The repeated twinning gives rise to twin-lamellae, which may be detected on the fractured surfaces, even of the massive material. The mineral is opaque, and has a brilliant metallic lustre with a lead-grey colour. The hardness is 2½, and the specific gravity 5.8.

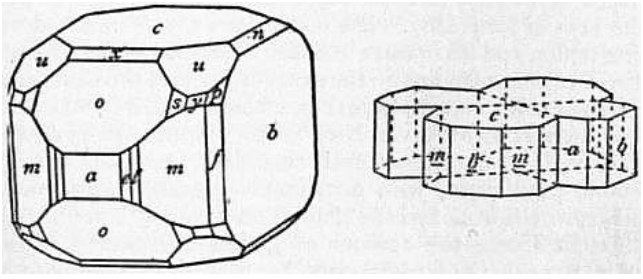


FIG. 1.—Crystal of Bournonite.

FIG. 2.—Twinned Crystal of Bournonite.

At the original locality, Wheal Boys in the parish of Endellion in Cornwall, it was found associated with jamesonite, blende and chalybite. Later, still better crystals were found in another Cornish mine, namely, Herodsfoot mine near Liskeard, which was worked for argentiferous galena. Fine crystals of large size have been found with quartz and chalybite in the mines at Neudorf in the Harz, and with blende and tetrahedrite at Kapnik-Bánya near Nagy-Bánya in Hungary. A few other localities are known for this mineral.

(L. J. S.)

BOURRÉE, a French name for a dance common in Auvergne and in Biscay in Spain; also a term for a musical composition or a dance-movement in a suite, somewhat akin to the gavotte, in quick time with two beats to the bar.

BOURRIENNE, LOUIS ANTOINE FAUVELET DE (1769-1834), French diplomatist, was born at Sens on the 9th of July 1769. He was educated at the military school of Brienne in Champagne along with Napoleon Bonaparte; and although the solitary habits of the latter made intimacy difficult, the two youths seem to have been on friendly terms. It must, however, be added that the stories of their very close friendship, as told in Bourrienne's memoirs, are open to suspicion. Leaving Brienne in 1787, and conceiving a distaste for the army, Bourrienne proceeded to Vienna. He was pursuing legal and diplomatic studies there and afterwards at Leipzig, when the French Revolution broke out and went through its first phases. Not until the spring of 1792 did Bourrienne return to France; at Paris he renewed his acquaintance with Bonaparte. They led a Bohemian life together, and among other incidents of that exciting time, they witnessed the mobbing of the royal family in the Tuileries (June 20) and the overthrow of the Swiss Guards at the same spot (August 10). Bourrienne next obtained a diplomatic appointment at Stuttgart, and soon his name was placed on the list of political *émigrés*, from which it was not removed until November 1797. Nevertheless, after the affair of 13th Vendémiaire (October 5, 1795) he returned to Paris and renewed his acquaintance with Bonaparte, who was then second in command of the Army of the Interior and soon received the command of the Army of Italy. Bourrienne did not proceed with him into Italy, but was called thither by the victorious general at the time of the long negotiations with Austria (May-October 1797), when his knowledge of law and diplomacy was of some service in the drafting of the terms of the treaty of Campo Formio (October 17). In the following year he accompanied Bonaparte to Egypt as his private secretary, and left a vivid, if not very trustworthy, account of the expedition in his memoirs. He also accompanied him on the adventurous return voyage to Fréjus (September-October 1799), and was of some help in the affairs which led up to the *coup d'état* of Brumaire (November) 1799. He remained by the side of the First Consul in his former capacity, but in the autumn of 1802 incurred his displeasure owing to his very questionable financial dealings. In the spring of 1805 he was sent as French envoy to the free city of Hamburg. There it was his duty to carry out the measures of commercial war against England, known as the Continental System; but it is known that he not only viewed those tyrannical measures with disgust, but secretly relaxed them in favour of those merchants who plied him with *douceurs*. In the early spring of 1807, when directed by Napoleon to order a large number of military cloaks for the army, then in East Prussia, he found that the only means of procuring them expeditiously was to order them from England. After gaining a large fortune while at Hamburg, he was recalled to France in disgrace at the close of 1810. In 1814 he embraced the royal cause, and during the Hundred Days (1815) accompanied Louis XVIII. to Ghent. The rest of his life was uneventful; he died at Caen on the 7th of February 1834, after suffering from a mental malady for two years.

The fame of Bourrienne rests, not upon his achievements or his original works, which are insignificant, but upon his *Mémoires*, edited by C.M. de Villemarest (10 vols., Paris, 1829-1831), which have been frequently republished and translated. The best English edition is that edited by Colonel R.W. Phipps (4 vols., London, 1893); a new French edition has been edited by D. Lacroix (5 vols., Paris, 1899-1900). See *Bourrienne et ses erreurs, volontaires et involontaires* (Paris, 1830), by Generals Belliard, Gourgaud, &c., for a discussion of the genuineness of his Memoirs; also *Napoléon et ses détracteurs*, by Prince Napoleon (Paris, 1887; Eng. trans., London, 1888).

(J. Hl. R.)

BOURRIT, MARC THÉODORE (1739-1819), Swiss traveller and writer, came of a family which was of French origin but had taken refuge at Geneva for reasons connected with religion. His father was a watchmaker there, and he himself was educated in his native city. He was a good artist and etcher, and also a pastor, so that by reason of his fine voice and love of music he was made (1768) precentor of the church of St Peter (the former cathedral) at Geneva. This post enabled him to devote himself to the exploration of the Alps, for which he had conceived a great passion ever since an ascent (1761) of the Voirons, near Geneva. In 1775 he made the first ascent of the Buet (10,201 ft.) by the now usual route from the Pierre à Bérard, on which the great flat rock known as the *Table au Chantre* still preserves his memory. In 1784-1785 he was the first traveller to attempt the ascent of Mont Blanc (not conquered till 1786), but neither then nor later (1788) did he succeed in reaching its summit. On the other hand he reopened (1787) the route over the Col du Géant (11,060 ft.), which had fallen into oblivion, and travelled also among the mountains of the Valais, of the Bernese Oberland, &c. He received a pension from Louis XVI., and was named the *historiographe des Alpes* by the emperor Joseph II., who visited him at Geneva. His last visit to Chamonix was in 1812. His writings are composed in a naïve, sentimental and rather pompous style, but breathe throughout a most passionate love for the Alps, as wonders of nature, and not as objects of scientific study. His chief works are the *Description des glacières de Savoye*, 1773 (English translation, Norwich, 1775-1776), the *Description des Alpes pennines et rhétiennes* (2 vols., 1781) (reprinted in 1783 under the title of *Nouvelle Description des vallées de glace*, and in 1785, with additions, in 3 vols., under the name of *Nouvelle Description des glacières*), and the *Descriptions des cols ou passages des Alpes*, (2 vols., 1803), while his *Itinéraire de Genève, Lausanne et Chamouni*, first published in 1791, went through several editions in his lifetime.

BOURSAULT, EDME (1638-1701), French dramatist and miscellaneous writer, was born at Mussy l'Évêque, now Mussy-sur-Seine (Aube), in October 1638. On his first arrival in Paris in 1651 his language was limited to a Burgundian patois, but within a year he produced his first comedy, *Le Mort vivant*. This and some other pieces of small merit secured for him distinguished patronage in the society ridiculed by Molière in the *École des femmes*. Boursault was persuaded that the "Lysidas" of that play was a caricature of himself, and attacked Molière in *Le Portrait du peintre ou la contre-critique de l'École des femmes* (1663). Molière retaliated in *L'Impromptu de Versailles*, and Boileau attacked Boursault in Satires 7 and 9. Boursault replied to Boileau in his *Satire des satires* (1669), but was afterwards reconciled with him, when Boileau on his side erased his name from his satires. Boursault obtained a considerable pension as editor of a rhyming gazette, which was, however, suppressed for ridiculing a Capuchin friar, and the editor was only saved from the Bastille by the interposition of Condé. In 1671 he produced a work of edification in *Ad usum Delphini: la véritable étude des souverains*, which so pleased the court that its author was about to be made assistant tutor to the dauphin when it was found that he was ignorant of Greek and Latin, and the post was given to Pierre Huet. Perhaps in compensation Boursault was made collector of taxes at Mont-luçon about 1672, an appointment that he retained until 1688. Among his best-known plays are *Le Mercure galant*, the title of which was changed to *La Comédie sans titre* (1683); *La Princesse de Clèves* (1676), an unsuccessful play which, when refurbished with fresh names by its author, succeeded as *Germanicus; Ésope à la ville* (1690); and *Ésope à la cour* (1701). His lack of dramatic instinct could hardly be better indicated than by the scheme of his *Ésope*, which allows the fabulist to come on the stage in each scene and recite a fable. Boursault died in Paris on the 15th of September 1701.

The *Oeuvres choisies* of Boursault were published in 1811, and a sketch of him is to be found in M. Saint-René Taillandier's *Études littéraires* (1881).

BOURSE (from the Med. Lat. *bursa*, a purse), the French equivalent of the Stock Exchange, and so used of the Paris Exchange, or of any foreign money-market. The English form "burse," as in Sir Thomas Gresham's building, which was known as "Britain's Burse," went out of use in the 18th century. The origin of the name is doubtful; it is not derived from any connexion between purse and money, but rather from the use of a purse as a sign. At Bruges a house belonging to the family de Bursa is said to have been first used as an Exchange, and to have had three purses as a sign on the front.

BOURSSE, ESAIAS (1630-1673), Dutch painter, was born in Amsterdam. He was a follower of Pieter de Hooch, in whose manner he worked for many years in his native town; then he took service with the Dutch East India Company, and died on a sea voyage. His paintings are exceedingly rare, perhaps because, in spite of their greater freedom and breadth, many of them pass under the names of Vermeer of Delft and Pieter de Hooch. Two of the paintings ascribed to the latter (one bears the false signature) at the Ryks museum in Amsterdam, are now recognized as being the work of Boursse. His subjects are interiors with figures, painted with great precision and with exquisite quality of colour. The Wallace collection has his masterpiece, an interior with a woman and a child in a cradle, almost as brilliant as on the day it was painted, and reflecting something of the feeling of Rembrandt, by whom he was influenced. Other important examples are at the Ryks museum and at Aix-la-Chapelle. Boursse's "Boy blowing Soap Bubbles," in the Berlin museum, was until lately attributed to Vermeer of Delft. More than one picture bearing the false signature of Boursse have been publicly shown of late years.

BOUSSINGAULT, JEAN BAPTISTE JOSEPH DIEUDONNÉ (1802-1887), French chemist, was born in Paris on the 2nd of February 1802. After studying at the school of mines at Saint-Étienne he went, when little more than twenty years old, to South America as a mining engineer on behalf of an English company. During the insurrection of the Spanish colonies he was attached to the staff of General Bolivar, and travelled widely in the northern parts of the continent. Returning to France he became professor of chemistry at Lyons, and in 1839 was appointed to the chair of agricultural and analytical

chemistry at the Conservatoire des Arts et Métiers in Paris. In 1848 he was elected to the National Assembly, where he sat as a Moderate republican. Three years later he was dismissed from his professorship on account of his political opinions, but so much resentment at this action was shown by scientific men in general, and especially by his colleagues, who threatened to resign in a body, that he was reinstated. He died in Paris on the 11th of May 1887. His first papers were concerned with mining topics, and his sojourn in South America yielded a number of miscellaneous memoirs, on the cause of goitre in the Cordilleras, the gasses of volcanoes, earthquakes, tropical rain, &c., which won the commendation of A. von Humboldt. From 1836 he devoted himself mainly to agricultural chemistry and animal and vegetable physiology, with occasional excursions into mineral chemistry. His work included papers on the quantity of nitrogen in different foods, the amount of gluten in different wheats, investigations on the question whether plants can assimilate free nitrogen from the atmosphere (which he answered in the negative), the respiration of plants, the function of their leaves, the action and value of manures, and other similar subjects. Through his wife he had a share in an estate at Bechebronn in Alsace, where he carried out many agricultural experiments. He collaborated with J.B.A. Dumas in writing an *Essai de statique chimique des ètres organisés* (1841), and was the author of *Traité d'économic rurale* (1844), which was remodelled as *Agronomie, chimie agricole, et physiologie* (5 vols., 1860-1874; 2nd ed., 1884), and of *Études sur la transformation du fer en acier* (1875).

BOUTERWEK, FRIEDRICH (1766-1828), German philosopher and critic, was born at Oker, near Goslar in Lower Saxony, and studied law at Göttingen. From 1790, however, he became a disciple of Kant, published *Aphorismen nach Kants Lehre vorgelegt* (1793), and became professor of philosophy at Göttingen (1802), where he died on the 9th of August 1828. As a philosopher, he is interesting for his criticism of the theory of the "thing-in-itself" (*Ding-an-sich*). For the pure reason, as described in the *Kritik*, the "thing-in-itself" can be only an inconceivable "something-in-general"; any statement about it involves the predication of Reality, Unity and Plurality, which belong not to the absolute thing but to phenomena. On the other hand, the subject is known by the fact of will, and the object by that of resistance; the cognizance of willing is the assertion of absolute reality in the domain of relative knowledge. This doctrine has since been described as absolute Virtualism. Following this train of thought, Bouterwek left the Kantian position through his opposition to its formalism. In later life he inclined to the views of F.H. Jacobi, whose letters to him (published at Göttingen, 1868) shed much light on the development of his thought. His chief philosophical works are *Ideen zu einer allgemeinen Apodiktik* (Göttingen and Halle, 1799); *Aesthetik* (Leipzig, 1806; Göttingen, 1815 and 1824); *Lehrbuch der philos. Vorkenntnisse* (Göttingen, 1810 and 1820); *Lehrbuch der philos. Wissenschaften* (Göttingen, 1813 and 1820). In these works he dissociated himself from the Kantian school. His chief critical work was the *Geschichte der neuern Poesie und Beredsamkeit* (Göttingen, 12 vols., 1801-1819), of which the history of Spanish literature has been published separately in French, Spanish and English. The *Geschichte* is a work of wide learning and generally sound criticism, but it is not of equal merit throughout. He also wrote three novels, *Paulus Septimus* (Halle, 1795), *Graf Donamar* (Göttingen, 1791) and *Ramiro* (Leipzig, 1804), and published a collection of poems (Göttingen, 1802).

BOUTHILLIER, CLAUDE, Sieur de Fouilletourte (1581-1652), French statesman, began life as an advocate. In 1613 he was councillor in the parlement of Paris, and in 1619 became councillor of state and a secretary to the queen-mother, Marie de' Medici. The connexion of his father, Denis Bouthillier (d. 1622), with Cardinal Richelieu secured for him the title of secretary of state in 1628, and he was able to remain on good terms with both Marie de' Medici and Richelieu, in spite of their rivalry. In 1632 he became superintendent of finances. But his great role was in diplomacy. Richelieu employed him on many diplomatic missions, and the success of his foreign policy was due in no small degree to Bouthillier's ability and devotion. In 1630 he had taken part at Regensburg in arranging the abortive treaty between the emperor and France. From 1633 to 1640 he was continually busied with secret missions in Germany, sometimes alone, sometimes with Father Joseph. Following Richelieu's instructions, he negotiated the alliances which brought France into the Thirty Years' War. Meanwhile, at home, his tact and amiable disposition, as well as his reputation for straightforwardness, had secured for him a unique position of influence in a court torn by jealousies and intrigues. Trusted by the king, the confidant of Richelieu, the friend of Marie de' Medici, and through his son, Léon Bouthillier, who was appointed in 1635 chancellor to Gaston d'Orléans, able to bring his influence to bear on that prince, he was an invaluable mediator; and the personal influence thus exercised, combined with the fact that he was at the head of both the finances and the foreign policy of France, made him, next to the cardinal, the most powerful man in the kingdom. Richelieu made him executor of his will, and Louis XIII. named him a member of the council of regency which he intended should govern the kingdom after his death. But the king's last plans were not carried out, and Bouthillier was obliged to retire into private life, giving up his office of superintendent of finances in June 1643. He died in Paris on the 13th of March 1652.

His son, Léon Bouthillier (1608-1652), comte de Chavigny, was early associated with his father, who took him with him from 1629 to 1632 to all the great courts of Europe, instructing him in diplomacy. In 1632 he was named secretary of state and seconded his father's work, so that it is not easy always to distinguish their respective parts. After the death of Louis XIII. he had to give up his office; but was sent as plenipotentiary to the negotiations at Munster. He showed himself incapable, however, giving himself up to pleasure and fêtes, and returned to France to intrigue against Mazarin. Arrested twice during the Fronde, and then for a short time in power during Mazarin's exile (April 1651), he busied himself with small intrigues which came to nothing.

BOUTS-RIMÉS, literally (from the French) "rhymed ends," the name given in all literatures to a kind of verses of which no better definition can be found than was made by Addison, in the Spectator, when he described them as "lists of words that rhyme to one another, drawn up by another hand, and given to a poet, who was to make a poem to the rhymes in the same order that they were placed upon the list." The more odd and perplexing the rhymes are, the more ingenuity is required to give a semblance of common-sense to the production. For instance, the rhymes *breeze, elephant, squeeze, pant, scant, please, hope, pope* are submitted, and the following stanza is the result:—

Escaping from the Indian *breeze*,
The vast, sententious *elephant*
Through groves of sandal loves to *squeeze*
And in their fragrant shade to *pant*;
Although the shelter there be *scant*,
The vivid odours soothe and *please*,
And while he yields to dreams of *hope*,
Adoring beasts surround their *Pope*.

The invention of bouts-rimés is attributed to a minor French poet of the 17th century, Dulot, of whom little else is remembered. According to the *Menagiana*, about the year 1648, Dulot was complaining one day that he had been robbed of a number of valuable papers, and, in particular, of three hundred sonnets. Surprise being expressed at his having written so many, Dulot explained that they were all "blank sonnets," that is to say, that he had put down the rhymes and nothing else. The idea struck every one as amusing, and what Dulot had done seriously was taken up as a jest. Bouts-rimés became the fashion, and in 1654 no less a person than Sarrasin composed a satire against them, entitled *La Défaite des bouts-rimés*, which enjoyed a great success. Nevertheless, they continued to be abundantly composed in France throughout the 17th century and a great part of the 18th century. In 1701 Etienne Mallemans (d. 1716) published a collection of serious sonnets, all written to rhymes selected for him by the duchess of Maine. Neither Piron, nor Marmontel, nor La Motte disdained this ingenious exercise, and early in the 19th century the fashion was revived. The most curious incident, however, in the history of bouts-rimés is the fact that the elder Alexandre Dumas, in 1864, took them under his protection. He issued an invitation to all the poets of France to display their skill by composing to sets of rhymes selected for the purpose by the poet, Joseph Méry (1798-1866). No fewer than 350 writers responded to the appeal, and Dumas published the result, as a volume, in 1865.

W.M. Rossetti, in the memoir of his brother prefixed to D.G. Rossetti's *Collected Works* (1886), mentions that, especially in 1848 and 1849, he and Dante Gabriel Rossetti constantly practised their pens in writing sonnets to *bouts-rimés*, each giving the other the rhymes for a sonnet, and Dante Gabriel writing off these exercises in verse-making at the rate of a sonnet in five or eight minutes. Most of W.M. Rossetti's poems in *The Germ* were *bouts-rimés* experiments. Many of Dante Gabriel's, a little touched up, remained in his brother's possession, but were not included in the *Collected Works*.

(E. G.)

BOUTWELL, GEORGE SEWALL (1818-1905), American statesman, was born in Brookline, Massachusetts, on the 28th of January 1818. He was reared on a farm, and at an early age began a mercantile career at Groton, Mass. There he studied law and in 1836 was admitted to the bar, but did not begin practice for many years. In 1842-1844 and again in 1847-1850 he served in the state house of representatives, and became the recognized leader on the Democratic side; he was thrice defeated for Congress, and was twice an unsuccessful candidate for governor. In 1851, however, by means of "Free-Soil" votes, he was chosen governor, and was re-elected by the same coalition in 1852. In the following year he took an active part in the state constitutional convention. He became a member of the Massachusetts Board of Education in 1853, and as its secretary in 1855-1861 prepared valuable reports and rendered much service to the state's school system. The passage of the Kansas-Nebraska Bill in 1854 had finally alienated him from the Democratic party, and he became one of the founders of the new Republican party in the state. He played an influential part in the Republican national convention

in 1860, and in 1862 after the passage of the war tax measures he was appointed by President Lincoln the first commissioner of internal revenue, which department he organized. From 1863 to 1869 he was a representative in Congress, taking an influential part in debate, and acting as one of the managers of President Johnson's impeachment. From 1869 to 1873 he was secretary of the treasury in President Grant's cabinet, and from 1873 until 1877 was a United States senator from Massachusetts. Under an appointment by President Hayes, he prepared the second edition of the *United States Revised Statutes* (1878). In 1880 he represented the United States before the commission appointed in accordance with the treaty of that year, between France and the United States, to decide the claims brought by French citizens against the United States for acts of the American authorities during the Civil War, and the claims of American citizens against France for acts of French authorities during the war between France and Mexico, the Franco-German War and the Commune. He opposed the acquisition by the United States of the Philippine Islands, became president of the Anti-Imperialistic League, and was a presidential elector on the Bryan (Democratic) ticket in 1900. He died at Groton, Massachusetts, on the 28th of February 1905. He published various volumes, including *The Constitution of the United States at the End of the First Century* (1895), and *Reminiscences of Sixty Years in Public Affairs* (2 vols., New York, 1902).

BOUVARDIA, a genus of handsome evergreen greenhouse shrubs, belonging to the natural order Rubiaceae, and a native of tropical America. The flowers are in terminal generally many-flowered clusters; the corolla has a large tube and a spreading four-rayed limb. The cultivated forms include a number of hybrids. The plants are best increased by cuttings taken off in April, and placed in a brisk heat in a propagating frame with a close atmosphere. When rooted they should be potted singly into 3-in. pots in fibrous peat and loam, mixed with one-fourth leaf-mould and a good sprinkling of sand, and kept in a temperature of 70° by night and 80° during the day; shade when required; syringe overhead in the afternoon and close the house with sun-heat. The plants should be topped to ensure a bushy habit, and as they grow must be shifted into 6-in. or 7-in. pots. After midsummer move to a cool pit, where they may remain till the middle of September, receiving plenty of air and space. They should then be removed to a house, and some of the plants put at once in a temperature of about 70° at night, with a few degrees higher in the daytime, to bring them into flower. Others are moved into heat to supply flowers in succession through the winter and spring.

BOUVET, FRANÇOIS JOSEPH (1753-1832), French admiral, son of a captain in the service of the French East India Company, was born on the 23rd of April 1753. He went to sea at the age of twelve with his father. Bouvet served in the East Indies in the famous campaign of 1781-83 under the command of Suffren, but only in a subordinate rank. On the outbreak of the French Revolution he very naturally took the anti-royalist side. Murder and exile had removed the great majority of the officers of the monarchy, and the services of a man of Bouvet's experience were valuable. He was promoted captain and received the command of the "Audacieux" (80) in the first great fleet collected by the republic. In the same year (1793) he was advanced to rear-admiral, and he commanded a division in the fleet which fought the battle of the 1st of June 1794 against Lord Howe. Until the close of 1796 he continued in command of a squadron in the French Channel fleet. In the December of that year he was entrusted with the van division of the fleet which was sent from Brest to attempt to land General Hoche with an expeditionary force in the south of Ireland. The stormy weather which scattered the French as soon as they left Brest gave Bouvet a prominence which he had not been designed to enjoy. Bouvet, who found himself at daybreak on the 17th of December separated with nine sail of the line from the rest of the fleet, opened his secret orders, and found that he was to make his way to Mizen Head. He took a wide course to avoid meeting British cruisers, and on the 19th had the good luck to fall in with a considerable part of the rest of the fleet and some of the transports. On the 21st of December he arrived off Dursey Island at the entry to Bantry Bay. On the 24th he anchored near Bear Island with part of his fleet. The continued storms which blew down Bantry Bay, and the awkwardness of the French crews, made it impossible to land the troops he had with him. On the evening of the 25th the storm increased to such a pitch of violence that the frigate in which Bouvet had hoisted his flag was blown out to sea. The wind moderated by the 29th, but Bouvet, being convinced that none of the ships of his squadron could have remained at the anchorage, steered for Brest, where he arrived on the 1st of January 1797. His fortune had been very much that of his colleagues in this storm-tossed expedition, and on the whole he had shown more energy than most of them. He was wrong, however, in thinking that all his squadron had failed to keep their anchorage in Bantry Bay. The government, displeased by his precipitate return to Brest, dismissed him from command soon afterwards. He was compelled to open a school to support himself. Napoleon restored him to the service, and he commanded the squadron sent to occupy Guadaloupe during the peace of Amiens, but he had no further service, and lived in obscurity till his death on the 21st of July 1832.

Tronde, *Batailles navales de la France*, vols. ii. and iii., and James, *Naval History*, vols. i. and ii., give

accounts of the 1st of June and the expedition to Ireland. There is a vigorous account of the expedition in Tronde's *English in Ireland*, and it is dealt with in Admiral Colomb's *Naval Warfare*.

(D. H.)

BOUVIER, JOHN (1787-1851), American jurist, was born in Codogno, France, in 1787. In 1802 his family, who were Quakers (his mother was a member of the well-known Benezet family), emigrated to America and settled in Philadelphia, and after varied experiences as proprietor of a book shop and as a country editor he was admitted to the bar in 1818, having become a citizen of the United States in 1812. He attained high standing in his profession, was recorder of Philadelphia in 1836, and from 1838 until his death was an associate justice of the court of criminal sessions in that city. He is best known for his able legal writings. His *Law Dictionary Adapted to the Constitution and Laws of the United States of America and of the Several States of the American Union* (1839, revised and brought up to date by Francis Rawle, under the title of *Bouvier's Law Dictionary*, 2 vols., 1897) has always been a standard. He published also an edition of *Bacon's Abridgement of the Law* (10 vols., 1842-1846), and a compendium of American law entitled *The Institutes of American Law* (4 vols., 1851; new ed. 2 vols., 1876).

BOUVINES, a village on the French-Belgian frontier between Lille and Tournay, the scene of one of the greatest battles of the middle ages, fought on the 27th of July 1214, between the forces of Philip Augustus, king of France, and those of the coalition formed against him, of which the principal members were the emperor and King John of England. The plan of campaign seems to have been designed by King John, who was the soul of the alliance; his general idea was to draw the French king to the southward against himself, while the emperor Otto IV., the princes of the Netherlands and the main army of the allies should at the right moment march upon Paris from the north. John's part in the general strategy was perfectly executed; the allies in the north moved slowly. While John, after two inroads, turned back to his Guienne possessions on the 3rd of July, it was not until three weeks later that the emperor concentrated his forces at Valenciennes, and in the interval Philip Augustus had countermarched northward and concentrated an army at Péronne. Philip now took the offensive himself, and in manoeuvring to get a good cavalry ground upon which to fight he offered battle (July 27), on the plain east of Bouvines and the river Marque— the same plain on which in 1794 the brilliant cavalry action of Willems was fought. The imperial army accepted the challenge and drew up facing south-westward towards Bouvines, the heavy cavalry on the wings, the infantry in one great mass in the centre, supported by the cavalry corps under the emperor himself. The total force is estimated at 6500 heavy cavalry and 40,000 foot. The French army (about 7000 cavalry and 30,000 infantry) took ground exactly opposite to the enemy and in a similar formation, cavalry on the wings, infantry, including the *milice des communes*, in the centre, Philip with the cavalry reserve and the Oriflamme in rear of the foot. The battle opened with a confused cavalry fight on the French right, in which individual feats of knightly gallantry were more noticeable than any attempt at combined action. The fighting was more serious between the two centres; the infantry of the Low Countries, who were at this time almost the best in existence, drove in the French; Philip led the cavalry reserve of nobles and knights to retrieve the day, and after a long and doubtful fight, in which he himself was unhorsed and narrowly escaped death, began to drive back the Flemings. In the meanwhile the French feudatories on the left wing had thoroughly defeated the imperialists opposed to them, and William Longsword, earl of Salisbury, the leader of this corps, was unhorsed and taken prisoner by the warlike bishop of Beauvais. Victory declared itself also on the other wing, where the French at last routed the Flemish cavalry and captured Count Ferdinand of Flanders, one of the leaders of the coalition. In the centre the battle was now between the two mounted reserves led respectively by the king and the emperor in person. Here too the imperial forces suffered defeat, Otto himself being saved only by the devotion of a handful of Saxon knights. The day was already decided in favour of the French when their wings began to close inwards to cut off the retreat of the imperial centre. The battle closed with the celebrated stand of Reginald of Boulogne, a revolted vassal of King Philip, who formed a ring of seven hundred Brabançon pikemen, and not only defied every attack of the French cavalry, but himself made repeated charges or sorties with his small force of knights. Eventually, and long after the imperial army had begun its retreat, the gallant schiltron was ridden down and annihilated by a charge of three thousand men-at-arms. Reginald was taken prisoner in the *mêlée*; and the prisoners also included two other counts, Ferdinand and William Longsword, twenty-five barons and over a hundred knights. The killed amounted to about 170 knights of the defeated party, and many thousands of foot on either side, of whom no accurate account can be given.

See Oman, *History of the Art of War*, vii. pp. 457-480; also Köhler, *Kriegsgeschichte, &c.*, i. 140, and Delpech, *Tactique au XIII siècle*, 127.

BOVEY BEDS, in geology, a deposit of sands, clays and lignite, 200-300 ft. thick, which lies in a basin extending from Bovey Tracey to Newton Abbot in Devonshire, England. The deposit is evidently the result of the degradation of the neighbouring Dartmoor granite; and it was no doubt laid down in a lake. O. Heer, who examined the numerous plant remains from these beds, concluded that they belonged to the same geological horizon as the Molasse or Oligocene of Switzerland. Starkie Gardiner, however, who subsequently examined the flora, showed that it bore a close resemblance to that of the Bournemouth Beds or Lower Bagshot; in this view he is supported by C. Reid. Large excavations have been made for the extraction of the clays, which are very valuable for pottery and similar purposes. The lignite or "Bovey Coal" has at times been burned in the local kilns, and in the engines and workmen's cottages, but it is not economical.

See S. Gardiner, *Q. J. G. S.* London, xxxv., 1879; W. Pengelly and O. Heer, *Phil. Trans.*, 1862; C. Reid, *Q. J. G. S.* lii., 1896, p. 490, and *loc. cit.* liv., 1898, p. 234. An interesting general account is given by A.W. Clayden, *The History of Devonshire Scenery* (London, 1906), pp. 159-168.

BOVIANUM, the name of two ancient Italian towns, (1) Undecimanorum [*Boiano*], the chief city of the Pentri Samnites, 9 m. N.W. of Saepinum and 18 m. S.E. of Aesernia, on the important road from Beneventum to Corfinium, which connected the Via Appia and the Via Valeria. The original city occupied the height (Civita) above the modern town, where remains of Cyclopean walls still exist, while the Roman town (probably founded after the Social War, in which Bovianum was the seat of the Samnite assembly) lay in the plain. It acquired the name *Undecimanorum* when Vespasian settled the veterans of the Legio XI. Claudia there. Its remains have been covered by over 30 ft. of earth washed down from the mountains. Comparatively few inscriptions have been discovered. (2) Vetus (near Pietrabbondante, 5 m. S. of Agnone and 19 m. N.W. of Campobasso), according to Th. Mommsen (*Corpus Inscrip. Lat.* ix. Berlin, 1883, p. 257) the chief town of the Caraceni. It lay in a remote situation among the mountains, and where Bovianum is mentioned the reference is generally to Bovianum Undecimanorum. Remains of fortifications and lower down of a temple and a theatre (cf. *Römische Mitteilungen*, 1903, 154)— the latter remarkable for the fine preservation of the stone seats of the three lowest rows of the auditorium —are to be seen. No less than eight Oscan inscriptions have been found.

(T. As.)

BOVIDAE, the name of the family of hollow-horned ruminant mammals typified by the common ox (*Bos taurus*), and specially characterized by the presence on the skulls of the males or of both sexes of a pair of bony projections, or cores, covered in life with hollow sheaths of horn, which are never branched, and at all events after a very early stage of existence are permanently retained. From this, which is alone sufficient for diagnostic purposes, the group is often called the Cavicornia. For other characteristics see Pecora. The *Bovidae* comprise a great number of genera and species, and include the oxen, sheep, goats, antelopes and certain other kinds which come under neither of these designations. In stature they range from the size of a hare to that of a rhinoceros; and their horns vary in size and shape from the small and simple spikes of the oribi and duiker antlers to the enormous and variously shaped structures borne respectively by buffaloes, wild sheep and kudu and other large antelopes. In geographical distribution the *Bovidae* present a remarkable contrast to the deer tribe, or *Cervidae*. Both of these families are distributed over the whole of the northern hemisphere, but whereas the Cervidae are absent from Africa south of the Sahara and well represented in South America, the Bovidae are unknown in the latter area, but are extraordinarily abundant in Africa. Neither group is represented in Australasia; Celebes being the eastern limit of the *Bovidae*. The present family doubtless originated in the northern half of the Old World, whence it effected an entrance by way of the Bering Strait route into North America, where it has always been but poorly represented in the matter of genera and species.

The *Bovidae* are divided into a number of sections, or subfamilies, each of which is briefly noticed in the present article, while fuller mention of some of the more important representatives of these is made in other articles.

The first section is that of the *Bovinae*, which includes buffaloes, bison and oxen. The majority of these are large and heavily-built ruminants, with horns present in both sexes, the muzzle broad, moist and naked, the nostrils lateral, no face-glands, and a large dewlap often developed in the males; while the tail is long and generally tufted, although in one instance longhaired throughout. The horns are of nearly equal size in both sexes, are placed on or near the vertex of the skull, and may be either rounded or angulated, while their direction is more or less outwards, with an upward direction near the tips, and conspicuous knobs or ridges are never developed on their surface. The tall upper molars have inner columns. The group is represented throughout the Old World as far east as Celebes, and has one living North American representative. All the species may be included in the genus *Bos*, with several subgeneric divisions (see Anoa, Aurochs, Bantin, Bison, Buffalo, Gaur, Gayal, Ox and Yak).

The second group, or *Caprinae*, includes the sheep and goats, which are smaller animals than most of the *Bovidae*, generally with horns in both sexes, but those of the females small. In the males the horns are usually compressed and triangular, with transverse ridges or knobs, and either curving backwards or spiral. The muzzle is narrow and hairy; and when face-glands are present these are small and insignificant; while the tail is short and flattened. Unlike the *Bovinae*, there are frequently glands in the feet; and the upper molar teeth differ from those of that group in their narrower crowns, which lack a distinct inner column. When a face-pit is present in the skull it is small. The genera are *Ovis* (sheep), *Capra* (goats) and *Hemitragus* (tahr). Sheep and goats are very nearly related, but the former never have a beard on the chin of the males, which are devoid of a strong odour; and their horns are typically of a different type. There are, however, several more or less transitional forms. Tahr are short-horned goats. The group is unknown in America, and in Africa is only represented in the mountains of the north, extending, however, some distance south into the Sudan and Abyssinia. All the species are mountain-dwellers. (See Udad, Argali, Goat, Ibex, Mouflon, Sheep and Tahr.)

The musk-ox (*Ovibos moschatus*) alone represents the family *Ovibovinae*, which is probably most nearly related to the next group (see Musk-ox).

Next come the *Rupicaprinae*, which include several genera of mountain-dwelling ruminants, typified by the European chamois (*Rupicapra*); the other genera being the Asiatic serow, goral and takin, and the North American Rocky Mountain goat. These ruminants are best described as goat-like antelopes. (See Antelope, Chamois, Goral, Rocky Mountain Goat, Serow and Takin.)

Under the indefinable term “antelope” (*q.v.*) may be included the seven remaining sections, namely *Tragelaphinae* (kudu and eland), *Hippotraginae* (sable antelope and oryx), *Antilopinae* (black-buck, gazelles, &c.), *Cervicaprinae* (reedbuck and waterbuck), *Neotraginae* (klipspringer and steinbok), *Cephalophinae* (duikers and four-horned antelopes) and *Bubalinae* (hartebeests and gnus).

(R. L.*)

BOVILL, SIR WILLIAM (1814-1873), English judge, a younger son of Benjamin Bovill, of Wimbledon, was born at All-hallows, Barking, on the 26th of May 1814. On leaving school he was articled to a firm of solicitors, but entering the Middle Temple he practised for a short time as a special pleader below the bar. He was called in 1841 and joined the home circuit. His special training in a solicitor’s office, and its resulting connexion, combined with a thorough knowledge of the details of engineering, acquired through his interest in a manufacturing firm in the east end of London, soon brought him a very extensive patent and commercial practice. He became Q.C. in 1855, and in 1857 was elected M.P. for Guildford. In the House of Commons he was very zealous for legal reform, and the Partnership Law Amendment Act 1865, which he helped to pass, is always referred to as Bovill’s Act. In 1866 he was appointed solicitor-general, an office which he vacated on becoming chief justice of the common pleas in succession to Sir W. Erie in November of the same year. He died at Kingston, Surrey, on the 1st of November 1873. As a barrister he was unsurpassed for his remarkable knowledge of commercial law; and when promoted to the bench his painstaking labour and unswerving uprightness, as well as his great patience and courtesy, gained for him the respect and affection of the profession.

BOVILLAE, an ancient town of Latium, a station on the Via Appia (which in 293 B.C. was already paved up to this point), 11 m. S.E. of Rome. It was a colony of Alba Longa, and appears as one of the thirty cities of the Latin league; after the destruction of Alba Longa the *sacra* were, it was held, transferred to Bovillae, including the cult of Vesta (in inscriptions *virgines Vestales Albanae* are mentioned, and the inhabitants of Bovillae are always spoken of as *Albani Longani Bovillenses*) and that of the *gens Iulia*. The existence of this hereditary worship led to an increase in its importance when the Julian house rose to the highest power in the state. The knights met Augustus’s dead body at Bovillae on its way to Rome, and in A.D. 16 the shrine of the family worship was dedicated anew,[1] and yearly games in the circus instituted, probably under the charge of the *sodales Augustales*, whose official calendar has been found here. In history Bovillae appears as the scene of the quarrel between Milo and Clodius, in which the latter, whose villa lay above the town on the left of the Via Appia, was killed. The site is not naturally strong, and remains of early fortifications cannot be traced. It may be that Bovillae took the place of Alba Longa as a local centre after the destruction of the latter by Rome, which would explain the deliberate choice of a strategically weak position. Remains of buildings of the imperial period—the circus, a small theatre, and edifices probably connected with the post-station—may still be seen on the south-west edge of the Via Appia.

See L. Canina, *Via Appia* (Rome, 1853), i. 202 seq.; T. Ashby in *Mélanges de l’école française de Rome* (1903), p. 395.

(T. As.)

1 It is not likely that any remains of it now exist.

BOW (pronounced "bō"), a common Teutonic word for anything bent[1] (O. Eng. *boȝa*; cf. O. Sax. and O.H.G. *bogo*, M.H.G. *boge*, Mod. Ger. *bogen*; from O. Teut. stem *bug-* of *beugan*, Mod. Ger. *biegen*, to bend). Thus it is found in English compound words, *e.g.* "elbow," "rainbow," "bow-net," "bow-window," "bow-knot," "saddle-bow," and by itself as the designation of a great variety of objects. The Old English use of "bow," or stone-bow, for "arch," now obsolete, survives in certain names of churches and places, *e.g.* Bow church (St Mary-in-Arcubus) in Cheapside, and Stratford-le-Bow (the "Stratford-atte-Bowe" of Chaucer). "Bow," however, is still the designation of objects so various as an appliance for shooting arrows (see Archery), a necktie in the form of a bow-knot (*i.e.* a double-looped knot), a ring or hoop forming a handle (*e.g.* the bow of a watch), certain instruments or tools consisting of a bent piece of wood with the ends drawn together by a string, used for drilling, turning, &c., in various crafts, and the stick strung with horsehair by means of which the strings of instruments of the violin family are set in vibration. It is with this last that the present article is solely concerned.

Bow in Music.—The modern bow (Fr. *archet*; Ger. *Bogen*; Ital. *arco*) consists of five parts, *i.e.* the "stick," the screw or "ferrule," the "nut," the "hair" and the "head." The stick, in high-grade bows, is made of Pernambuco wood (*Caesalpinia brasiliensis*), which alone combines the requisite lightness, elasticity and power of resistance; for the cheaper bows American oak is used, and for the double-bass bow beech. A billet rich in colouring matter and straight in the grain is selected, and the stick is usually cut from a templet so as to obtain the accurate taper, which begins about 4¼ in. from the nut, decreasing according to regular proportions from ⅜ in. at the screw to $^3/_{16}$ at the back of the head. The stick is cut absolutely straight and parallel along its whole length with the fibre of the wood; it is then bent by heat until it is slightly convex to the hair and has assumed the elegant *cambrure* first given to it by François Tourte (1747-1835). This process requires the greatest care, for if the fibres be not heated right through, they offer a continual resistance to the curve, and return after a time to the rigid straight line, a defect often observed in cheap bows. The sticks are now of either cylindrical or octagonal section, and are lapped or covered with gold thread or leather for some inches beyond the nut in order to afford a firm grip. The length of the stick was definitely and finally fixed by François Tourte at 29.34 to 29.528 in.

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The centre of gravity in a well-balanced violin bow should be at 19 cm. (7½ to 7¾ in.) from the nut;[2] in the violoncello bow the hair measures from 60 to 62 cm. (24 to 25 in.), and the centre of gravity is at from 175 to 180 mm. (7 to 7¼ in.) from the nut. In consequence of the flexure given to the stick, Tourte found it necessary to readjust the proportions and relative height of head and nut, in order to keep the hair at a satisfactory distance from the stick, and at the necessary angle in attacking the strings so as to avoid contact between stick and strings in bowing. In order to counterbalance the consequent increased weight of the head and to keep the centre of gravity nearer the hand, Tourte loaded the nut with metal inlays or ornamental designs.

The screw or ferrule, at the cylindrical end of the stick held by the hand, provides the means of tightening or loosening the tension of the hair. This screw, about 3¼ in. long, hidden within the stick, runs through the eye of another little screw at right angles to it, which is firmly embedded in the nut.

The nut is a wooden block at the screw end of the stick, the original purpose of which was to keep the hair at a proper distance from the stick and to provide a secure attachment for the hair. The whole nut slides up and down the stick in a groove in answer to the screw, thus tightening or relaxing the tension of the hair. In the nut is a little cavity or chamber, into which the knotted end of the hair is firmly fixed by means of a little wedge, the hair being then brought out and flattened over the front of the nut like a ribbon by the pressure of a flat ferrule. The mother-of-pearl slide which runs along a mortised groove further protects the hair on the outside of the nut. Bows having these attachments of ferrule and slide, added by Tourte at the instigation of the violinist Giovanni Battista Viotti, were known as *archets à recouvrements*.

The hair is chosen from the best white horsehair, and each of the 150 to 200 hairs which compose the half-inch wide ribbon of the bow must be perfectly cylindrical and smooth. It is bought by the pound, and must be very carefully sorted, for not more than one hair in ten is perfectly cylindrical and fit for use on a high-grade bow. Experience determines the right number of hairs, for if the ribbon be too thick it hinders the vibration of the strings; if too thin the friction is not strong enough to produce a good tone. Fétis gives 175 to 250 as the number used in the modern bow,[3] and Julius Rühlmann 110 to 120.[4] Tourte attached the greatest importance to the hairing of the bow, and bestowed quite as much attention upon it as upon the stick. He subjected the hair to the following process of cleansing: first it was thoroughly scoured with soap and water to remove all grease, then steeped in bran-water, freed from all heterogeneous matter still adhering to it, and finally rinsed in pure water slightly blued. When passed between the fingers in the direction from root to tip, the hair glides smoothly and offers no resistance, but passed in the opposite direction it feels rough, suggesting a regular succession of minute projections. The outer epithelium or sheath of the hair is composed of minute scales which produce a succession of infinitesimal shocks when the hair is drawn across the strings; the force and uniformity of these shocks, which produce series of vibrations of equal persistency, is considerably heightened by the application of rosin to the hair. The particles of rosin cling to the scales of the epithelium, thus accentuating the projections and the energy of the attack or "bite" upon the strings. With use, the scales

of the epithelium wear off, and then no matter how much rosin is applied, the bow fails to elicit musical sounds— it is then “played out” and must be re-haired. The organic construction of horsehair makes it necessary, in hairing the bow, to lay the hairs in opposite directions, so that the up and down strokes may be equal and a pure and even tone obtained. Waxed silk is wound round both ends of the hair to form a strong knot, which is afterwards covered with melted rosin and hardens with the hair into a solid mass.

The head, 1 in. long and $^{7}/_{16}$ in. wide at the plate, is cut in one piece with the stick, an operation which requires delicate workmanship; otherwise the head is liable to snap at this point during a *sforzando* passage. The head has a chamber and wedge contrivance similar to that of the nut, in which the other end of the hair is immovably fixed. The hair on the face of the head is protected by a metal or ivory plate.

The model bow here described, elaborated by François Tourte as long ago as between 1775 and 1780 according to Fétis,[5] or between 1785 and 1790 according to Vidal,[6] has not since been surpassed.

That the violin and the bow form one inseparable whole becomes evident when we consider the history of the forerunners of the viol family: without the bow the ancestor of the violin would have remained a guitar; the bow would not have reached its present state of perfection had it been required only for instruments of the *rebec* and *vielle* type. As soon as the possibilities of the violin were realized, as a solo instrument capable, through the agency of the bow, of expressing the emotions of the performer, the perfecting of the bow was prosecuted in earnest until it was capable of responding to every shade of delicate thought and feeling. This accounts in a measure for the protracted development of the bow, which, although used long before the violin had been evolved, did not reach a state of perfection at the hands of Tourte until more than a century and a half after the Cremona master had given us the violin.

The question of the origin of the bow still remains a matter of conjecture. Its appearance in western Europe seems to have coincided with the conquest of Spain by the Moors in the 8th century, and the consequent impetus their superior culture gave to arts and sciences in the south-west of Europe. We have, however, no well-authenticated representation of the bow before the 9th century in Europe; the earliest is the bow illustrated along with the Lyra Teutonica by Martin Gerbert[7], the representation being taken from a MS. at the monastery of St Blaise, dating in his opinion from the 9th century. On the other hand, Byzantine art of the 9th and 11th centuries[8] reveals acquaintance with a bow far in advance of most of the crude contemporary specimens of western Europe. The bow undoubtedly came from the East, and was obviously borrowed by the Greeks of Asia Minor and the Arabs from a common source—probably India, by way of Persia. The earliest representation of a bow yet discovered is to be found among the fine frescoes in one of the chapels of the monastery of Bawit[9] in Egypt. The mural paintings in question were the work of many artists, covering a considerable period of time. The only non-religious subject depicted is a picture of a youthful Orpheus, assigned by Jean Clédat to some date not later than the 8th century A.D., but more probably the work of a 6th-century artist. Orpheus is holding an instrument, which appears to be a rebab, against his chin, in the act of bowing and stopping the strings. The bow is similar in shape to one shown in the Psalter of Labeo Notker, Leipzig, 10th century, mentioned farther on. On Indian sculptures of the first centuries of our era, such as the Buddhist *stupas* of Amaravati, the risers of the topes of Jamal-Garhi, in the Yusafzai district of Afghanistan (both in the British Museum), on which stringed instruments abound, there is no bow. The bow has remained a primitive instrument in India to this day; a Hindu tradition assigns its invention to Ravanon, a king of Ceylon, and the instrument for which it was invented was called *ravanastron*; a primitive instrument of that name is still in use in Hindustan[10]. F.J. Fétis[11], Antoine Vidal[12], Edward Heron-Allen[13], and others have given the question some consideration, and readers who wish to pursue the matter farther are referred to their works.

There is thus no absolute proof of the existence of the bow in primitive times. The earliest bow known in Europe was associated with the rebab (*q.v.*), the most widely used bowed instrument until the 12th century. The development of this instrument can be traced with some degree of certainty, but it is quite impossible to decide at what date or in what place the use of the bow was introduced. The bow developed very slowly in Europe and remained a crude instrument as long as it was applied to the rebab and its hybrids. Its progress became marked only from the time when it was applied to the almost perfect guitar (*q.v.*), which then became the guitar fiddle (*q.v.*), the immediate forerunner of the viols.

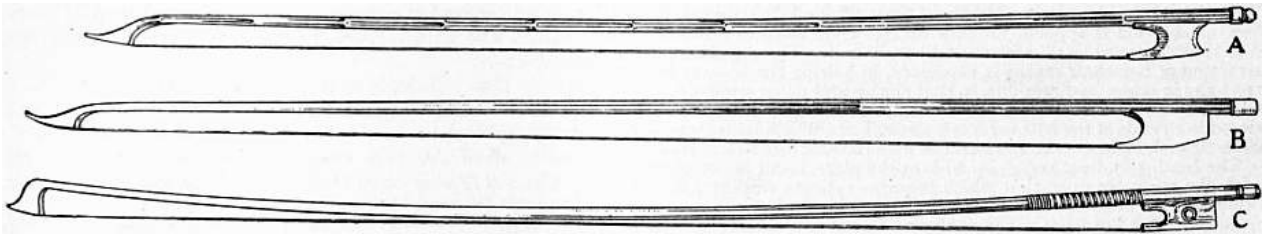
The first improvement on the primitive arched bow was to provide some sort of handle in a straight line with the hair or string of the bow, such as is shown in the MS. translation of the Psalms by Labeo Notker, late 10th century, in the University library, Leipzig.[14] The length of the handle was often greatly exaggerated, perhaps by the fancy of the artist. Another handle (see Bodleian Library MS., N.E.D. 2, 12th century) was in the form of a hilt with a knob, possibly a screw-nut, in which the arched stick and the hair were both fixed. The first development of importance influencing the technique of stringed instruments was the attempt to find some device for controlling the tension of the hair. The contrivance known as *crémaillère*, which was the first step in this direction, seems to have been foreshadowed in the bows drawn in a quaint MS. of the 14th century in the British Museum (Sloane 3983, fol. 43 and 13) on astronomy. Forming an obtuse angle with the handle of the bow is a

contrivance shaped like a spear-head which presumably served some useful purpose; if it had notches (which would be too small to show in the drawing), and the hair of the bow was finished with a loop, then we have here an early example of a device for controlling the tension. Another bow in the same MS. has two round knobs on the stick which may be assumed to have served the same purpose.

A very early example of the *crémaillère* bow (fig. 1) occurs on a carved ivory plate ornamenting the binding of the fine Carolingian MS. Psalter of Lothair (A.D. 825), for some time known as the Ellis and White Psalter, but now in the library of Sir Thomas Brooke at Armitage Bridge House. The carved figure of King David, assigned from its characteristic pose and the treatment of the drapery to the 11th century, holds a stringed instrument, a rotta of peculiar shape, which occurs twice in other Carolingian MSS.[15] of the 9th century, but copied here without understanding, as though it were a lyre with many strings. The artist has added a bow with *crémaillère* attachment, which is startling if the carving be accurately placed in the 11th century. The earliest representation of a *crémaillère* bow, with this exception, dates from the 15th century, according to Viollet-le-Duc, who merely states that it was copied from a painting.[16] Fétis (op. cit. p. 117) figures a *crémaillère* bow which he styles "Bassani, 1680." Sebastian Virdung draws a bow for a *tromba marina*, with the hair and stick bound together with waxed cord. The hair appears to be kept more or less tense by means of a wedge of wood or other material forced in between stick and hair, the latter bulging slightly at this point like the string of an archery bow when the arrow is in position; this contrivance may be due to the fancy of the artist.

Drawn from the ivory cover of the *Lothair Psalter*, by permission of Sir Thomas Brooke.

FIG. 1.—Earliest Bow of the Crémaillère Type (*c.* 11th century).



Drawn from bows the property of William E. Hill & Sons.

FIG. 2.—A, B, Tartini Bows; C, Tourte Bow.

The invention of a movable nut propelled by a screw is ascribed to the elder Tourte (fig. 2); had we not this information on the best authority (Vuillaume and Fétis), it might be imagined that some of the bows figured by Mersenne,[17] *e.g.* the bass viol bow KL (p. 184), and another KLM (p. 192), had a movable nut and screw; the nut is clearly drawn astride the stick as in the modern bow. Mersenne explains (p. 178) the construction of the bow, which consists of three parts: the *bois, bâton* or *brin*, the *soye*, and the *demi-roüe* or *hausse*. The term "half-wheel" clearly indicates that the base of the nut was cut round so as to fit round the stick. In the absence of any allusion to such ingenious mechanism as that of screw and nut, we must infer that the drawing is misleading and that the very decided button was only meant for an ornamental finish to the stick. We are informed further that *la soye* was in reality hairs from the horse or some other animal, of which from 80 to 100 were used for each bow. The up-stroke of the bow was used on the weak beats, 2, 4, 6, 8, and the down-stroke on the strong beats, 1, 3, 5, 7 (p. 185). The same practice prevailed in England in 1667, when Christopher Simpson wrote the *Division Viol*. He gives information concerning the construction of the bow in these words: "the viol-bow for division should be stiff but not heavy. The length (betwixt the two places where the hairs are fastened at each end) about seven-and-twenty inches. The nut should be short, the height of it about a finger's breadth or a little more" (p. 2).

As soon as Corelli (1653-1713) formulated the principles of the technique of the violin, marked modifications in the construction of the bow became noticeable. Tartini, who began during the second decade of the 18th century to gauge the capabilities of the bow, introduced further improvements, such as a lighter wood for the stick, a straight contour, and a shorter head, in order to give better equilibrium. The Tourtes, father and son, accomplished the rest.

> After Francois Tourte, the following makers are the most esteemed: J.B. Vuillaume, who was directly inspired by Tourte and rendered an inestimable service to violinists by working out on a scientific basis the empirical taper of the Tourte stick, which was found in all his bows to conform to strict ratio;[18] Dominique Peccate, apprenticed to J.B. Vuillaume; Henry, 1812-1870, who signs his name and "Paris" on the stick near the nut; Jacques Lefleur, 1760-1832; François Lupot, 1774-1837, the first to line the angular cutting of the nut, where it slides along the stick, with a plate of metal; Simon, born 1808, who also signs his bows on the stick near the nut; John Dodd of Richmond, the greatest English bow-maker, who was especially renowned for his violoncello bows, though his violin bows had the defect of being rather short.

The violoncello bow is a little shorter than those used for violin and viola, and the head and nut are deeper.

The principal models of double-bass bows in vogue at the beginning of the 19th century were the *Dragonetti*, maintaining the arch of the medieval bows, and the *Bottesini*, shaped and held like the violin bow; the former was held over-hand with the hair inclining towards the bridge, and was adopted by the Paris Conservatoire under Habeneck about 1830; the great artist himself sent over the model from London. Illustrations of both bows are given by Vidal (*op. cit.* pl. xviii.).

Messrs W.E. Hill & Sons probably possess the finest and most representative collection of bows in the world.

(K. S.)

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1 "Bow," the forepart or head of a ship, must be distinguished from this word. It is the same word, and pronounced in the same way, as "bough," an arm or limb of a tree, and represents a common Teutonic word, seen in O. Eng. *bog*, Ger. *Bug*, shoulder, and is cognate with Gr. πῆχυς, forearm. The sense of "shoulder" of a ship is not found in O. Eng. *bog*. but was probably borrowed from Dutch or Danish. "Bow," an inclination of the head or body, though pronounced as "bough," is of the same origin as "bow," to bend.

2 See F.J. Fétis, *Antoine Stradivari*, pp. 120-121 (Paris, 1856).

3 Fétis, *op. cit.* p. 123.

4 J. Rühlmann, *Die Geschichte der Bogeninstrumente* (Brunswick, 1882), p. 143.

5 Fétis, *op. cit.* p. 119.

6 Antoine Vidal, *Les Instruments à archet* (Paris, 1876-1878), tome i. p. 269

7 *De Cantu et Musica Sacra* (1774), tome ii. pl. xxxii. No. 18; the MS. has since perished by fire.

8 See, for an illustration of the bowed instrument on one of the sides of a Byzantine ivory casket, 9th century, in the Carrand Collection, Florence, A. Venturi, *Gallerie Nazionali Italiane*, iii. (Rome, 1897), plate, p. 263; and *Add. MS. 19,352, British Museum*, Greek Psalter, dated 1066.

9 See Jean Clédat, "Le Monastère et la nécropole de Baouît," in *Mém. de l'Inst. franç. d'archéol. orient. du Caire*, vol. xii. (1904), chap. xviii. pl. lxiv. (2); also Fernand Cabrol, *Dict. d'archéol. chrétienne, s.v.* "Baouît."

10 For an illustration, see Sonnerat, *Voyage aux Indes orientales* (Paris, 1806), vol. i. p. 182.

11 *Op. cit.* pp. 4-10.

12 *Op. cit.* vol. i. p. 3 and pl. ii.

13 Edward Heron-Allen, *Violin-making as it was and is* (London, 1884), pp. 37-42, figs. 5-10.

14 MS. 774, fol. 30. For an illustration of it see Hyacinth Abele, *Die Violine, ihre Geschichte und ihr Bau* (Neuburg-a-D., 1874), pl. 5, No. 7.

15 See Crowd for fig. from the Bible of Charles le Chauve; and also King David in the Bible of St Paul *extra muros*, Rome (photographic facsimile by J.O. Westwood, Oxford, 1876).

16 See *Dictionnaire raisonné du mobilier français* (Paris, 1871), vol. ii. part iv. pp. 265 D. and 266 note.

17 Marin Mersenne, *L'Harmonie universelle* (Paris, 1636-1637), pp. 184 and 192.

18 Vuillaume's diagram and explanation are reproduced by Fétis, op. cit. pp. 125-128.

BOWDICH, THOMAS EDWARD (1790-1824), English traveller and author, was born at Bristol in 1790. In 1814, through his uncle, J. Hope-Smith, governor of the British Gold Coast Settlements, he obtained a writership in the service of the African Company of Merchants and was sent to Cape Coast. In 1817 he was sent, with two companions, to Kumasi on a mission to the king of Ashanti, and chiefly through his skilful diplomacy the mission succeeded in its object of securing British control over the coast natives (see Ashanti: *History*). In 1818 Bowdich returned to England, and in 1819 published an account of his mission and of the study he had made of the barbaric court of Kumasi, entitled *Mission from Cape Coast Castle to Ashantee, &c.* (London, 1819). His African collections he presented to the British Museum. Bowdich publicly attacked the management of the African committee, and his strictures were instrumental in leading the British government to assume direct control over the Gold Coast. From 1820 to 1822 Bowdich lived in Paris, studying mathematics and the natural sciences, and was on intimate terms with Cuvier, Humboldt and other savants. During his stay in France he edited several works on Africa, and also wrote scientific works. In 1822, accompanied by his wife, he went to Lisbon, where, from a study of historic MSS., he published *An Account of the Discoveries of the Portuguese in ... Angola and Mozambique* (London, 1824). In 1823 Bowdich and his wife, after some months spent in Madeira and Cape Verde Islands, arrived at Bathurst at the mouth of the Gambia, intending to go to Sierra Leone and thence explore the interior. But at Bathurst Bowdich died on the 10th of January 1824. His widow published an account of his last journey, entitled *Excursions in Madeira and Porto Santo ... to which is added.... A Narrative of the Continuance of the Voyage to its Completion, &c.* (London, 1825). Bowdich's daughter, Mrs Hutchinson Hale, republished in 1873, with an introductory preface, her father's *Mission from Cape Coast Castle to Ashantee*.

BOWDITCH, NATHANIEL (1773-1838), American mathematician, was born at Salem, Massachusetts. He was bred to his father's business as a cooper, and afterwards apprenticed to a ship-chandler. His taste for mathematics early developed itself; and he acquired Latin that he might study Newton's *Principia*. As clerk (1795) and then as supercargo (1796, 1798, 1799) he made four long voyages; and, being an excellent navigator, he afterwards (1802) commanded a vessel, instructing his crews in lunar and other observations. He edited two editions of Hamilton Moore's *Navigation*, and in 1802 published a valuable work, *New American Practical Navigator*, founded on the earlier treatise by Moore. In 1804 he became president of a Salem insurance company. In the midst of his active career he undertook a translation of the *Mécanique céleste* of P.S. Laplace, with valuable annotations (vol. i., 1829). He was offered, but declined, the professorship of mathematics and astronomy at Harvard. Subsequently he became president of the Mechanics' Institute in Boston, and also of the American Academy of Arts and Sciences. He died at Boston on the 16th of March 1838.

A life of Bowditch was written by his son Nathaniel Ingersoll Bowditch (1805-1861), and was prefixed to the fourth volume (1839) of the translation of Laplace. In 1865 this was elaborated into a separate biography by another son, Henry Ingersoll Bowditch (1808-1892), a famous Boston physician.

BOWDLER, THOMAS (1754-1825), editor of the "family" Shakespeare, younger son of Thomas Bowdler, a gentleman of independent fortune, was born at Ashley, near Bath, on the 11th of July 1754. He studied medicine at the universities of St Andrews and Edinburgh, graduating M.D. in 1776. After four years spent in foreign travel, he settled in London, where he became intimate with Mrs Montague and other learned ladies. In 1800 he left London to live in the Isle of Wight, and later on he removed to South Wales. He was an energetic philanthropist, and carried on John Howard's work in the prisons and penitentiaries. In 1818 he published *The Family Shakespeare* "in ten volumes, in which nothing is added to the original text; but those words and expressions are omitted which cannot with propriety be read aloud in a family." Criticisms of this edition appeared in the *British Critic* of April 1822. Bowdler also expurgated Edward Gibbon's *History of the Decline and Fall of the Roman Empire* (published posthumously, 1826); and he issued a selection from the Old Testament for the use of children. He died at Rhyddings, near Swansea, on the 24th of February 1825.

From Bowdler's name we have the word to "bowdlerize," first known to occur in General Perronet Thompson's *Letters of a Representative to his Constituents during the Session of 1836*, printed in Thompson's *Exercises*, iv. 126. The official interpretation is "to expurgate (a book or writing) by omitting or modifying words or passages considered indelicate or offensive." Both the word and its derivatives, however, are associated with false squeamishness. In the ridicule poured on the name of Bowdler it is worth noting that Swinburne in "Social Verse" (*Studies in Prose and Poetry*, 1894, p. 98) said of him that "no man ever did better service to Shakespeare than the man who made it possible to put him into the hands of intelligent and imaginative children," and stigmatized the talk about his expurgations as "nauseous and foolish cant."

BOWDOIN, JAMES (1726-1790), American political leader, was born of French Huguenot descent, in Boston, Massachusetts, on the 7th of August 1726. He graduated at Harvard in 1745, and was a member of the lower house of the general court of Massachusetts in 1753-1756, and from 1757 to 1774 of the Massachusetts council, in which, according to Governor Thomas Hutchinson, he "was without a rival," and, on the approach of the War of Independence, was "the principal supporter of the opposition to the government." From August 1775 until the summer of 1777 he was the president of the council, which had then become to a greater extent than formerly an executive as well as a legislative body. In 1779-1780 he was president of the constitutional convention of Massachusetts, also serving as chairman of the committee by which the draft of the constitution was prepared. Immediately afterward he was a member of a commission appointed "to revise the laws in force in the state; to select, abridge, alter and digest them, so as to be accommodated to the present government." From 1785 to 1787 he was governor of Massachusetts, suppressing with much vigour Shays' Rebellion, and failing to be re-elected largely because it was believed that he would punish the insurrectionists with more severity than would his competitor, John Hancock. Bowdoin was a member of the state convention which in February 1788 ratified for Massachusetts the Federal Constitution, his son being also a member. He died in Boston on the 6th of November 1790. He took much interest in natural philosophy, and presented various papers before the American Academy of Arts and Sciences, of which he was one of the founders and, from 1780 to 1790, the first president. Bowdoin College was named in his honour.

His son, James Bowdoin (1752-1811), was born in Boston on the 22nd of September 1752, graduated at Harvard in 1771, and served, at various times, as a representative, senator and councillor of the state. From 1805 until 1808 he was the minister plenipotentiary of the United States in Spain. He died on Naushon Island, Dukes county, Massachusetts, on the 11th of October 1811. To Bowdoin College he gave land, money and apparatus; and he made the college his residuary legatee, bequeathing to it his collection of paintings and drawings, then considered the finest in the country.

BOWELL, SIR MACKENZIE (1823-), Canadian politician, son of John Bowell, carpenter and builder, was born at Ricking-hall, England, on the 27th of December 1823. In 1833 he moved with his family to Belleville, Canada, where he finally became editor and proprietor of the *Intelligencer*. He was elected grand master of the Orange Association of British America, and was long the exponent in the Canadian parliament of the claims of that order. From 1867 till 1892 he represented North Hastings in the House, after which he retired to the senate. From 1878 till 1891 he was minister of customs in the cabinet of Sir John Macdonald; then minister of militia; and under the premiership of Sir John Thompson, minister of trade and commerce. From December 1894 till April 1896 he was premier of Canada, and endeavoured to enforce remedial legislation in the question of the Manitoba schools. But his policy was unsuccessful, and he retired from the government. From 1896 till 1906 he led the Conservative party in the senate. In 1894 he presided over the colonial conference held in Ottawa, and in 1895 was created K.C.M.G.

BOWEN, CHARLES SYNGE CHRISTOPHER BOWEN, Baron (1835-1894), English judge, was born on the 1st of January 1835, at Woolaston in Gloucestershire, his father, the Rev. Christopher Bowen of Hollymount, Co. Mayo, being then curate of the parish. He was educated at Lille, Blackheath and Rugby schools, leaving the latter with a Balliol scholarship in 1853. At Oxford he made good the promise of his earlier youth, winning the principal classical scholarships and prizes of his time. He was made a fellow of Balliol in 1858. From Oxford Bowen went to London, where he was called to the bar at Lincoln's Inn in 1861, and while studying law he wrote regularly for the *Saturday Renew*, and also later for the *Spectator*. For a time he had little success at the bar, and came near to exchanging it for the career of a college tutor, but he was induced by his friends, who recognized his talents, to persevere. Soon after he had begun to make his mark he was briefed against the claimant in the famous "Tichborne Case." Bowen's services to his leader, Sir John Coleridge, helped to procure for him the appointment of junior counsel to the treasury when Sir John had passed, as he did while the trial proceeded, from the office of solicitor-general to that of attorney-general; and from this time his practice became a very large one. The strain, however, of the Tichborne trials had been great, so that his physical health became unequal to the tasks which his zeal for work imposed upon it, and in 1879 his acceptance of a judgeship in the queen's bench division, on the retirement of Mr Justice Mellor, gave him the opportunity of comparative rest. The character of Charles Bowen's intellect hardly qualified him for some of the duties of a puisne judge; but it was otherwise when, in 1882, in succession to Lord Justice Holker, he was raised to the court of appeal. As a lord justice of appeal he was conspicuous for his learning, his industry and his courtesy to all who appeared before him; and in spite of failing health he was able to sit more or less regularly until August 1893, when, on the retirement of Lord Hannen, he was made a lord of appeal in ordinary, and a baron for life, with the title of Baron Bowen of Colwood. By this time, however, his health had finally broken down; he never sat as a law lord to hear appeals, and he gave but one vote as a peer, while his last public service consisted in presiding over the commission which sat in October 1893 to inquire into the Featherstone riots. He died on the 10th of April 1894.

Lord Bowen was regarded with great affection by all who knew him either professionally or privately. He had a polished and graceful wit, of which many instances might be given, although such anecdotes lose force in print. For example, when it was suggested on the occasion of an address to Queen Victoria, to be presented by her judges, that a passage in it, "conscious as we are of our shortcomings," suggested too great humility, he proposed the emendation "conscious as we are of one another's shortcomings"; and on another occasion he defined a jurist as "a person who knows a little about the laws of every country except his own." Lord Bowen's judicial reputation will rest upon the series of judgments delivered by him in the court of appeal, which are remarkable for their lucid interpretation of legal principles as applied to the facts and business of life. Among good examples of his judgment may be cited that given in advising the House of Lords in *Angus* v. *Dalton* (6 App. Cas. 740), and those delivered in *Abrath* v. *North Eastern Railway* (11 Q.B.D. 440); *Thomas* v. *Quartermaine* (18 Q.B.D. 685); *Vagliano* v. *Bank of England* (23 Q.B.D. 243) (in which he prepared the majority judgment of the court, which was held to be wrong in its conclusion by the majority of the House of Lords); and the *Mogul Steamship Company* v. *M'Gregor* (23 Q.B.D. 598). Of Lord Bowen's literary works besides those already indicated may be mentioned his translation of Virgil's *Eclogues*, and *Aeneid*, books i.-vi., and his pamphlet, *The Alabama Claim and Arbitration considered from a Legal Point of View.* Lord Bowen married in 1862 Emily Frances, eldest daughter of James Meadows Rendel, F.R.S., by whom he had two

sons and a daughter.

See *Lord Bowen*, by Sir Henry Stewart Cunningham.

BOWEN, FRANCIS (1811-1890), American philosophical writer and educationalist, was born in Charlestown, Massachusetts, on the 8th of September 1811. He graduated at Harvard in 1833, taught for two years at Phillips Exeter Academy, and then from 1835 to 1839 was a tutor and instructor at Harvard. After several years of study in Europe, he settled in Cambridge, Massachusetts, and was editor and proprietor of the *North American Review* from 1843 to 1854. In 1850 he was appointed professor of history at Harvard; but his appointment was disapproved by the board of overseers on account of reactionary political opinions he had expressed in a controversy with Robert Carter (1819-1879) concerning the Hungarian revolution. In 1853 his appointment as Alford professor of natural religion, moral philosophy and civil polity was approved, and he occupied the chair until 1889. In 1876 he was a member of the Federal commission appointed to consider currency reform, and wrote (1877) the minority report, in which he opposed the restoration of the double standard and the remonetization of silver. He died in Boston, Massachusetts, on the 22nd of January 1890. His writings include lives of Sir William Phipps, Baron von Steuben, James Otis and Benjamin Lincoln in Jared Sparks' "Library of American Biography"; *Critical Essays on the History and Present Condition of Speculative Philosophy* (1842); *Lowell Lectures on the Application of Metaphysical and Ethical Science to the Evidences of Religion* (1849); *The Principles of Political Economy applied to the Condition, Resources and Institutions of the American People* (1856); *A Treatise on Logic* (1864); *American Political Economy* (1870); *Modern Philosophy from Descartes to Schopenhauer and Hartmann* (1877); and *Gleanings from a Literary Life, 1838-1880* (1880).

BOWEN, SIR GEORGE FERGUSON (1821-1899), British colonial governor, eldest son of the Rev. Edward Bowen, afterwards rector of Taughboyne, Co. Donegal, was born on the 2nd of November 1821. Educated at Charterhouse school and Trinity College, Oxford, he took a first class in classics in 1844, and was elected a fellow of Brasenose. In 1847 he was chosen president of the university of Corfu. Having served as secretary of government in the Ionian Islands, he was appointed in 1859 the first governor of Queensland, which colony had just been separated from New South Wales. He was interested in the exploration of Queensland and in the establishment of a volunteer force, but incurred some unpopularity by refusing to sanction the issue of inconvertible paper money during the financial crisis of 1866. In 1867 he was made governor of New Zealand, in which position he was successful in reconciling the Maoris to the English rule, and saw the end of the struggle between the colonists and the natives. Transferred to Victoria in 1872, Bowen endeavoured to reduce the expenses of the colony, and in 1879 became governor of Mauritius. His last official position was that of governor of Hong-Kong, which he held from 1882 to 1887. He was made a K.C.M.G. in 1856, a privy councillor in 1886, and received honorary degrees from both Oxford and Cambridge. In December 1887 he was appointed chief of the royal commission which was sent to Malta with regard to the new constitution for the island, and all the recommendations made by him were adopted. He died at Brighton on the 21st of February 1899, having been married twice, and having had a family of one son and four daughters. Bowen wrote *Ithaca in 1850* (London, 1854), translated into Greek in 1859; and *Mount Athos, Thessaly and Epirus* (London, 1852); and he was the author of Murray's *Handbook for Greece* (London, 1854).

A selection of his letters and despatches, *Thirty Years of Colonial Government* (London, 1889), was edited by S. Lane-Poole.

BOWER, WALTER (1385-1449), Scottish chronicler, was born about 1385 at Haddington. He was abbot of Inchcolm (in the Firth of Forth) from 1418, was one of the commissioners for the collection of the ransom of James I., king of Scots, in 1423 and 1424, and in 1433 one of the embassy to Paris on the business of the marriage of the king's daughter to the dauphin. He played an important part at the council of Perth (1432) in the defence of Scottish rights. During his closing years he was engaged on his work the *Scotichronicon*, on which his reputation now chiefly rests. This work, undertaken in 1440 by desire of a neighbour, Sir David Stewart of Rosyth, was a continuation of the *Chronica Gentis Scotorum* of Fordun. The completed work, in its original form, consisted of sixteen books, of which the first five and a portion of the sixth (to 1163) are Fordun's—or mainly his, for Bower added to them at places. In the later books, down to the reign of Robert I. (1371), he was aided by Fordun's *Gesta Annalia*, but from that point to the close the work is original and of contemporary importance, especially for James I., with

whose death it ends. The task was finished in 1447. In the two remaining years of his life he was engaged on a reduction or "abridgment" of this work, which is known as the *Book of Cupar*, and is preserved in the Advocates' library, Edinburgh (MS. 35. 1. 7). Other abridgments, not by Bower, were made about the same time, one about 1450 (perhaps by Patrick Russell, a Carthusian of Perth) preserved in the Advocates' library (MS. 35. 6. 7) and another in 1461 by an unknown writer, also preserved in the same collection (MS. 35. 5. 2). Copies of the full text of the *Scotichronicon*, by different scribes, are extant. There are two in the British Museum, in *The Black Book of Paisley*, and in Harl. MS. 712; one in the Advocates' library, from which Walter Goodall printed his edition (Edin., 1759), and one in the library of Corpus Christi, Cambridge.

Goodall's is the only complete modern edition of Bower's text. See also W.F. Skene's edition of Fordun in the series of *Historians of Scotland* (1871). Personal references are to be found in the *Exchequer Rolls of Scotland*, iii. and iv. The best recent account is that by T.A. Archer in the *Dict, of Nat. Biog.*

BOWERBANK, JAMES SCOTT (1797-1877), English naturalist and palaeontologist, was born in Bishopsgate, London, on the 14th of July 1797, and succeeded in conjunction with his brother to his father's distillery, in which he was actively engaged until 1847. In early years astronomy and natural history, especially botany, engaged much of his attention; he became an enthusiastic worker at the microscope, studying the structure of shells, corals, moss-agates, flints, &c., and he also formed an extensive collection of fossils. The organic remains of the London Clay attracted particular attention, and about the year 1836 he and six other workers founded "The London Clay Club"—the members comprising Dr Bowerbank, Frederick E. Edwards (1799-1875), author of *The Eocene Mollusca* (Palaeontograph. Soc.), Searles V. Wood, John Morris, Alfred White (zoologist), N.T. Wetherell, surgeon of Highgate (1800-1875), and James de Carle Sowerby. In 1840 Bowerbank published *A History of the Fossil Fruits and Seeds of the London Clay*, and two years later he was elected F.R.S. In 1847 he suggested the establishment of a society for the publication of undescribed British Fossils, and thus originated the Palaeontographical Society. From 1844 until 1864 he did much to encourage a love of natural science by being "at home" every Monday evening at his residence in Park Street, Islington, and afterwards in Highbury Grove, where the treasures of his museum, his microscopes, and his personal assistance were at the service of every earnest student. In the study of sponges he became specially interested, and he was author of *A Monograph of the British Spongiadae* in 4 vols., published by the Ray Society, 1864-1882. He retired in 1864 to St Leonards, where he died on the 8th of March 1877.

BOWIE, JAMES (1796-1836), American pioneer, was born in Logan county, Kentucky. He was taken to Louisiana about 1802, and in 1818-1820 was engaged with his brothers, John J. and Rezin P., in smuggling negro slaves into the United States from the headquarters of the pirates led by Jean Lafitte on Galveston Island. Bowie removed to Texas in 1828 and took a prominent part in the revolt against Mexico, being present at the battles of Nacogdoches (1832), Concepcion (1835) and the Grass Fight (1835). He was one of the defenders of the Alamo (see San Antonio), but was ill of pneumonia at the time of the final assault on the 6th of March 1836, and was among the last to be butchered. Bowie's name is now perpetuated by a county in north-eastern Texas, and by its association with that of the famous hunting-knife, which he used, but probably did not invent.

BOW-LEG (*Genu Varum*), a deformity characterized by separation of the knees when the ankles are in contact. Usually there is an outward curvature of both femur and tibia, with at times an interior bend of the latter bone. At birth all children are more or less bandy-legged. The child lies on its nurse's knee with the soles of the feet facing one another; the tibiae and femora are curved outwards; and, if the limbs are extended, although the ankles are in contact, there is a distinct space between the knee-joints. During the first year of life a gradual change takes place. The knee-joints approach one another; the femora slope downwards and inwards towards the knee-joints; the tibiae become straight; and the sole of the foot faces almost directly downwards. While these changes are occurring, the bones, which at first consist principally of cartilage, are gradually becoming ossified, and in a normal child by the time it begins to walk the lower limbs are prepared, both by their general direction and by the rigidity of the bones which form them, to support the weight of the body. If, however, the child attempts either as the result of imitation or from encouragement to walk before the normal bandy condition had passed off, the result will necessarily be either an arrest in the development of the limbs or an increase of the bandy condition. If the child is weakly, either rachitic or suffering from any ailment which prevents the due ossification of the bones, or is improperly fed, the bandy condition may remain persistent. Thus the

chief cause of this deformity is rickets (*q.v.*). The remaining causes are occupation, especially that of a jockey, and traumatism, the condition being very likely to supervene after accidents involving the condyles of the femur. In the rickety form the most important thing is to treat the constitutional disease, at the same time instructing the mother never to place the child on its feet. In many cases this is quite sufficient in itself to effect a cure, but matters can be hastened somewhat by applying splints. When in older patients the deformity arises either from traumatism or occupation, the only treatment is that of operation.

A far commoner deformity than the preceding is that known as *knock-knee* (or *Genu Valgum*). In this condition there is close approximation of the knees with more or less separation of the feet, the patient being unable to bring the feet together when standing. Occasionally only one limb may be affected, but the double form is the more common. There are two varieties of this deformity: (i.) that due to rickets and occurring in young children (the rachitic form), and (ii.) that met with in adolescents and known as the static form. In young children it is practically always due to rickets, and the constitutional disease must be most rigorously dealt with. It is, however, especially in these cases that cod-liver oil is to be avoided, since it increases the body weight and so may do harm rather than good. The child if quite young must be kept in bed, and the limbs manipulated several times a day. Where the child is a little older and it is more difficult to keep him off his feet, long splints should be applied from the axilla or waist to a point several inches below the level of the foot. It is only by making the splints sufficiently long that a naturally active child can be kept at rest. The little patient should live in the open air as much as possible.

The static form of Genu Valgum usually occurs in young adolescents, especially in anaemic nurse-girls, young bricklayers, and young people who have outgrown their strength, yet have to carry heavy weights. Normally in the erect posture the weight of the body is passed through the outer condyle of the femur rather than the inner, and this latter is lengthened to keep the plane of the knee-joint horizontal. This throws considerable strain on the internal lateral ligament of the knee-joint, and after standing of long duration or with undue weight the muscles of the inner side of the limb also become over-fatigued. Thus the ligament gradually becomes stretched, giving the knee undue mobility from side to side. If the condition be not attended to, the outer condyle becomes gradually atrophied, owing to the increased weight transmitted through it, and the inner condyle becomes lengthened. These changes are the direct outcome of a general law, namely, that diminished pressure results in increased growth, increased pressure in diminished growth. The best example of the former principle is the rapid growth that takes place in the child that is confined to bed during a prolonged illness. The distorted, stunted, shortened and fashionable foot of the Chinese lady is an example of the latter. Flat-foot (see CLUB-FOOT) and lateral curvature of the spine, scoliosis, are often associated with this form of Genu Valgum, the former being due to relaxation of ligaments, the latter being compensatory where the deformity only affects one leg, though often found merely in association with the more common bilateral variety. In the early stages of the static form attention to general health, massage and change of air, will often effect a cure. But in the more aggravated forms an apparatus is needed. This usually consists of an outside iron rod, jointed at the knee, attached above to a pelvic band and below to the heel of the boot. By the gradual tightening of padded straps passing round the limbs the bones can be drawn by degrees into a more natural position. But if the patient has reached such an age that the deformity is fixed, then the only remedy is that of operation.

BOWLES, SAMUEL (1826-1878), American journalist, was born in Springfield, Massachusetts, on the 9th of February 1826. He was the son of Samuel Bowles (1779-1851) of the same city, who had established the weekly *Springfield Republican* in 1824. The daily issue was begun in 1844, as an evening newspaper, afterwards becoming a morning journal. To its service Samuel Bowles, junior, devoted his life (with the exception of a brief period during which he was in charge of a daily in Boston), and he gave the paper a national reputation by the vigour, incisiveness and independence of its editorial utterances, and the concise and convenient arrangement of its local and general news-matter. During the controversies affecting slavery and resulting in the Civil War, Bowles supported, in general, the Whig and Republican parties, but in the period of Reconstruction under President Grant his paper represented anti-administration or “Liberal Republican” opinions, while in the disputed election of 1876 it favoured the claims of Tilden, and subsequently became independent in politics. Bowles died at Springfield on the 16th of January 1878. During his lifetime, and subsequently, the *Republican* office was a sort of school for young journalists, especially in the matter of pungency and conciseness of style, one of his maxims being “put it all in the first paragraph.” Bowles published two books of travel, *Across the Continent* (1865) and *The Switzerland of America* (1869), which were combined into one volume under the title *Our New West* (1869). He was succeeded as publisher and editor-in-chief of the *Republican* by his son Samuel Bowles (b. 1851).

A eulogistic *Life and Times of Samuel Bowles* (2 vols., New York, 1885), by George S. Merriam, is virtually a history of American political movements after the compromise of 1850.

BOWLES, WILLIAM LISLE (1762-1850), English poet and critic, was born at King's Sutton, Northamptonshire, of which his father was vicar, on the 24th of September 1762. At the age of fourteen he entered Winchester school, the head-master at the time being Dr Joseph Warton. In 1781 he left as captain of the school, and proceeded to Trinity College, Oxford, where he had gained a scholarship. Two years later he won the chancellor's prize for Latin verse. In 1789 he published, in a small quarto volume, *Fourteen Sonnets*, which met with considerable favour at the time, and were hailed with delight by Coleridge and his young contemporaries. The *Sonnets* even in form were a revival, a return to the older and purer poetic style, and by their grace of expression, melodious versification, tender tone of feeling and vivid appreciation of the life and beauty of nature, stood out in strong contrast to the elaborated commonplaces which at that time formed the bulk of English poetry. After taking his degree at Oxford he entered the Church, and was appointed in 1792 to the vicarage of Chicklade in Wiltshire. In 1797 he received the vicarage of Dumbleton in Gloucestershire, and in 1804 was presented to the vicarage of Bremhill in Wiltshire. In the same year he was collated by Bishop Douglas to a prebendal stall in the cathedral of Salisbury. In 1818 he was made chaplain to the prince regent, and in 1828 he was elected residentiary canon of Salisbury. He died at Salisbury on the 7th of April 1850, aged 88.

The longer poems published by Bowles are not of a very high standard, though all are distinguished by purity of imagination, cultured and graceful diction, and great tenderness of feeling. The most extensive were *The Spirit of Discovery* (1804), which was mercilessly ridiculed by Byron; *The Missionary of the Andes* (1815); *The Grave of the Last Saxon* (1822); and *St John in Patmos* (1833). Bowles is perhaps more celebrated as a critic of poetry than as a poet. In 1806 he published an edition of Pope's works with notes and an essay on the poetical character of Pope. In this essay he laid down certain canons as to poetic imagery which, subject to some modification, have been since recognized as true and valuable, but which were received at the time with strong opposition by all admirers of Pope and his style. The "Pope and Bowles" controversy brought into sharp contrast the opposing views of poetry, which may be roughly described as the natural and the artificial. Bowles maintained that images drawn from nature are poetically finer than those drawn from art; and that in the highest kinds of poetry the themes or passions handled should be of the general or elemental kind, and not the transient manners of any society. These positions were vigorously assailed by Byron, Campbell, Roscoe and others of less note, while for a time Bowles was almost solitary. Hazlitt and the *Blackwood* critics, however, came to his assistance, and on the whole Bowles had reason to congratulate himself on having established certain principles which might serve as the basis of a true method of poetical criticism, and of having inaugurated, both by precept and by example, a new era in English poetry. Among other prose works from his prolific pen was a *Life of Bishop Ken* (2 vols., 1830-1831).

His *Poetical Works* were collected in 1855, with a memoir by G. Gilfillan.

BOWLINE (a word found in most Teutonic languages, probably connected with the "bow" of a ship), a nautical term for a rope leading from the edge of a sail to the bows, for the purpose of steadying the sail when sailing close to the wind—"on a bowline."

BOWLING (Lat. *bulla*, a globe, through O. Fr. *boule*, ball), an indoor game played upon an alley with wooden balls and nine or ten wooden pins. It has been played for centuries in Germany and the Low Countries, where it is still in high favour, but attains its greatest popularity in the United States, whence it was introduced in colonial times from Holland. The Dutch inhabitants of New Amsterdam, now New York, were much addicted to it, and up to the year 1840 it was played on the green, the principal resort of the bowlers being the square just north of the Battery still called Bowling Green. The first covered alleys were made of hardened clay or of slate, but those in vogue at present are built up of alternate strips of pine and maple wood, about 1 × 3 in. in size, set on edge, and fastened together and to the bed of the alley with the nicest art of the cabinet-maker. The width of the alley is 4l½ in., and its whole length about 80 ft. From the head, or apex, pin to the foul-line, over which the player may not step in delivering the ball, the distance is 60 ft. On each side of the alley is a 9-in. "gutter" to catch any balls that are bowled wide. Originally nine pins, set up in the diamond form, were used, but during the first part of the 19th century the game of "nine-pins" was prohibited by law, on account of the excessive betting connected with it. This ordinance, however, was soon evaded by the addition of a tenth pin, resulting in the game of "ten-pins," the pastime in vogue to-day. The ten pins are set up at the end of the alley in the form of a right-angled triangle in four rows, four pins at the back, then three, then two and one as head pin. The back row is placed 3 in. from the alley's edge, back of which is the pin-pit, 10 in. deep and about 3 ft. wide. The back wall is heavily padded (often with a heavy, swinging cushion), and there are safety corners for the pin-boys, who set up the pins, call the scores and place the balls in the sloping "railway" which returns them to the players' end of the alley. The pins are made of hard maple and are 15 in. high, 2¼ in. in diameter at their base and 15 in. in circumference at the thickest point. The balls, which are made of some very hard wood, usually lignum vitae, may be of any size not

exceeding 27 in. in circumference and 16½ lb in weight. They are provided with holes for the thumb and middle finger. As many may play on a side as please, five being the number for championship teams, though this sometimes varies. Each player rolls three balls, called a *frame*, and ten frames constitute a game, unless otherwise agreed upon. In first-class matches two balls only are rolled. If all ten pins are knocked down by the first ball the player makes a *strike*, which counts him 10 plus whatever he may make with the first two balls of his next frame. If, however, he should then make another strike, 10 more are added to his score, making 20, to which are added the pins he may knock down with his first ball of the third frame. This may also score a strike, making 30 as the score of the first frame, and, should the player keep up this high average, he will score the maximum, 300, in his ten frames. If all the pins are knocked down with two balls it is called a *spare*, and the player may add the pins made by the first ball of his second frame. This seemingly complicated mode of scoring is comparatively simple when properly lined score-boards are used. Of course, if all three balls are used no strike or spare is scored, but the number of pins overturned is recorded. The tens of thousands of bowling clubs in the United States and Canada are under the jurisdiction of the American Bowling Congress, which meets once a year to revise the rules and hold contests for the national championships.

Several minor varieties of bowling are popular in America, the most in vogue being “Cocked Hat,” which is played with three pins, one in the head-pin position and the others on either corner of the back row. The pins are usually a little larger than those used in the regular game, and smaller balls are used. The maximum score is 90, and all balls, even those going into the gutter, are in play. “Cocked hat and Feather” is similar, except that a fourth pin is added, placed in the centre. Other variations of bowling are “Quintet,” in which five pins, set up like an arrow pointed towards the bowler, are used; the “Battle Game,” in which 12 can be scored by knocking down all but the centre, or king, pin; “Head Pin and Four Back,” in which five pins are used, one in the head-pin position and the rest on the back line; “Four Back”; “Five Back”; “Duck Pin”; “Head Pin,” with nine pins set up in the old-fashioned way, and “Candle Pin,” in which thin pins tapering towards the top and bottom are used, the other rules being similar to those of the regular game.

The American bowling game is played to a slight extent in Great Britain and Germany. In the latter country, however, the old-fashioned game of nine-pins (*Kegelspiel*) with solid balls and the pins set up diamond-fashion, obtains universally. The alleys are made with less care than the American, being of cement, asphalt, slate or marble.

BOWLING GREEN, a city and the county-seat of Warren county, Kentucky, U.S.A., on the Barren river, 113 m. S. by W. of Louisville. Pop. (1890) 7803; (1900) 8226, of whom 2593 were negroes; (1910) 9173. The city is served by the Louisville & Nashville railway (which maintains car shops here), and by steamboats navigating the river. Macadamized or gravel roads also radiate from it to all parts of the surrounding country, a rich agricultural and live-stock raising region, in which there are deposits of coal, iron ore, oil, natural gas, asphalt and building stone. The city is the seat of Potter College (for girls; non-sectarian, opened 1889); of Ogden College (non-sectarian, 1877), a secondary school, endowed by the bequest of Major Robert W. Ogden (1796-1873); of the West Kentucky State Normal School, opened (as the Southern Normal School and Business College) at Glasgow in 1875 and removed to Bowling Green in 1884; and of the Bowling Green Business University, formerly a part of the Southern Normal School and Business College. Bowling Green has two parks, a large horse and mule market, and a trade in other live-stock, tobacco and lumber; among its manufactures are flour, lumber, tobacco and furniture. The municipality owns and operates the water-works and the electric lighting plant. Bowling Green was incorporated in 1812. During the early part of the Civil War Bowling Green was on the right flank of the first line of Confederate defence in the West, and was for some time the headquarters of General Albert Sidney Johnston. It was abandoned, however, after the capture by the Federals of Forts Henry and Donelson.

BOWLING GREEN, a city and the county-seat of Wood county, Ohio, U.S.A., 20 m. S. by W. of Toledo, of which it is a residential suburb. Pop. (1890) 3467; (1900) 5067 (264 foreign-born); (1910) 5222. Bowling Green is served by the Cincinnati, Hamilton & Dayton and the Toledo & Ohio Central railways, and by the Toledo Urban & Interurban and the Lake Erie, Bowling Green & Napoleon electric lines, the former extending from Toledo to Dayton. It is situated in a rich agricultural region which abounds in oil and natural gas. Many of the residences and business places of Bowling Green are heated by a privately owned central hot-water heating plant. Among the manufactures are cut glass, stoves and ranges, kitchen furniture, guns, thread-cutting machines, brooms and agricultural implements. Bowling Green was first settled in 1832, was incorporated as a town in 1855, and became a city in 1904.

BOWLS, the oldest British outdoor pastime, next to archery, still in vogue. It has been traced certainly to the 13th, and conjecturally to the 12th century. William Fitzstephen (d. about 1190), in his biography of Thomas Becket, gives a graphic sketch of the London of his day and, writing of the summer amusements of the young men, says that on holidays they were "exercised in Leaping, Shooting. Wrestling, Casting of Stones [*in jactu lapidum*], and Throwing of Javelins fitted with Loops for the Purpose, which they strive to fling before the Mark; they also use Bucklers, like fighting Men." It is commonly supposed that by *jactus lapidum* Fitzstephen meant the game of bowls, but though it is possible that round stones may sometimes have been employed in an early variety of the game-and there is a record of iron bowls being used, though at a much later date, on festive occasions at Nairn,—nevertheless the inference seems unwarranted. The *jactus lapidum* of which he speaks was probably more akin to the modern "putting the weight," once even called "putting the stone." It is beyond dispute, however, that the game, at any rate in a rudimentary form, was played in the 13th century. A MS. of that period in the royal library, Windsor (No. 20, E iv.), contains a drawing representing two players aiming at a small cone instead of an earthenware ball or jack. Another MS. of the same century has a picture—crude, but spirited—which brings us into close touch with the existing game. Three figures are introduced and a jack. The first player's bowl has come to rest just in front of the jack; the second has delivered his bowl and is following after it with one of those eccentric contortions still not unusual on modern greens, the first player meanwhile making a repressive gesture with his hand, as if to urge the bowl to stop short of his own; the third player is depicted as in the act of delivering his bowl. A 14th-century MS. *Book of Prayers* in the Francis Douce collection in the Bodleian library at Oxford contains a drawing in which two persons are shown, but they bowl to no mark. Strutt (*Sports and Pastimes*) suggests that the first player's bowl may have been regarded by the second player as a species of jack; but in that case it is not clear what was the first player's target. In these three earliest illustrations of the pastime it is worth noting that each player has one bowl only, and that the attitude in delivering it was as various five or six hundred years ago as it is to-day. In the third he stands almost upright; in the first he kneels; in the second he stoops, halfway between the upright and the kneeling position.

History.

As the game grew in popularity it came under the ban of king and parliament, both fearing it might jeopardize the practice of archery, then so important in battle; and statutes forbidding it and other sports were enacted in the reigns of Edward III., Richard II. and other monarchs. Even when, on the invention of gunpowder and firearms, the bow had fallen into disuse as a weapon of war, the prohibition was continued. The discredit attaching to bowling alleys, first established in London in 1455, probably encouraged subsequent repressive legislation, for many of the alleys were connected with taverns frequented by the dissolute and gamesters. The word "bowls" occurs for the first time in the statute of 1511 in which Henry VIII. confirmed previous enactments against unlawful games. By a further act of 1541—which was not repealed until 1845—artificers, labourers, apprentices, servants and the like were forbidden to play bowls at any time save Christmas, and then only in their master's house and presence. It was further enjoined that any one playing bowls outside of his own garden or orchard was liable to a penalty of 6s. 8d., while those possessed of lands of the yearly value of £100 might obtain licences to play on their own private greens. But though the same statute absolutely prohibited bowling alleys, Henry VIII. had them constructed for his own pleasure at Whitehall Palace, and was wont to back himself when he played. In Mary's reign (1555) the licences were withdrawn, the queen or her advisers deeming the game an excuse for "unlawful assemblies, conventicles, seditions and conspiracies." The scandals of the bowling alleys grew rampant in Elizabethan London, and Stephen Gosson in his *School of Abuse* (1579) says, "Common bowling alleys are privy moths that eat up the credit of many idle citizens; whose gains at home are not able to weigh down their losses abroad; whose shops are so far from maintaining their play, that their wives and children cry out for bread, and go to bed supperless often in the year."

Biased bowls were introduced in the 16th century. "A little altering of the one side," says Robert Recorde, the mathematician, in his *Castle of Knowledge* (1556), "maketh the bowl to run biasse waies." And Shakespeare (*Richard II.*, Act. III. Sc. 4) causes the queen to remonstrate, in reply to her lady's suggestion of a game at bowls to relieve her ennui, "'Twill make me think the world is full of rubs, and that my fortune runs against the bias." This passage is interesting also as showing that women were accustomed to play the game in those days. It is pleasant to think that there is foundation for the familiar story of Sir Francis Drake playing bowls on Plymouth Hoe as the Armada was beating up Channel, and finishing his game before tackling the Spaniards. Bowls, at that date, was looked upon as a legitimate amusement for Sundays,—as, indeed, were many other sports. When John Knox visited Calvin at Geneva one Sunday, it is said that he discovered him engaged in a game; and John Aylmer (1521-1594), though bishop of London, enjoyed a game of a Sunday afternoon, but used such language "as justly exposed his character to reproach." The pastime found favour with the Stuarts. In the *Book of Sports* (1618), James I. recommended a moderate indulgence to his son, Prince Henry, and Charles I. was an enthusiastic bowler, unfortunately encouraging by example wagering and playing for high stakes, habits that ultimately brought the green into as general disrepute as the alley. It is recorded that the king occasionally visited Richard Shute, a Turkey merchant who owned a beautiful green at Barking Hall, and that after one bout his losses were £1000. He was permitted to play his favourite game to beguile the tedium of his captivity. The signboard of a wayside inn near Goring Heath in Oxfordshire long bore a portrait of the king with couplets reciting how his majesty "drank from the bowl, and bowl'd for what he drank." During his stay at the Northamptonshire village of Holdenby or Holmby—where Sir Thomas Herbert complains the green was not well kept—Charles frequently rode over to Lord Vaux's place at Harrowden, or to Lord Spencer's at Althorp, for a game, and, according to one account, was actually playing on the latter green when Cornet Joyce came to Holmby to remove him

to other quarters. During this period gambling had become a mania. John Aubrey, the antiquary, chronicles that the sisters of Sir John Suckling, the courtier-poet, once went to the bowling-green in Piccadilly, crying, “for fear he should lose all their portions.” If the Puritans regarded bowls with no friendly eye, as Lord Macaulay asserts, one can hardly wonder at it. But even the Puritans could not suppress betting. So eminently respectable a person as John Evelyn thought no harm in bowling for stakes, and once played at the Durdans, near Epsom, for £10, winning match and money, as he triumphantly notes in his *Diary* for the 14th of August 1657. Samuel Pepys repeatedly mentions finding great people “at bowles.” But in time the excesses attending the game rendered it unfashionable, and after the Revolution it became practically a pothouse recreation, nearly all the greens, like the alleys, having been constructed in the grounds and gardens attached to taverns.

After a long interval salvation came from Scotland, somewhat unexpectedly, because although, along with its winter analogue of curling, bowls may now be considered, much more than golf, the Scottish national game, it was not until well into the 19th century that the pastime acquired popularity in that country. It had been known in Scotland since the close of the 16th century (the Glasgow kirk session fulminated an edict against Sunday bowls in 1595), but greens were few and far between. There is record of a club in Haddington in 1709, of Tom Bicket’s green in Kilmarnock in 1740, of greens in Candleriggs and Gallowgate, Glasgow, and of one in Lanark in 1750, of greens in the grounds of Heriot’s hospital, Edinburgh, prior to 1768, and of one in Peebles in 1775. These are, of course, mere infants compared with the Southampton Town Bowling Club, founded in 1299, which still uses the green on which it has played for centuries and possesses the quaint custom of describing its master, or president, as “sir,” and are younger even than the Newcastle-on-Tyne club established in 1657. But the earlier clubs did nothing towards organizing the game. In 1848 and 1849, however, when many clubs had come into existence in the west and south of Scotland (the Willowbank, dating from 1816, is the oldest club in Glasgow), meetings were held in Glasgow for the purpose of promoting a national association. This was regarded, by many, as impracticable, but a decision of final importance was reached when a consultative committee was appointed to draft a uniform code of laws to govern the game. This body delegated its functions to its secretary, W.W. Mitchell (1803-1884), who prepared a code that was immediately adopted in Scotland as the standard laws. It was in this sense that Scottish bowlers saved the game. They were, besides, pioneers in laying down level greens of superlative excellence. Not satisfied with seed-sown grass or meadow turf, they experimented with seaside turf and found it answer admirably. The 13th earl of Eglinton also set an example of active interest which many magnates emulated. Himself a keen bowler, he offered for competition, in 1854, a silver bowl and, in 1857, a gold bowl and the Eglinton Cup, all to be played for annually. These trophies excited healthy rivalry in Ayrshire and Lanarkshire, and the enthusiasm as well as the skill with which the game was conducted in Scotland at length proved contagious. Clubs in England began to consider the question of legislation, and to improve their greens. Moreover, Scottish emigrants introduced the game wherever they went, and colonists in Australia and New Zealand established many clubs which, in the main, adopted Mitchell’s laws; while clubs were also started in Canada and in the United States, in South Africa, India (Calcutta, Karachi), Japan (Kobe, Yokohama, Kumamoto) and Hong-Kong. In Ireland the game took root very gradually, but in Ulster, owing doubtless to constant intercourse with Scotland, such clubs as have been founded are strong in numbers and play.

On the European continent the game can scarcely be said to be played on scientific principles. It has existed in France since the 17th century. When John Evelyn was in Paris in 1644 he saw it played in the gardens of the Luxembourg Palace. In the south of France it is rather popular with artisans, who, however, are content to pursue it on any flat surface and use round instead of biased bowls, the bowler, moreover, indulging in a preliminary run before delivering the bowl, after the fashion of a bowler in cricket. A rude variety of the game occurs in Italy, and, as we have seen, John Calvin played it in Geneva, where John Evelyn also noticed it in 1646. There is evidence of its vogue in Holland in the 17th century, for the painting by David Teniers (1610-1690), in the Scottish National Gallery at Edinburgh, is wrongly described as “Peasants playing at Skittles.” In this picture three men are represented as having played a bowl, while the fourth is in the act of delivering his bowl. The game is obviously bowls, the sole difference being that an upright peg, about 4 in. high, is employed instead of a jack,—recalling, in this respect, the old English form of the game already mentioned.

Serious efforts to organize the game were made in the last quarter of the 19th century, but this time the lead came from Australia. The Bowling Associations of Victoria and New South Wales were established in 1880, and it was not until 1892 that the Scottish Bowling Association was founded. Then in rapid succession came several independent bodies—the Midland Counties (1895), the London and Southern Counties (1896), the Imperial (1899), the English (1903) and the Irish and Welsh (1904). These institutions were concerned with the task of regularizing the game within the territories indicated by their titles, but it soon appeared that the multiplicity of associations was likely to prove a hindrance rather than a help, and with a view, therefore, to reducing the number of clashing jurisdictions and bringing about the establishment of a single legislative authority, the Imperial amalgamated with the English B.A. in 1905. The visits to the United Kingdom of properly organized teams of bowlers from Australia and New Zealand in 1901 and from Canada in 1904 demonstrated that the game had gained enormously in popularity. The former visit was commemorated by the institution of the Australia Cup, presented to the Imperial Bowling Association (and now the property of the English B.A.) by Mr Charles Wood, president of the Victorian Bowling Association. An accredited team of bowlers from the mother country visited Canada in 1906, and was accorded a royal welcome. Perhaps the most interesting proof that bowls is a true *Volksspiel* is to be found in the fact that it has become municipalized. In Edinburgh, Glasgow, and elsewhere in Scotland, and in London (through the county council), Newcastle and other English towns, the corporations have laid down greens in public

parks and open spaces. In Scotland the public greens are self-supporting, from a charge, which includes the use of bowls, of one penny an hour for each player; in London the upkeep of the greens falls on the rates, but players must provide their own bowls.

The game.

There are two kinds of bowling green, the level and the crown. The crown has a fall which may amount to as much as 18 in. all round from the centre to the sides. This type of green is confined almost wholly to certain of the northern and midland counties of England, where it is popular for single-handed, gate-money contests. But although the crown-green game is of a sporting character, it necessitates the use of bowls of narrow bias and affords but limited scope for the display of skill and science. It is the game on the perfectly level green that constitutes the historical game of bowls. Subject to the rule as to the shortest distance to which the jack must be thrown (25 yds.), there is no prescribed size for the lawn; but 42 yds. square forms an ideal green. The Queen's Park and Titwood clubs in Glasgow have each three greens, and as they can quite comfortably play six rinks on each, it is not uncommon to see 144 players making their game simultaneously. An undersized lawn is really a poor pitch, because it involves playing from corner to corner instead of up and down—the orthodox direction. For the scientific construction of a green, the whole ground must be excavated to a depth of 18 in. or so, and thoroughly drained, and layers of different materials (gravel, cinders, moulds, silver-sand) laid down before the final covering of turf, 2½ or 3 in. thick. Seaside turf is the best. It wears longest and keeps its "spring" to the last. Surrounding the green is a space called a ditch, which is nearly but not quite on a level with the green and slopes gently away from it, the side next the turf being lined with boarding, the ditch itself bottomed with wooden spars resting on the foundation. Beyond the ditch are banks generally laid with turf. A green is divided into spaces usually from 18 to 21 ft. in width, commonly styled "rinks"—a word which also designates each set of players—and these are numbered in sequence on a plate fixed in the bank at each end opposite the centre of the space. The end ditch within the limits of the space is, according to Scottish laws, regarded as part of the green, a regulation which prejudices the general acceptance of those laws. In match play each space is further marked off from its neighbour by thin string securely fastened flush with the turf.

Every player uses four *lignum vitae* bowls in single-handed games and (as a rule) in friendly games, but only two in matches. Every bowl must have a certain amount of bias, which was formerly obtained by loading one side with lead, but is now imparted by the turner making one side more convex than the other, the bulge showing the side of the bias. No bowl must have less than No. 3 bias—that is, it should draw about 6 ft. to a 30 yd. jack on a first-rate green: it follows that on an inferior green the bowler, though using the same bowl, would have to allow for a narrower draw. It is also a rule that the diameter of the bowl shall not be less than 4½ in. nor more than 5¼ in., and that its weight must not exceed 3½ lb. The jack or kitty, as the white earthenware ball to which the bowler bowls is called, is round and 2½ to 2¾ in. in diameter. On crown-greens it is customary to use a small biased wooden jack to give the bowler some clue to the run of the green. The bowler delivers his bowl with one foot on a mat or footer, made of india-rubber or cocoa-nut fibre, the size of which is also prescribed by rule as 24 by 16 in., though, with a view to protecting the green, Australasian clubs employ a much larger size, and require the bowler to keep both feet on the mat in the act of delivery.

In theory the game of bowls is very simple, the aim of the player being to roll his bowl so as to cause it to rest nearer to the jack than his opponent's, or to protect a well-placed bowl, or to dislodge a better bowl than his own. But in practice there is every opportunity for skill. On all good greens the game is played in rinks of four a side, there being, however, on the part of many English clubs still an adherence to the old-fashioned method of two and three a side rinks. Ordinarily a match team consists of four rinks of four players each, or sixteen men in all. The four players in a rink are known as the leader, second player, third player and skip (or driver, captain or director), and their positions, at least in matches, are unchangeable. Great responsibility is thus thrown on the skip in the choice of his players, who are selected for well-defined reasons. The leader has to place the mat, to throw the jack, to count the game, and to call the result of each end or head to the skip who is at the other end of the green. He is picked for his skill in playing to the jack. It is, therefore, his business to "be up." There is no excuse for short play on his part, and his bowls would be better off the green than obstructing the path of subsequent bowls. So he will endeavour to be "on the jack," the ideal position being a bowl at rest immediately in front of or behind it. The skip plays last, and directs his men from the end that is being played to. The weakest player in the four is invariably played in the second place (the "soft second"). Most frequently he will be required either to protect a good bowl or to rectify a possible error of the leader. His official duty is to mark the game on the scoring card when the leader announces the result. He keeps a record of the play of both sides. The third player, who does any measuring that may be necessary to determine which bowl or bowls may be nearest the jack, holds almost as responsible a position as the captain, whose place, in fact, he takes whenever the skip is temporarily absent. The duties of the skip will already be understood by inference. Before he leaves the jack to play, he must observe the situation of the bowls of both sides. It may be that he has to draw a shot with the utmost nicety to save the end, or even the match, or to lay a cunningly contrived block, or to "fire"—that is, to deliver his bowl almost dead straight at the object, with enough force to kill the bias for the moment. The score having been counted, the leader then places the mat, usually within a yard of the spot where the jack lay at the conclusion of the head, and throws the jack in the opposite direction for a fresh end. On small greens play, for obvious reasons, generally takes place from each ditch. The players play in couples—the first on both sides, then the second and so on. The leader having played his first bowl, the opposing leader will play his first and so on. As a rule, a match consists of 21 points, or 21 ends (or a few more, by agreement).

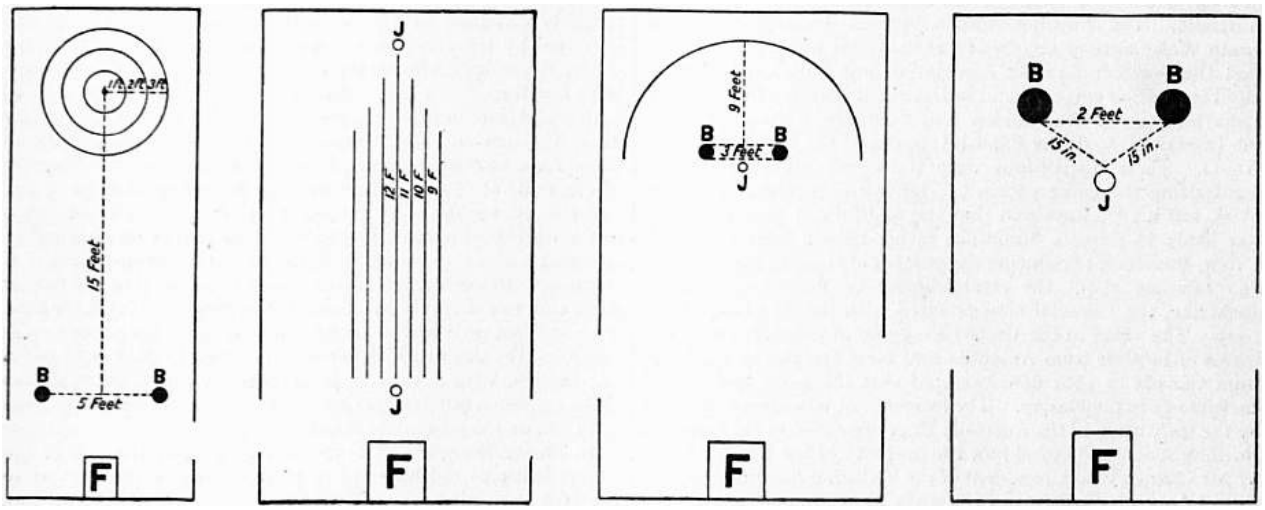


FIG. 1.—Drawing. FIG. 2.—Guarding. FIGS. 3.—Trailing. FIGS. 4.—Driving.

(In every case F is the Footer, B the Bowl, J the Jack.)

Certain points in the play call for notice. In throwing the jack, the leader is bound to throw (*i.e.* roll) a legal jack. A legal jack must travel at least 25 yds. from the footer and not come to rest within 2 yds. of either side boundary; but it may be thrown as far beyond this as the leader chooses, provided that it does not run within 2 yds. of the end ditch or either side boundary. In English practice the leader is entitled to a second throw if he fail to roll a legal jack at his first attempt; should he fail again, the right to throw passes to his opponent, but not the right of playing first. On Scottish greens the leader has only a single throw. A legal jack should not be interfered with except by the course of play. Should the jack be driven towards the side boundary, it is legitimate for a player to cause his bowl to draw outside of the dividing string, provided that when it has ceased running it shall have come to rest entirely within his own space. If it stop on the string, or outside of it, the bowl is “dead” and must be removed to the bank. A “toucher” bowl is a characteristic of the Scottish game to which great exception is taken by many English clubs. Should a bowl running jackwards touch the jack, however slightly, it is called a toucher and must be marked by the skip with a chalk cross as soon as it is at rest. Such a bowl is alive until the end is finished wherever it may lie, within the limits of the space. Even if it run into the ditch or be driven in by another bowl, it will yet count as alive. A bowl, however, that is forced on to the jack by another is not a toucher. The feat of hitting the jack is so common that it really calls for no special reward. Difference of opinion prevails as to the condition of the jack after it has been driven into the ditch. According to Scottish rules, unless it has been forced clean out of bounds, such a jack is still alive. On most English greens it is a “dead” jack and the end void. Every bowler should learn both forehand and backhand play. In forehand play the bowl as it courses to the jack describes its segment of a circle on the right, in backhand play on the left. In both styles the biased side must always be the inner.

In the United Kingdom the regular bowling season extends from May day till the end of September or the middle of October. At its close the green must be carefully examined, weeds uprooted, worn patches re-turfed, and the whole laid under a winter blanket of silver-sand.

On Scottish greens the game of points is frequently played, but it is rarely seen on English greens. Its main object is to perfect the proficiency of players in certain departments of bowls proper. There are four sections in the game, namely, drawing, guarding, trailing and driving. In *drawing* (fig. 1), the object is to draw as near as possible to the jack, the player’s bowl passing outside of two other bowls placed 5 ft. apart in a horizontal line 15 ft. from the jack, without touching either of them. Three points are scored if the bowl come to rest within 1 ft. of the jack, two points if within 2 ft., and one point if within 3 ft. Circles of these radii are usually marked around the jack for convenience sake. In *guarding* (fig. 2), two jacks are laid at the far end of the green 12 ft. apart in a vertical line. A thread is then pinned down between them, and on each side of this thread three others are pinned down parallel with it and 6 in. apart from each other. A bowl that comes to rest on the central line, or within 6 in. of it, counts three points, a bowl 12 in. away two points, and a bowl 18 in. off one point. In *trailing* (fig. 3), two bowls are laid on the turf 3 ft. apart, and straight lines are chalked from bowl to bowl across their back and front faces, and a jack is then deposited equidistant from each bowl and immediately before the front line. A semicircle is then drawn behind the bowls with a radius of 9 ft. from the jack. Three points are given to the bowl that trails the jack over both lines into the semicircle and goes over them itself. If a bowl trail the jack over both lines, but only itself cross the first; or if it pass both lines, but the jack cross only the first, two points are awarded. A bowl passing between the jack and either of the stationary bowls, and passing over the back line; or touching the jack, yet not trailing it past the first line, but itself crossing the back line; or trailing the jack over the front line without crossing it itself, receives one point. In no case must the stationary bowls be touched, or the semicircle crossed by the trailed jack or played bowls. In *driving* (fig. 4), two bowls are laid down 2 ft. apart, and then a jack is placed in front of them, 15 in. apart from each, and occupying the position of the apex of an inverted pyramid. The player who drives the jack into the ditch between the two bowls scores three. If he moves the jack, but does not carry it through to the ditch, he scores two. If he pass between the jack and either bowl he scores one, although it is not easy to see what driving he has done. The played bowl must itself run into the ditch without touching either of the stationary bowls. It is obvious that the points game demands an ideally perfect green.

See W.W. Mitchell, *Manual of Bowl-playing* (Glasgow, 1880); *Laws of the Game issued by the Scottish*

B.A. (1893, et sqq.); H.J. Dingley, *Touchers and Rubs* (Glasgow, 1893); Sam Aylwin, *The Gentle Art of Bowling*, with 26 diagrams (London, 1904); James A. Manson, *The Bowler's Handbook* (London, 1906).

(J. A. M.)

BOWNESS-ON-WINDERMERE, an urban district in the Appleby parliamentary division of Westmorland, England, on the east shore of Windermere, 1¼ m. S.W. of Windermere station on the London & North-Western railway. Together with the town of Windermere it forms an urban district (pop. 5061 in 1901), but the two towns were separate until 1905. Its situation is fine, the lake-shore here rising sharply, while at this point the lake narrows and is studded with islands. The low surrounding hills are richly wooded, and a number of country seats stand upon them. Bowness lies at the head of a small bay, is served by the lake-steamers of the Furness Railway Company, and is a favourite yachting, boating, fishing and tourist centre. The church of St Martin is ancient, and contains stained glass from Cartmel priory in Furness. (See WINDERMERE.)

BOWRING, SIR JOHN (1792-1872), English linguist, political economist and miscellaneous writer, was born at Exeter, on the 17th of October 1792, of an old Puritan family. In early life he came under the influence of Jeremy Bentham. He did not, however, share his master's contempt for *belles-lettres*, but was a diligent student of literature and foreign languages, especially those of eastern Europe. As a linguist he ranked with Mezzofanti and von Gabelentz among the greatest of the world. The first-fruits of his study of foreign literature appeared in *Specimens of the Russian Poets* (1821-1823). These were speedily followed by *Batavian Anthology* (1824), *Ancient Poetry and Romances of Spain* (1824), *Specimens of the Polish Poets*, and *Servian Popular Poetry*, both in 1827. During this period he began to contribute to the newly founded *Westminster Review*, of which he was appointed editor in 1825. By his contributions to the *Review* he obtained considerable reputation as political economist and parliamentary reformer. He advocated in its pages the cause of free trade long before it was popularized by Richard Cobden and John Bright. He pleaded earnestly in behalf of parliamentary reform, Catholic emancipation and popular education. In 1828 he visited Holland, where the university of Groningen conferred on him the degree of doctor of laws. In the following year he was in Denmark, preparing for the publication of a collection of Scandinavian poetry. Bowring, who had been the trusted friend of Bentham during his life, was appointed his literary executor, and was charged with the task of preparing a collected edition of his works. This appeared in eleven volumes in 1843. Meanwhile Bowring had entered parliament in 1835 as member for Kilmarnock; and in the following year he was appointed head of a government commission to be sent to France to inquire into the actual state of commerce between the two countries. He was engaged in similar investigations in Switzerland, Italy, Syria and some of the German states. The results of these missions appeared in a series of reports laid before the House of Commons. After a retirement of four years he sat in parliament from 1841 till 1849 as member for Bolton. During this busy period he found leisure for literature, and published in 1843 a translation of the *Manuscript of the Queen's Court*, a collection of old Bohemian lyrics, &c. In 1849 he was appointed British consul at Canton, and superintendent of trade in China, a post which he held for four years. After his return he distinguished himself as an advocate of the decimal system, and published a work entitled *The Decimal System in Numbers, Coins and Accounts* (1854). The introduction of the florin as a preparatory step was chiefly due to his efforts. Knighted in 1854, he was again sent the same year to Hong-Kong as governor, invested with the supreme military and naval power. It was during his governorship that a dispute broke out with the Chinese; and the irritation caused by his "spirited" or high-handed policy led to the second war with China. In 1855 he visited Siam, and negotiated with the king a treaty of commerce. After the usual five years of service he retired and received a pension. His last employment by the English government was as a commissioner to Italy in 1861, to report on British commercial relations with the new kingdom. Sir John Bowring subsequently accepted the appointment of minister plenipotentiary and envoy extraordinary from the Hawaiian government to the courts of Europe, and in this capacity negotiated treaties with Belgium, Holland, Italy, Spain and Switzerland. In addition to the works already named he published—*Poetry of the Magyars* (1830); *Cheskian Anthology* (1832); *The Kingdom and People of Siam* (1857); a translation of *Peter Schlemihl* (1824); translations from the Hungarian poet, Alexander Petöfi (1866); and various pamphlets. He was elected F.R.S. and F.R.G.S., and received the decorations of several foreign orders of knighthood. He died at Claremont, near Exeter, on the 23rd of November 1872. His valuable collection of coleoptera was presented to the British Museum by his second son, Lewin Bowring, a well-known Anglo-Indian administrator; and his third son, E.A. Bowring, member of parliament for Exeter from 1868 to 1874, became known in the literary world as an able translator.

Sir John Bowring's *Recollections* were edited by Lewin Bowring (d. 1910) in 1877.

BOWTELL, a medieval term in architecture for a round or corniced moulding; the word is a variant of "boltel," which is probably the diminutive of "bolt," the shaft of an arrow or javelin. A "roving" bowtell is one which passes up the side of a bench end and round a finial, the term "roving" being applied to that which follows the line of a curve.

BOWYER, WILLIAM (1663-1737), English printer, was born in 1663, apprenticed to a printer in 1679, made a liveryman of the Stationers' Company in 1700, and nominated as one of the twenty printers allowed by the Star Chamber. He was burned out in the great fire of 1712, but his loss was partly made good by the subscription of friends and fellow craftsmen, as recorded on a tablet in Stationers' Hall, and in 1713 he returned to his Whitefriars shop and became the leading printer of his day. He died on the 27th of December 1737.

His son, William Bowyer (1699-1777), was born in London on the 19th of December 1699. He was educated at St John's College, Cambridge, and in 1722 became a partner in his father's business. In 1729 he was appointed printer of the votes of the House of Commons, and in 1736 printer to the Society of Antiquaries, of which he was elected a fellow in 1737. In 1737 he took as apprentice John Nichols, who was to be his successor and biographer. In 1761 Bowyer became printer to the Royal Society, and in 1767 printer of the rolls of the House of Lords and the journals of the House of Commons. He died on the 13th of November 1777, leaving unfinished a number of large works and among them the reprint of Domesday Book. He wrote a great many tracts and pamphlets, edited, arranged and published a host of books, but perhaps his principal work was an edition of the New Testament in Greek, with notes. His generous bequests in favour of his own profession are administered by the Stationers' Company, of which he became a liveryman in 1738, and in whose hall is his portrait bust and a painting of his father. He was known as "the learned printer."

BOX (Gr. πύξος, Lat. *buxus*, box-wood; cf. πύξις, a pyx), the most varied of all receptacles. A box may be square, oblong, round or oval, or of an even less normal shape; it usually opens by raising, sliding or removing the lid, which may be fastened by a catch, hasp or lock. Whatever its shape or purpose or the material of which it is fashioned, it is the direct descendant of the chest, one of the most ancient articles of domestic furniture. Its uses are infinite, and the name, preceded by a qualifying adjective, has been given to many objects of artistic or antiquarian interest.

Of the boxes which possess some attraction beyond their immediate purpose the feminine work-box is the commonest. It is usually fitted with a tray divided into many small compartments, for needles, reels of silk and cotton and other necessaries of stitchery. The date of its introduction is in considerable doubt, but 17th-century examples have come down to us, with covers of silk, stitched with beads and adorned with embroidery. In the 18th century no lady was without her work-box, and, especially in the second half of that period, much taste and elaborate pains were expended upon the case, which was often exceedingly dainty and elegant. These boxes are ordinarily portable, but sometimes form the top of a table.

But it is as a receptacle for snuff that the box has taken its most distinguished and artistic form. The snuff-box, which is now little more than a charming relic of a disagreeable practice, was throughout the larger part of the 18th century the indispensable companion of every man of birth and breeding. It long survived his sword, and was in frequent use until nearly the middle of the 19th century. The jeweller, the enameller and the artist bestowed infinite pains upon what was quite as often a delicate bijou as a piece of utility; fops and great personages possessed numbers of snuff-boxes, rich and more ordinary, their selection being regulated by their dress and by the relative splendour of the occasion. From the cheapest wood that was suitable—at one time potato-pulp was extensively used—to a frame of gold encased with diamonds, a great variety of materials was employed. Tortoise-shell was a favourite, and owing to its limpid lustre it was exceedingly effective. Mother-of-pearl was also used, together with silver, in its natural state or gilded. Costly gold boxes were often enriched with enamels or set with diamonds or other precious stones, and sometimes the lid was adorned with a portrait, a classical vignette, or a tiny miniature, often some choice work by an old master. After snuff-taking had ceased to be general it lingered for some time among diplomatists, either because—as Talleyrand explained—they found a ceremonious pinch to be a useful aid to reflection in a business interview, or because monarchs retained the habit of bestowing snuff-boxes upon ambassadors and other intermediaries, who could not well be honoured in any other way. It is, indeed, to the cessation of the habit of snuff-taking that we may trace much of modern lavishness in the distribution of decorations. To be invited to take a pinch from a monarch's snuff-box was a distinction almost equivalent to having one's ear pulled by Napoleon. At the coronation of George IV. of England, Messrs Rundell & Bridge, the court jewellers, were paid £8205 for snuff-boxes for foreign ministers. Now that the snuff-box is no longer used it is collected by wealthy amateurs or deposited in museums, and especially artistic examples command large sums.

George, duke of Cambridge (1819-1904), possessed an important collection; a Louis XV. gold box was sold by auction after his death for £2000.

A jewel-box is a receptacle for trinkets. It may take a very modest form, covered in leather and lined with satin, or it may reach the monumental proportions of the jewel cabinets which were made for Marie Antoinette, one of which is at Windsor, and another at Versailles, the work of Schwerdfeger as cabinet-maker, Degault as miniature-painter, and Thomire as chaser.

A strong-box is a receptacle for money, deeds and securities. Its place has been taken in modern life by the safe. Some of those which have survived, such as that of Sir Thomas Bodley in the Bodleian library, possess locks with an extremely elaborate mechanism contrived in the under-side of the lid.

The knife-box is one of the most charming of the minor pieces of furniture which we owe to the artistic taste and mechanical ingenuity of the English cabinet-makers of the last quarter of the 18th century. Some of the most elegant were the work of Adam, Hepplewhite and Sheraton. Occasionally flat-topped boxes, they were most frequently either vase-shaped, or tall and narrow with a sloping lid necessitated by a series of raised stages for exhibiting the handles of knives and the bowls of spoons. Mahogany and satinwood were the woods most frequently employed, and they were occasionally inlaid with marqueterie or edged with boxwood. These graceful receptacles still exist in large numbers; they are often converted into stationery cabinets.

The Bible-box, usually of the 17th century, but now and again more ancient, probably obtained its name from the fact that it was of a size to hold a large Bible. It often has a carved or incised lid.

The powder-box and the patch-box were respectively receptacles for the powder and the patches of the 18th century; the former was the direct ancestor of the puff-box of the modern dressing-table.

The *étui* is a cylindrical box or case of very various materials, often of pleasing shape or adornment, for holding sewing materials or small articles of feminine use. It was worn on the châtelaine.

BOXING (M.E. *box*, a blow, probably from Dan. *bask*, a buffet), the art of attack and defence with the fists protected by padded gloves, as distinguished from pugilism, in which the bare fists, or some kind of light gloves affording little moderation of the blow, are employed. The ancient Greeks used a sort of glove in practice, but, although far less formidable than the terrible caestus worn in serious encounters, it was by no means so mild an implement as the modern boxing-glove, the invention of which is traditionally ascribed to Jack Broughton (1705-1789), “the father of British pugilism.” In any case gloves were first used in his time, though only in practice, all prize-fights being decided with bare fists. Broughton, who was for years champion of England, also drew up the rules by which prize-fights were for many years regulated, and no doubt, with the help of the newly invented gloves, imparted instruction in boxing to the young aristocrats of his day. The most popular teacher of the art was, however, John Jackson (1769-1845), called “Gentleman Jackson,” who was champion from 1795 to 1800, and who is credited with imparting to boxing its scientific principles, such as countering, accurate judging of distance in hitting, and agility on the feet. Tom Moore, the poet, in his *Memoirs*, asserted that Jackson “made more than a thousand a year by teaching sparring.” Among his pupils was Lord Byron, who, when chided for keeping company with a pugilist, insisted that Jackson’s manners were “infinitely superior to those of the fellows of the college whom I meet at the high table,” and referred to him in the following lines in *Hints from Horace*:—

> “And men unpractised in exchanging knocks
> Must go to Jackson ere they dare to box.”

His rooms in Bond Street were crowded with men of birth and distinction, and when the allied monarchs visited London he was entrusted with the management of a boxing carnival with which they were vastly pleased. In 1814 the Pugilistic Club, the meeting-place of the aristocratic sporting element, was formed, but the high-water mark of the popularity of boxing had been reached, and it declined rapidly, although throughout the country considerable interest continued to be manifested in prize-fighting.

The sport of modern boxing, as distinguished from pugilism, may be said to date from the year 1866, when the public had become disgusted with the brutality and unfair practices of the professional “bruisers,” and the laws against prize-fighting began to be more rigidly enforced. In that year the “Amateur Athletic Club” was founded, principally through the efforts of John G. Chambers (1843-1883), who, in conjunction with the 8th marquess of Queensberry, drew up a code of laws (known as the Queensberry Rules) which govern all glove contests in Great Britain, and were also authoritative in America until the adoption of the boxing rules of the Amateur Athletic Union of America. In 1867 Lord Queensberry presented cups for the British amateur championships at the recognized weights.

For the history of pugilism in classic antiquity and an account of modern prize-fighting see Pugilism. At present two kinds of boxing contests are in vogue, that for a limited number of rounds (as in the amateur championships) and that for endurance, in which the one who cannot continue the fight loses.

Endurance contests, which contain the essential element of the old prize-fights, are now indulged in only by professionals. Among amateurs boxing is far less popular than it once was, owing to the importance placed upon brute strength, and the prevailing ambition of the modern boxer to “knock out” his opponent, *i.e.* reduce him to a state of insensibility. Even in 3-round matches between gentlemen, in which points win, and there is therefore no need to knock an opponent senseless, it is nevertheless a common practice to strike a dazed and reeling adversary a heavy blow with a view to ending the battle at once. During the annual boxing competitions between Oxford and Cambridge more than half the bouts have been known to end in this manner. Undoubtedly the prettiest boxing is seen when two men proficient in the art indulge in a practice bout—or “sparring.”

Boxing is the art of hitting without getting hit. The boxers face each other just out of reach and balanced equally on both feet, the left from 10 to 20 in. in advance of the right. The left foot is planted flat on the floor, while the right heel is raised slightly from it. The left side of the body is turned a little towards the opponent and the right shoulder slightly depressed. When the hands are clenched inside the gloves the thumb is doubled over the second and third fingers to avoid a sprain when hitting. The general position of the guard is a matter of individual taste. In the “crouch,” affected by many American professionals, the right hip is thrust forward and the body bent over towards the right, while the left arm is kept well stretched out to keep the opponent at a distance. No good master, however, teaches a 351
beginner any other than the upright position. Some boxers stand with the right foot forward, a practice common in the 18th century, which gives freer play with the right hand but is rather unstable. A boxer should stand lightly on his feet, ready to advance or retreat on the instant, using short steps, advancing with the left foot first and retreating with the right. Attacks are either simple or secondary. Simple attacks consist in straight leads, *i.e.* blows aimed with or without preliminary feints, at some part of the opponent’s body or head. All other attacks are either “counters” or returns after a guard or “block.” A counter is a lead carried out just as one is attacked, the object being to block (parry) the blow and land on the opponent at the same time. Counters are often carried out in connexion with a side-step, a slip or a crouch. In hitting, a boxer seeks to exert the greatest force at the instant of impact. Blows may be either straight, with or without the weight of the body behind them (“straight from the shouder” hits); jabs, short blows (usually with the left hand when at close quarters); hooks, or side-blows with bent arm; upper cuts (short swinging blows from beneath to the adversary’s chin); chops (short blows from above); punches (usually at close quarters, with the right hand); or swings (round-arm blows, usually delivered with a partial twist of the body to augment the force of the blow). Of the dangerous blows, which often result in a knockout, or in seriously weakening an adversary, the following may be mentioned:—on the pit of the stomach, called the solar plexus, from the sensitive network of nerves situated there; a blow on the point of the chin, having a tendency slightly to paralyse the brain; a blow under the ear, painful and often resulting in partial helplessness; and one directly over the heart, kidney or liver. As a boxer is allowed ten seconds after being knocked down in which to rise, an experienced ring-fighter will drop on one knee when partially stunned, remaining in that position in order to recover until the referee has counted nine.

Guarding is done with the arm or hand, either open or shut. If a blow is caught or stopped short it is called *blocking*, but a blow may also be shoved aside, or avoided altogether by *slipping, i.e.* moving the head quickly to one side, or by ducking and allowing the adversary’s swing to pass harmlessly over the head. Still another method of avoiding a blow without guarding is to bend back the head or body so as narrowly to escape the opponent’s glove.

The rules of the Amateur Boxing Association (founded 1884) contain the following provisions. “An amateur is one who has never competed for a money prize or staked bet with or against a professional for any prize, except with the express sanction of the A.B.A., and who has never taught, pursued or assisted in the practice of athletic exercises as a means of obtaining a livelihood.” The ring shall be roped and between 12 and 24 ft. square. No spikes shall be worn on shoes. Boxers are divided into the following classes by weight:—Bantam, not exceeding 8 st. 4 lb (116 lb); Feather, not exceeding 9 st. (126 lb); Light, not exceeding 10 st. (140 lb); Middle, not exceeding 11 st. 4 lb (158 lb); and Heavy, any weight above. There shall be two judges, a referee and a timekeeper. The votes of the judges decide the winner of a bout, unless they disagree, in which case the referee has the deciding vote. In case of doubt he may order an extra round of two minutes’ duration. Each match is for three rounds, the first two lasting three minutes and the third four, with one minute rest between the rounds. A competitor failing to come up at the call of time loses the match. When a competitor draws a bye he must box for a specified time with an opponent chosen by the judges. A competitor is allowed one assistant (second) only, and no advice or coaching during the progress of a round is permitted. Unless one competitor is unable to respond to the call of time, or is obliged to stop before the match is over, the judges decide the winner by *points*, which are for attack, comprising successful hits cleanly delivered, and defence, comprising guarding, slipping, ducking, counter-hitting and getting away in time to avoid a return. When the points are equal the decision is given in favour of the boxer who has done the most leading, *i.e.* has been the more aggressive. Fouls are hitting below the belt, kicking, hitting with the open hand, the side of the hand, the wrist, elbow or shoulder, wrestling or “roughing” on the ropes, *i.e.* unnecessary shouldering and jostling.

The boxing rules of the American Amateur Athletic Association differ slightly from the British. The ring is roped but must be from 16 to 24 ft. square. Gloves must not be worn more than 8 oz. in weight. The recognized classes by weight are: Bantam, 105 lb and under; Feather, 115 lb and under; Light, 135 lb and under; Welter, 145 lb and under; Middle, 158 lb and under; and Heavy, over 158 lb The rules for officials and rounds are identical with the British, except that only in final bouts does the last round last four minutes. Two “seconds” are allowed. The rules for points and fouls coincide with the British. The

amateur rules are very strict, and any one who competes in a boxing contest of more than four rounds is suspended from membership in the Athletic Association.

Glossary of terms not mentioned above:—*Break away*, to get away from the adversary, usually a command from the referee when the men clinch. *Break ground*, retire diagonally to right or left. *Catch-weight*, any weight. *Corners*, the opposite angles of the square "ring," in which the boxers rest between the rounds. *Cross-counter*, a blow in which the right or left arm crosses that of the adversary as he leads off; the arm is slightly curved to get round that of the opponent but is straightened at the moment of impact. *Clinching*, grappling after an exchange of blows; when breaking from a clinch one tries to pin the adversary's hands in order to prevent his hitting at close quarters. *Drawing* an opponent, enticing him by leaving an apparent opening into making an attack for which a counter is prepared. *Fiddling*, forward and back movements of the arms at the beginning of a round, a part of sparring for an opening. *Footwork*, the manner in which a boxer uses his feet. *In-fighting*, boxing at very close quarters. *Mark*, the pit of the stomach. *Side-step*, springing quickly to one side to avoid a blow, the movement being usually followed up by a counter attack. *Timing*, a blow delivered on the enemy's preparation of an attack of his own, but more quickly.

See *Boxing*, by R. Allanson Winn (Isthmian Library, London, 1897); *Boxing*, by Wm. Elder (Spalding's Athletic Library, New York, 1902) (these two books are excellent for the technicalities of boxing). The article "Boxing," by B. Jno. Angle and G.W. Barroll, in the *Encyclopaedia of Sport*; *Boxing*, by J.C. Trotter (Oval Series, London, 1896); *Fencing, Boxing and Wrestling*, in the Badminton Library (London, 1892).

French Boxing (*la boxe française*) dates from about 1830. It is more like the ancient Greek *pankration* (see Pugilism) than is British boxing, as not only striking with the fists, but also kicking with the feet, butting with the head and wrestling are allowed. It is a development of the old sport of *savate*, in which the feet, and not the hands, were used in attack. Lessons in savate, which was practised especially by roughs, were usually given in some low resort, and there were no respectable teachers. While Paris was restricted to savate, another sport, called *chausson* or *jeu marseillais*, was practised in the south of France, especially among the soldiers, in which blows of the fist as well as kicks were exchanged, and the kicks were given higher than in savate, in the stomach or even the face. It was an excellent exercise, but could hardly be reckoned a serious means of defence, for the high kicks usually fell short, and the upward blows of the fist could not be compared with the terrible sledge-hammer blows of the English boxers. Alexandre Dumas *père* says that Charles Lecour first conceived the idea of combining English boxing with savate. For this purpose he went to England, and took lessons of Adams and Smith, the London boxers. He then returned to Paris, about 1852, and opened a school to teach the sport since called *la boxe française*. Around him, and two provincial instructors who came to Paris about this time with similar ideas, there grew up a large number of sportsmen, who between 1845 and 1855 brought French boxing to its highest development. Among others who gave public exhibitions was Lecour's brother Hubert, who although rather undersized, was quick as lightning, and had an English blow and a French kick that were truly terrible. Charles Ducros was another whose style of boxing, more in the English fashion, but with low kicks about his opponent's shins, made a name for himself. Later came Vigneron, a "strong man," whose style, though slow, was severe in its punishment. About 1856 the police interfered in these fights, and Lecour and Vigneron had to cease giving public exhibitions and devote themselves to teaching. Towards 1862 a new boxer, J. Charlemont, was not only very clever with his fists and feet, but an excellent teacher, and the author of a treatise on the art. Lecour, Vigneron and Charlemont may be said to have created *la boxe française*, which, for defence *at equal weights*, the French claim to be better than the English.

See *L'Art de la boxe française et de la canne*, by J. Charlemont (Paris, 1899); *The French Method of the Noble Art of Self Defence*, by Georges d'Amoric (London, 1898).

BOXWOOD, the wood obtained from the genus *Buxus*, the principal species being the well-known tree or shrub, *B. sempervirens*, the common box, in general use for borders of garden walks, ornamental parterres, &c. The other source of the ordinary boxwood of commerce is *B. balearica*, which yields the variety known as Turkey boxwood. The common box is grown throughout Great Britain (perhaps native in the chalk-hills of the south of England), in the southern part of the European continent generally, and extends through Persia into India, where it is found growing on the slopes of the western Himalayas. There has been much discussion as to whether it is a true native of Britain. Writing more than 200 years ago, John Ray, the author of the important *Historia Plantarum*, says, "The Box grows wild on Boxhill, hence the name; also at Boxwell, on the Cotteswold Hills in Gloucestershire, and at Boxley in Kent.... It grows plentifully on the chalk hills near Dunstable." On the other hand the box is not wild in the Channel Islands, and in the north of France, Holland and Belgium is found mainly in hedgerows and near cultivation, and it may have been one of the many introductions owed to the Romans. Only a very small proportion of the wood suitable for industrial uses is now obtained in Great Britain. The box is a very slow-growing plant, adding not more than 1½ or 2 in. to its diameter in twenty years, and on an average attaining only a height of 16 ft., with a mean diameter of 10½ in. The leaves of this species are small, oval, leathery in texture and of a deep glossy green colour. *B. balearica* is a tree of considerable size, attaining to a height of 80 ft., with leaves three times larger than those of the common box. It is a native of the islands of the Mediterranean, and grows in Turkey, Asia Minor, and around the shores of the Black Sea, and is supposed to be the chief source of the boxwood which comes

into European commerce by way of Constantinople. The wood of both species possesses a delicate yellow colour; it is very dense in structure and has a fine uniform grain, which has given it unique value for the purposes of the wood-engraver. A large amount is used in the manufacture of measuring rules, various mathematical instruments, flutes and other musical instruments, as well as for turning into many minor articles, and for inlaying, and it is a favourite wood for small carvings. The use of boxwood for turnery and musical instruments is mentioned by Pliny, Virgil and Ovid.

BOYACÁ, or Bojacá, an inland department of Colombia, bounded by the departments of Santander and Cundinamarca on the N., W. and S., and the republic of Venezuela on the E., and having an area of 33,321 sq. m., including the Casanare territory. Pop. (1899, estimate) 508,940. The department is very mountainous, heavily forested and rich in minerals. The famous Muso emerald mines are located in the western part of Boyacá. The capital, Tunja (pop. 1902, 10,000), is situated in the Eastern Cordilleras, 9054 ft. above sea-level, and has a cool, temperate climate, though only 5½° N. of the equator. It was an important place in colonial times, and occupies the site of one of the Indian towns of this region (Hunsa), which had acquired a considerable degree of civilization before the discovery of America. Other towns of note in the department are Chiquinquira (20,000), Moniquira (18,000), Sogamoso (10,787), and Boyacá (7000), where on the 7th of August 1819 Bolivar defeated the Spanish army and secured the independence of New Granada.

BOYAR (Russ. *boyarin*, plur. *boyare*), a dignity of Old Russia conterminous with the history of the country. Originally the boyars were the intimate friends and confidential advisers of the Russian prince, the superior members of his *druzhina* or bodyguard, his comrades and champions. They were divided into classes according to rank, most generally determined by personal merit and service. Thus we hear of the “oldest,” “elder” and the “younger” boyars. At first the dignity seems to have been occasionally, but by no means invariably, hereditary. At a later day the boyars were the chief members of the prince’s *duma*, or council, like the *senatores* of Poland and Lithuania. Their further designation of *luchshie lyudi* or “the best people” proves that they were generally richer than their fellow subjects. So long as the princes, in their interminable struggles with the barbarians of the Steppe, needed the assistance of the towns, “the best people” of the cities and of the *druzhina* proper mingled freely together both in war and commerce; but after Yaroslav’s crushing victory over the Petchenegs in 1036 beneath the walls of Kiev, the two classes began to draw apart, and a political and economical difference between the members of the princely *druzhina* and the aristocracy of the towns becomes discernible. The townsmen devote themselves henceforth more exclusively to commerce, while the *druzhina* asserts the privileges of an exclusively military caste with a primary claim upon the land. Still later, when the courts of the northern grand dukes were established, the boyars appear as the first grade of a fullblown court aristocracy with the exclusive privilege of possessing land and serfs. Hence their title of *dvoryane* (courtiers), first used in the 12th century. On the other hand there was no distinction, as in Germany, between the *Dienst Adel* (nobility of service) and the simple *Adel*. The Russian boyardom had no corporate or class privileges, (1) because their importance was purely local (the dignity of the principality determining the degree of dignity of the boyars), (2) because of their inalienable right of transmigration from one prince to another at will, which prevented the formation of a settled aristocracy, and (3) because birth did not determine but only facilitated the attainment of high rank, *e.g.* the son of a boyar was not a boyar born, but could more easily attain to boyardom, if of superior personal merit. It was reserved for Peter the Great to transform the *boyarstvo* or boyardom into something more nearly resembling the aristocracy of the West.

See Alexander Markevich, *The History of Rank-priority in the Realm of Muscovy in the 15th-18th Centuries* (Russ.) (Odessa, 1888); V. Klyuchevsky, *The Boyar Duma of Ancient Russia* (Russ.) (Moscow, 1888).

(R. N. B.)

BOY-BISHOP, the name given to the “bishop of the boys” (*episcopus puerorum* or *innocentium*, sometimes *episcopus scholariorum* or *chorestarum*), who, according to a custom very wide-spread in the middle ages, was chosen in connexion with the festival of Holy Innocents. For the origin of the curious authority of the boy-bishop and of the rites over which he presided, see Fools, Feast of. In England the boy-bishop was elected on December 6, the feast of St Nicholas, the patron of children, and his authority lasted till Holy Innocents’ day (December 28). The election made, the lad was dressed in full bishop’s robes with mitre and crozier and, attended by comrades dressed as priests, made a circuit

of the town blessing the people. At Salisbury the boy-bishop seems to have actually had ecclesiastical patronage during his episcopate, and could make valid appointments. The boy and his colleagues took possession of the cathedral and performed all the ceremonies and offices except mass. Originally, it seems, confined to the cathedrals, the custom spread to nearly all the parishes. Several ecclesiastical councils had attempted to abolish or to restrain the abuses of the custom, before it was prohibited by the council of Basel in 1431. It was, however, too popular to be easily suppressed. In England it was abolished by Henry VIII. in 1542, revived by Mary in 1552 and finally abolished by Elizabeth. On the continent it survived longest in Germany, in the so-called *Gregoriusfest*, said to have been founded by Gregory IV. in 828 in honour of St Gregory, the patron of schools. A school-boy was elected bishop, duly vested, and, attended by two boy-deacons and the town clergy, proceeded to the parish church, where, after a hymn in honour of St Gregory had been sung, he preached. At Meiningen this custom survived till 1799.

See Brand, *Pop. Antiquities of Great Britain* (1905); Gasquet, *Parish Life in Medieval England* (1906); Du Cange, *Glossarium* (London, 1884), *s.v.* “Episcopus puerorum.”

BOYCE, WILLIAM (1710-1779), English musical composer, the son of a cabinet-maker, was born in London on the 7th of February 1710. As a chorister in St Paul’s he received his early musical education from Charles King and Dr Maurice Greene, and he afterwards studied the theory of music under Dr Pepusch. In 1734, having become organist of Oxford chapel, Vere Street, Cavendish Square, he set Lord Lansdowne’s masque of *Peleus and Thetis* to music. In 1736 he left Oxford chapel and was appointed organist of St Michael’s church, Cornhill, and in the same year he became composer to the chapel royal, and wrote the music for John Lockman’s oratorio *David’s Lamentation over Saul and Jonathan*. In 1737 he was appointed to conduct the meetings of the three choirs of Gloucester, Worcester and Hereford. In 1743 was written the serenata *Solomon*, in which occurs the favourite song “Softly rise, O southern breeze.” In 1749 he received the degree of doctor of music from the university of Cambridge, as an acknowledgment of the merit of his setting of the ode performed at the installation of Henry Pelham, duke of Newcastle, as chancellor; and in this year he became organist of All-hallows the Great and Less, Thames Street. A musical setting to *The Chaplet*, an entertainment by Moses Mendez, was Boyce’s most successful achievement in this year. In 1750 he wrote songs for Dryden’s *Secular Masque* and in 1751 set another piece (*The Shepherd’s Lottery*) by Mendez. He became master of the king’s band in succession to Greene in 1757, and in 1758 he was appointed principal organist to the chapel royal. As an ecclesiastical composer Boyce ranks among the best representatives of the English school. His two church services and his anthems, of which the best specimens are *By the Waters of Babylon* and *O, Where shall Wisdom be found*, are frequently performed. It should also be remembered that he wrote additional accompaniments and choruses for Purcell’s *Te Deum* and *Jubilate*, which the earlier musician had composed for the St Cecilia’s day of 1694. Boyce did this in his capacity of conductor at the annual festivals of the Sons of the Clergy at St Paul’s cathedral, an office which he had taken in succession to Greene. His twelve trios for two violins and a bass were long popular. One of his most valuable services to musical art was his publication in three volumes quarto of a work on *Cathedral Music*. The collection had been begun by Greene, but it was mainly the work of Boyce. The first volume appeared in 1760 and the last in 1778. On the 7th of February 1779 Boyce died from an attack of gout. He was buried under the dome of St Paul’s cathedral.

BOYCOTT, the refusal and incitement to refusal to have commercial or social dealings with any one on whom it is wished to bring pressure. As merely a form of “sending to Coventry” or (in W.E. Gladstone’s phrase) “exclusive dealing,” boycotting may be, from a legal point of view, unassailable, and as such has frequently been justified by its original political inventors. But in practice it has usually taken the form of what is undoubtedly an illegal conspiracy to injure the person, property or business of another by unwarrantably putting pressure on all and sundry to withdraw from him their social or business intercourse. The word was first used in Ireland, and was derived from the name of Captain Charles Cunningham Boycott (1832-1897), agent for the estates of the earl of Erne in Co. Mayo. For refusing in 1880 to receive rents at figures fixed by the tenants, Captain Boycott had his life threatened, his servants compelled to leave him, his fences torn down, his letters intercepted and his food supplies interfered with. It took a force of 900 soldiers to protect the Ulster Orangemen (“Emergency Men”) who succeeded finally in getting in his crops. He was hooted and mobbed in the streets, and hanged and burnt in effigy. The system of boycotting was an essential part of the Irish Nationalist “Plan of Campaign,” and was dealt with under the Crimes Act of 1887. The term soon came into common English use, and was speedily adopted by the French, Germans, Dutch and Russians. In the United States this method of “persuasion” was taken up by the trade unions about 1886, an employer who refused their demands being brought to terms by a combination to refuse to buy his product or do his work, or to deal with any who did. Various cases have occurred in America in which labour organizations have pronounced such a boycott against a firm; and its illegal nature has been established in the law-courts,

notably in the case of the Bucks Stove Company *v.* The American Federation of Labor (1907) in the Supreme Court of the district of Columbia, and in a suit against the Hatters' Union (February 1908) in the U.S. Supreme Court. A boycott has also been held by the U.S. Supreme Court to be a violation of the Sherman Anti-Trust law.

BOYD, ANDREW KENNEDY HUTCHISON (1825-1899), Scottish author and divine, was born at Auchinleck manse in Ayrshire on the 3rd of November 1825. He studied at King's College, London, and at the Middle Temple, with the idea of practising at the English bar. Returning to Scotland, however, he entered Glasgow University and there qualified for the Scottish ministry, being licensed as a preacher by the presbytery of Ayr. He served in succession the parishes of Newton-on-Ayr, Kirkpatrick-Irongray near Dumfries, St Bernard's, Edinburgh, and finally, in 1865, became minister of the first charge at St Andrews. Here he advocated an improved ritual in the Scottish church, his action resulting in the appointment by the general assembly of a committee, with Boyd as convener, to prepare a new hymnal. In 1890 he was appointed moderator of the general assembly, and fulfilled the duties of the position with admirable dignity and tact. He died at Bournemouth on the 1st of March 1899. Dr Boyd was a very famous preacher and talker, and his desultory essays have very much of the charm of his conversation. Among his numerous publications may be specially mentioned the two works (each in three series), *Recreations of a Country Parson* (1859, 1861 and 1878), and *Graver Thoughts of a Country Parson* (1862-1865 and 1875); he also wrote *Twenty-five Years at St Andrews* (1892), and *St Andrews and Elsewhere* (1894). He was familiarly known to the public as a writer by his initials "A.K.H.B."

BOYD, ROBERT BOYD, Lord (d.c. 1470), Scottish statesman, was a son of Sir Thomas Boyd (d. 1439), and belonged to an old and distinguished family, one member of which, Sir Robert Boyd, had fought with Wallace and Robert Bruce. Boyd, who was created a peer about 1454, was one of the regents of Scotland during the minority of James III., but, in 1466, with some associates he secured the person of the young king and was appointed his sole governor. As ruler of Scotland he was instrumental in reforming some religious foundations; he arranged the marriage between James III. and Margaret, daughter of Christian I., king of Denmark and Norway, and secured the cession of the Orkney Islands by Norway. However, when in 1467 he obtained the offices of chamberlain and justiciary for himself, and the hand of the king's sister Mary, with the title of earl of Arran for his eldest son Thomas, his enemies became too strong for him, and he was found guilty of treason and sentenced to death. He escaped to England, and the date of his death is unknown. His brother and assistant, Sir Alexander Boyd, was beheaded on the 22nd of November 1469.

Boyd's son Thomas, earl of Arran, was in Denmark when his father was overthrown. However, he fulfilled his mission, that of bringing the king's bride, Margaret, to Scotland, and then, warned by his wife, escaped to the continent of Europe. He is mentioned very eulogistically in one of the Paston Letters, but practically nothing is known of his subsequent history.

Lord Boyd's grandson Robert (d. *c.* 1550), a son of Alexander Boyd, was confirmed in the possession of the estates and honours of his grandfather in 1549, and is generally regarded as the 3rd Lord Boyd. His son Robert, 4th Lord Boyd (d. 1590), took a prominent part in Scottish politics during the troubled time which followed the death of James V. in 1542. At first he favoured the reformed religion, but afterwards his views changed and he became one of the most trusted advisers of Mary, queen of Scots, whom he accompanied to the battle of Langside in 1568. During the queen's captivity he was often employed on diplomatic errands; he tried to stir up insurrections in her favour, and he was suspected of participation in the murder of the regent Murray. He enjoyed a high and influential position under the regent James Douglas, earl of Morton, but was banished in 1583 for his share in the seizure of King James VI., a plot known as the Raid of Ruthven. He retired to France, but was soon allowed to return to Scotland. He died on the 3rd of January 1590.

William, 8th or 9th Lord Boyd (d. 1692), was created earl of Kilmarnock in 1661, and this nobleman's grandson William, the 3rd earl (d. 1717), was a partisan of the Hanoverian kings and fought for George I. during the rising of 1715. His son William, the 4th earl (1704-1746), was educated in the same principles, but in 1745, owing either to a personal affront or to the influence of his wife or to his straitened circumstances he deserted George II. and joined Charles Edward, the Young Pretender. The 4th earl fought at Falkirk and Culloden, where he was made prisoner, and was beheaded on the 18th of August 1746. The title of earl of Kilmarnock is now merged in that of earl of Erroll.

BOYD, ZACHARY (1585?-1653), Scottish divine, was educated at the universities of Glasgow and St Andrews. He was for many years a teacher in the Protestant college of Saumur in France, but returned to Scotland in 1621, to escape the Huguenot persecution. In 1623 he was appointed minister of the Barony church in Glasgow, and he was rector of the university in 1634, 1635 and 1645. He bequeathed to the university the half of his fortune, a sum amounting to £20,000 Scots, besides his library and twelve volumes of MSS. His poetical compositions, though often eccentric, have some merit. The common statement that he made the printing of his metrical version of the Gospels and other Biblical narratives a condition of the reception of his grant to the university is a mistake. In later years he was a staunch Covenanter, and though for a time opposed to Oliver Cromwell, afterwards became friendly with him. His best-known works are *The Battel of the Soul in Death* (1629), of which a new edition, with a biography by G. Neil, was published in Glasgow in 1831; *Zion's Flowers*—often called "Boyd's Bible" (1644); *Four Letters of Comfort* (1640, reprinted, Edinburgh, 1878).

BOYDELL, JOHN (1719-1804), English alderman and publisher, was born at Dorrington, and at the age of twenty-one came to London and was apprenticed for seven years to an engraver. In 1746 he published a volume of views in England and Wales, and started in business as a print-seller. By his good taste and liberality he managed to secure the services of the best artists, and his engravings were executed with such skill that his business became extensive and lucrative. He succeeded in his plan of a Shakespeare gallery, and obtained the assistance of the most eminent painters of the day, whose contributions were exhibited publicly for many years. The engravings from these paintings form a splendid companion volume to his large illustrated edition of Shakespeare's works. Towards the close of his life Boydell sustained severe losses through the French Revolution, and was compelled to dispose of his Shakespeare gallery by lottery. Boydell had previously become an alderman, and rose to be lord mayor of London.

BOYER, ALEXIS (1757-1833), French surgeon, was born on the 1st of March 1757 at Uzerches (Corrèze). The son of a tailor, he obtained his first medical knowledge in the shop of a barber-surgeon. Removing to Paris he had the good fortune to attract the notice of Antoine Louis (1723-1792) and P.J. Desault (1744-1795); and his perseverance, anatomical skill and dexterity as an operator, became so conspicuous, that at the age of thirty-seven he obtained the appointment of second surgeon to the Hôtel Dieu of Paris. On the establishment of the École de Santé he gained the chair of operative surgery, but soon exchanged it for the chair of clinical surgery. In 1805 Napoleon nominated him imperial family surgeon, and, after the brilliant campaigns of 1806-7, conferred on him the legion of honour, with the title of baron of the empire and a salary of 25,000 francs. On the fall of Napoleon the merits of Boyer secured him the favour of the succeeding sovereigns of France, and he was consulting surgeon to Louis XVIII., Charles X., and Louis Philippe. In 1825 he succeeded J.F.L. Deschamps (1740-1824) as surgeon-in-chief to the Hôpital de la Charité, and was chosen a member of the Institute. He died in Paris on the 23rd of November 1833. Perhaps no French surgeon of his time thought or wrote with greater clearness and good sense than Boyer; and while his natural modesty made him distrustful of innovation, and somewhat tenacious of established modes of treatment, he was as judicious in his diagnosis and as cool and skilful in manipulating, as he was cautious in forming his judgment on individual cases. His two great works are:—*Traité complet de l'anatomie* (in 4 vols., 1797-1799), of which a fourth edition appeared in 1815, and *Traité des maladies chirurgicales et des opérations qui leur conviennent* (in 11 vols., 1814-1826), of which a new edition in 7 vols. was published in 1844-1853, with additions by his son, Philippe Boyer (1801-1858).

BOYER, JEAN PIERRE (1776-1850), president of the republic of Haiti, a mulatto, was born at Port-au-Prince on the 28th of February 1776. He received a good education in France, and, returning to St Domingo, joined the army in 1792. In 1794 he was already in command of a battalion, and fought with distinction under General Rigaud against the English. The negro insurrection under Toussaint l'Ouverture, which was directed against the mulattoes as well as the whites, ultimately forced him to take refuge in France. He was well received by Napoleon, and in 1802 obtained a commission in Leclerc's expedition. Being opposed to the reinstitution of slavery, he turned against the French and succeeded in producing an alliance between the negroes and mulattoes by which they were driven from the island. Dessalines, a negro, was proclaimed king, but his cruelty and despotism were such that Boyer combined with A.A.S. Pétion and General Christophe to overthrow him (1806). Christophe now seized the supreme power, but Pétion set up an independent republic in the southern part of the island,

with Boyer as commander-in-chief. Christophe's efforts to crush this state were defeated by Boyer's gallant defence of Port-au-Prince, and a series of brilliant victories, which, on Pétion's death in 1818, led to Boyer's election as president. Two years later the death of Christophe removed his only rival, and he gained almost undisputed possession of the whole island. During his presidency Boyer did much to set the finances and the administration in order, and to encourage the arts and sciences, and in 1825 obtained French recognition of the independence of Haiti, in return for a payment of 150,000 francs. The weight of this debt excited the greatest discontent in Haiti. Boyer was able to carry on his government for some years longer, but in March 1843 a violent insurrection overthrew his power and compelled him to take refuge in Jamaica. He resided there till 1848, when he removed to Paris, where he died in 1850.

See Wallez, *Précis historique des négociations entre la France et Saint-Domingue, avec une notice biographique sur le général Boyer* (Paris, 1826).

BOYLE, JOHN J. (1851-), American sculptor, was born in New York City. He studied in the Pennsylvania Academy of Fine Arts, Philadelphia, and in the École des Beaux Arts, Paris. He is particularly successful in the portrayal of Indians. Among his principal works are: "Stone Age," Fairmount Park, Philadelphia; "The Alarm," Lincoln Park, Chicago; and, a third study in primitive culture, the two groups, "The Savage Age" at the Pan-American Exposition of 1901. His work also includes the seated "Franklin," in Philadelphia; and "Bacon" and "Plato" in the Congressional library, Washington, D.C.

BOYLE, ROBERT (1627-1691), English natural philosopher, seventh son and fourteenth child of Richard Boyle, the great earl of Cork, was born at Lismore Castle, in the province of Munster, Ireland, on the 25th of January 1627. While still a child he learned to speak Latin and French, and he was only eight years old when he was sent to Eton, of which his father's friend, Sir Henry Wotton, was then provost. After spending over three years at the college, he went to travel abroad with a French tutor. Nearly two years were passed in Geneva; visiting Italy in 1641, he remained during the winter of that year in Florence, studying the "paradoxes of the great star-gazer" Galileo, who died within a league of the city early in 1642. Returning to England in 1644 he found that his father was dead and had left him the manor of Stalbridge in Dorsetshire, together with estates in Ireland. From that time he gave up his life to study and scientific research, and soon took a prominent place in the band of inquirers, known as the "Invisible College," who devoted themselves to the cultivation of the "new philosophy." They met frequently in London, often at Gresham College; some of the members also had meetings at Oxford, and in that city Boyle went to reside in 1654. Reading in 1657 of Otto von Guericke's air-pump, he set himself with the assistance of Robert Hooke to devise improvements in its construction, and with the result, the "machina Boyleana" or "Pneumatical Engine," finished in 1659, he began a series of experiments on the properties of air. An account of the work he did with this instrument was published in 1660 under the title *New Experiments Physico-Mechanical touching the spring of air and its effects*. Among the critics of the views put forward in this book was a Jesuit, Franciscus Linus (1595-1675), and it was while answering his objections that Boyle enunciated the law that the volume of a gas varies inversely as the pressure, which among English-speaking peoples is usually called after his name, though on the continent of Europe it is attributed to E. Mariotte, who did not publish it till 1676. In 1663 the "Invisible College" became the "Royal Society of London for improving natural knowledge," and the charter of incorporation granted by Charles II. named Boyle a member of the council. In 1680 he was elected president of the society, but declined the honour from a scruple about oaths. In 1668 he left Oxford for London where he resided at the house of his sister, Lady Ranelagh, in Pall Mall. About 1689 his health, never very strong, began to fail seriously and he gradually withdrew from his public engagements, ceasing his communications to the Royal Society, and advertising his desire to be excused from receiving guests, "unless upon occasions very extraordinary," on Tuesday and Friday forenoon, and Wednesday and Saturday afternoon. In the leisure thus gained he wished to "recruit his spirits, range his papers," and prepare some important chemical investigations which he proposed to leave "as a kind of Hermetic legacy to the studious disciples of that art," but of which he did not make known the nature. His health became still worse in 1691, and his death occurred on the 30th of December of that year, just a week after that of the sister with whom he had lived for more than twenty years. He was buried in the churchyard of St Martin's in the Fields, his funeral sermon being preached by his friend Bishop Burnet.

Boyle's great merit as a scientific investigator is that he carried out the principles which Bacon preached in the *Novum Organum*. Yet he would not avow himself a follower of Bacon or indeed of any other teacher: on several occasions he mentions that in order to keep his judgment as unprepossessed as might be with any of the modern theories of philosophy, till he was "provided of experiments" to help him judge of them, he refrained from any study of the Atomical and the Cartesian systems, and even of

the *Novum Organum* itself, though he admits to “transiently consulting” them about a few particulars. Nothing was more alien to his mental temperament than the spinning of hypotheses. He regarded the acquisition of knowledge as an end in itself, and in consequence he gained a wider outlook on the aims of scientific inquiry than had been enjoyed by his predecessors for many centuries. This, however, did not mean that he paid no attention to the practical application of science nor that he despised knowledge which tended to use. He himself was an alchemist; and believing the transmutation of metals to be a possibility, he carried out experiments in the hope of effecting it; and he was instrumental in obtaining the repeal, in 1689, of the statute of Henry IV. against multiplying gold and silver. With all the important work he accomplished in physics—the enunciation of Boyle’s law, the discovery of the part taken by air in the propagation of sound, and investigations on the expansive force of freezing water, on specific gravities and refractive powers, on crystals, on electricity, on colour, on hydrostatics, &c.—chemistry was his peculiar and favourite study. His first book on the subject was *The Sceptical Chemist*, published in 1661, in which he criticized the “experiments whereby vulgar Spagyrists are wont to endeavour to evince their Salt, Sulphur and Mercury to be the true Principles of Things.” For him chemistry was the science of the composition of substances, not merely an adjunct to the arts of the alchemist or the physician. He advanced towards the modern view of elements as the undecomposable constituents of material bodies; and understanding the distinction between mixtures and compounds, he made considerable progress in the technique of detecting their ingredients, a process which he designated by the term “analysis.” He further supposed that the elements were ultimately composed of particles of various sorts and sizes, into which, however, they were not to be resolved in any known way. Applied chemistry had to thank him for improved methods and for an extended knowledge of individual substances. He also studied the chemistry of combustion and of respiration, and made experiments in physiology, where, however, he was hampered by the “tenderness of his nature” which kept him from anatomical dissections, especially of living animals, though he knew them to be “most instructing.”

Besides being a busy natural philosopher, Boyle devoted much time to theology, showing a very decided leaning to the practical side and an indifference to controversial polemics. At the Restoration he was favourably received at court, and in 1665 would have received the provostship of Eton, if he would have taken orders; but this he refused to do, on the ground that his writings on religious subjects would have greater weight coming from a layman than a paid minister of the Church. He spent large sums in promoting the spread of Christianity, contributing liberally to missionary societies, and to the expenses of translating the Bible or portions of it into various languages. By his will he founded the Boyle lectures, for proving the Christian religion against “notorious infidels, viz. atheists, theists, pagans, Jews and Mahommedans,” with the proviso that controversies between Christians were not to be mentioned.

In person Boyle was tall, slender and of a pale countenance. His constitution was far from robust, and throughout his life he suffered from feeble health and low spirits. While his scientific work procured him an extraordinary reputation among his contemporaries, his private character and virtues, the charm of his social manners, his wit and powers of conversation, endeared him to a large circle of personal friends. He was never married. His writings are exceedingly voluminous, and his style is clear and straightforward, though undeniably prolix.

The following are the more important of his works in addition to the two already mentioned:—*Considerations touching the Usefulness of Experimental Natural Philosophy* (1663), followed by a second part in 1671; *Experiments and Considerations upon Colours, with Observations on a Diamond that Shines in the Dark* (1663); *New Experiments and Observations upon Cold* (1665); *Hydrostatical Paradoxes* (1666); *Origin of Forms and Qualities according to the Corpuscular Philosophy* (1666); a continuation of his work on the spring of air (1669); tracts about the *Cosmical Qualities of Things*, the *Temperature of the Subterraneal and Submarine Regions*, the *Bottom of the Sea*, &c. with an *Introduction to the History of Particular Qualities* (1670); *Origin and Virtues of Gems* (1672); *Essays of the strange Subtilty, great Efficacy, determinate Nature of Effluviums* (1673); two volumes of tracts on the *Saltness of the Sea*, the *Hidden Qualities of the Air, Cold, Celestial Magnets, Animadversions on Hobbes’s* Problemata de Vacuo (1674); *Experiments and Notes about the Mechanical Origin or Production of Particular Qualities*, including some notes on electricity and magnetism (1676); *Observations upon an artificial Substance that Shines without any Preceding Illustration* (1678); the *Aerial Noctiluca* (1680); *New Experiments and Observations upon the Icy Noctiluca* (1682); a further continuation of his work on the air; *Memoirs for the Natural History of the Human Blood* (1684); *Short Memoirs for the Natural Experimental History of Mineral Waters* (1685); *Medicina Hydrostatica* (1690); and *Experimenta et Observiationes Physicae* (1691). Among his religious and philosophical writings were:—*Seraphic Love*, written in 1648, but not published till 1660; an *Essay upon the Style of the Holy Scriptures* (1663); *Occasional Reflections upon Several Subjects* (1665), which was ridiculed by Swift in *A Pious Meditation upon a Broomstick*, and by Butler in *An Occasional Reflection on Dr Charlton’s Feeling a Dog’s Pulse at Cresham College*; *Excellence of Theology compared with Natural Philosophy* (1664); *Some Considerations about the Reconcileableness of Reason and Religion*, with a *Discourse about the Possibility of the Resurrection* (1675); *Discourse of Things above Reason* (1681); *High Veneration Man owes to God* (1685); *A Free Inquiry into the vulgarly received Notion of Nature* (1686); and the *Christian Virtuoso* (1690). Several other works appeared after his death, among them *The General History of the Air designed and begun* (1692); a “collection of choice remedies,” *Medicinal Experiments* (1692-1698); and *A Free Discourse against Customary Swearing* (1695). An incomplete and unauthorized edition of Boyle’s works was published at Geneva in 1677, but the first complete edition was that of Thomas Birch, with a life, published in 1744, in five folio volumes, a second edition appearing in 1772 in six volumes, 4to. Boyle bequeathed his natural history collections to the Royal Society, which also possesses a portrait of him by the German painter, Friedrich Kerseboom (1632-

1690).

BOYLE, a market town of Co. Roscommon, Ireland, in the north parliamentary division, on the Sligo line of the Midland Great Western railway, 106¼ m. N.W. by W. from Dublin and 28 m. S. by E. from Sligo. Pop. (1901) 2477. It is beautifully situated on both banks of the river Boyle, an affluent of the Shannon, between Loughs Gara and Key. Three bridges connect the two parts of the town. There is considerable trade in agricultural produce. To the north of the town stand the extensive ruins of a Cistercian abbey founded in 1161, including remains of a cruciform church, with a fine west front, and Norman and Transitional arcades with carving of very beautiful detail. The offices of the monastery are well preserved, and an interesting feature is seen in the names carved on the door of the lodge, attributed in Cromwell's soldier, who occupied the buildings. Neighbouring antiquities are Asselyn church near Lough Key, and a large cromlech by the road towards Lough Gara. Boyle was incorporated by James I., and returned two members to the Irish parliament.

BOYNE, a river of Ireland, which, rising in the Bog of Allen, near Carbery in Co. Kildare, and flowing in a north-easterly direction, passes Trim, Navan and Drogheda, and enters the Irish Sea, 4 m. below the town last named. It is navigable for barges to Navan, 19 m. from its mouth. Much of the scenery on its banks is beautiful, though never grand. About 2 m. west of Drogheda, an obelisk, 150 ft. in height, marks the spot where the forces of William III. gained a celebrated victory over those of James II., on the 1st of July[1] 1690, known as the battle of the Boyne.

1 This was the "old style" date, which in the new style (see CALENDAR) would be July 11th (not 12th, as Lecky says, *Hist, of Ireland*, iii. p. 427). The 12th of July is annually celebrated by the Orangemen in the north of Ireland as the anniversary, but this is a confusion between the supposed new style for July 1st and the old style date of the battle of Aughrim, July 12th; the intention being to commemorate both.

BOYS' BRIGADE, an organization founded in Glasgow by Mr (afterwards Sir) W.A. Smith in 1883 to develop Christian manliness by the use of a semi-military discipline and order, gymnastics, summer camps and religious services and classes. There are about 2200 companies connected with different churches throughout the United Kingdom, the British empire and the United States, with 10,000 officers and 100,000 boys. A similar organization, confined to the Anglican communion, is the Church Lads' Brigade. Boys' and girls' life brigades are a more recent movement; they teach young people how to save life from fire and from water, and hold classes in hygiene, ambulance and elementary nursing.

BOZDAR, a Baluch tribe of Rind (Arab) extraction, usually associated with the mountain districts of the frontier near Dera Ghazi Khan. They are also to be found in Zhob, Thal-Chotiali and Las Bela, whilst the majority of the population are said to live in the Punjab. They are usually graziers, and the name Bozdar is probably derived from Buz, the Persian name for goat. Within the limits of their mountain home on the outer spurs of the Suliman hills they have always been a turbulent race, mustering about 2700 fighting men, and they were formerly constantly at feud with the neighbouring Ustarana and Sherani tribes. In 1857 their raids into the Punjab drew upon them an expedition under Brigadier-General Sir N.B. Chamberlain. The Sangarh pass was captured and the Bozdars submitted. Since Baluchistan has been taken over they have given but little trouble.

BOZRAH. (1) A capital of Edom (Gen. xxxvi. 33; Amos i. 12; Is. xxxiv. 6, lxiii. 1), doubtfully identified with *el-Buseireh*, S.E. of the Dead Sea, in the broken country N. of Petra; the ruins here are comparatively unimportant. It is the centre of a pastoral district, and its inhabitants, who number

between 100 and 200, are all shepherds. (2) A city in the *Mishor* or plain country of Moab, denounced by Jeremiah (xlviii. 24). It has been identified (also questionably) with a very extensive collection of ruins of various ages, now called Bosrā (the Roman *Bostra*), situated in the Hauran, about 80 m. south of Damascus. The area within the walls is about 1¼ m. in length, and nearly 1 m. in breadth, while extensive suburbs lie to the east, north and west. The principal buildings which can still be distinguished are a temple, an aqueduct, a large theatre (enclosed by a castle of much more recent workmanship), several baths, a triumphal and other arches, three mosques, and what are known as the church and convent of the monk Boheira. In A.D. 106 the city was beautified and perhaps restored from ruin by Trajan, who made it the capital of the new province of Arabia. In the reign of Alexander Severus it was made a colony, and in 244, a native of the place, Philippus, ascended the imperial throne. By the time of Constantine the Great it seems to have been Christianized, and not long after it was the seat of an extensive bishopric. It was one of the first cities of Syria to be subjected to the Mahommedans, and it successfully resisted all the attempts of the Crusaders to wrest it from their hands. As late as the 14th century it was a populous city, after which it gradually fell into decay. It is now inhabited by thirty or forty families only. Another suggested identification is with Kusūr el-Besheir, equidistant (2 m.) from Dibon and Aroer. This is perhaps the same as the Bezer mentioned in Deuteronomy and Joshua as a levitical city and a city of refuge.

In 1 Macc. v. 26 there is mention of Bosor and of Bosora. The latter is probably to be identified with Bosra, the former perhaps with the present Busr el-Hariri in the south-east corner of the Lejā.

(R. A. S. M.)

BRABANT, a duchy which existed from 1190 to 1430, when it was united with the duchy of Burgundy, the name being derived from Brabo, a semi-mythical Frankish chief.

The history of Brabant is connected with that of the duchy of Lower Lorraine (*q.v.*), which became in the course of the 11th century split up into a number of small feudal states. The counts of Hainaut, Namur, Luxemburg and Limburg asserted their independence, and the territory of Liége passed to the bishops of that city. The remnant of the duchy, united since 1100 with the margraviate of Antwerp, was conferred in 1106 by the emperor Henry V., with the title of duke of Lower Lorraine, upon Godfrey (Godefroid) I., “the Bearded,” count of Louvain and Brussels. His title was disputed by Count Henry of Limburg, and for three generations the representatives of the rival houses contested the possession of the ducal dignity in Lower Lorraine. The issue was decided in favour of the house of Louvain by Duke Godfrey III. in 1159. His son, Henry I., “the Warrior” (1183-1235), abandoned the title of duke of Lower Lorraine and assumed in 1190 that of duke of Brabant. His successors were Henry II., “the Magnanimous” (1235-1248), Henry III., “le Debonnair” (1248-1261), and John I., “the Victorious” (1261-1294). These were all able rulers. Their usual place of residence was Louvain. John I., in 1283 bought the duchy of Limburg from Adolf of Berg, and secured his acquisition by defeating and slaying his competitor, Henry of Luxemburg, at the battle of Woeringen (June 5, 1288). His own son, John II., “the Pacific” (1294-1312), bestowed liberties upon his subjects by the charter of Cortenberg. This charter laid the foundation of Brabantine freedom. By it the imposition of grants (*beden*) and taxes was strictly limited and regulated, and its execution was entrusted to a council appointed by the duke for life (four nobles, ten burghers) whose duty it was to consider all complaints and to see that the conditions laid down by the charter concerning the administration of justice and finance were not infringed. He was succeeded by his son, John III., “the Triumphant” (1312-1355), who succeeded in maintaining his position in spite of formidable risings in Louvain and Brussels, and a league formed against him by his princely neighbours, but he had a hard struggle to face, and many ups and downs of fortune. He it was to whom Brabant owed the great charter of its liberties, called *La joyeuse entrée*, because it was granted on the occasion of the marriage of his daughter Johanna (Jeanne) with Wenzel (Wenceslaus) of Luxemburg, and was proclaimed on their state entry into Brussels (1356).

Henry, the only legitimate son of John III., having died in 1349, the ducal dignity passed to his daughter and heiress, the above-named Johanna (d. 1406). She had married in first wedlock William IV., count of Holland (d. 1345). Wenzel of Luxemburg, her second husband, assumed in right of his wife, and by the sanction of the charter *La joyeuse entrée*, the style of duke of Brabant. Johanna’s title was, however, disputed by Louis II., count of Flanders (d. 1384), who had married her sister Margaret. The question had been compromised by the cession to Margaret in 1347 of the margraviate of Antwerp by John III., but a war broke out in 1356 between Wenzel supported by the gilds, and Louis, who upheld the burgher-patrician party in the Brabant cities. The democratic leaders were Everhard Tserclaes at Brussels and Peter Coutercel at Louvain. In the course of a stormy reign Wenzel was taken prisoner in 1371 by the duke of Gelderland, and had to be ransomed by his subjects. After his death (1383) his widow continued to rule over the two duchies for eighteen years, but was obliged to rely on the support of the house of Burgundy in her contests with the turbulent city gilds and with her neighbours, the dukes of Jülich and Gelderland. In 1390 she revoked the deed which secured the succession to Brabant to the house of Luxemburg, and appointed her niece, Margaret of Flanders (d. 1405), daughter of Louis II. and Margaret of Brabant (see FLANDERS), and her husband, Philip the Bold of Burgundy, her heirs. Margaret of Flanders had married (1) Philip I. de Rouvre of Burgundy (d. 1361) and (2) Philip II., the Bold, (d. 1404), son of John II., king of France (see BURGUNDY). Of her three sons by her second marriage John succeeded to Burgundy, and Anthony to Brabant on the death of Johanna in 1406. Anthony was

killed at the battle of Agincourt in 1415 and was succeeded by his eldest son by Jeanne of Luxemburg St Pol, John IV. (d. 1427). He is chiefly memorable for the excitement caused by his divorce from his wife Jacoba (*q.v.*), countess of Holland. John IV. left no issue, and the succession passed to his brother Philip I., who also died without issue in 1430.

On the extinction of the line of Anthony the duchy of Brabant became the inheritance of the elder branch of the house of Burgundy, in the person of Philip III., "the Good," of Burgundy, II. of Brabant, son of John. His grand-daughter Mary (d. 1482), daughter and heiress of Charles I., "the Bold," (d. 1477) married the archduke Maximilian of Austria (afterwards emperor) and so brought Brabant with the other Burgundian possessions to the house of Habsburg. The chief city of Brabant, Brussels, became under the Habsburg régime the residence of the court and the capital of the Netherlands. In the person of the emperor Charles V. the destinies of Brabant and the other Netherland states were linked with those of the Spanish monarchy. The attempt of Philip II. of Spain to impose despotic rule upon the Netherlands led to the outbreak of the Netherland revolt, 1568 (see NETHERLANDS).

In the course of the eighty years' war of independence the province of Brabant became separated into two portions. In the southern and larger part Spanish rule was maintained, and Brussels continued to be the seat of government. The northern (smaller) part was conquered by the Dutch under Maurice and Frederick Henry of Orange. The latter captured 's Hertogenbosch (1629), Maastricht (1632) and Breda (1637). At the peace of Münster this portion, which now forms the Dutch province of North Brabant, was ceded by Philip IV. to the United Provinces and was known as Generality Land, and placed under the direct government of the states-general. The southern portion, now divided into the provinces of Antwerp and South Brabant, remained under the rule of the Spanish Habsburgs until the death of Charles II., the last of his race in 1700. After the War of the Spanish Succession the southern Netherlands passed by the treaty of Utrecht (1713) to the Austrian branch of the Habsburgs. During the whole period of Austrian rule the province of Brabant succeeded in maintaining, to a very large extent unimpaired, the immunities and privileges to which it was entitled under the provisions of its ancient charter of liberty, the Joyous Entry. An ill-judged attempt by the emperor Joseph II., in his zeal for reform, to infringe these inherited rights stirred up the people under the leadership of Henry van der Noot to armed resistance in the Brabançon revolt of 1789-1790.

Since the French conquest of 1794 the history of Brabant is merged in that of Belgium (*q.v.*). The revolt against Dutch rule in 1830 broke out at Brussels and was in its initial stages largely a Brabançon movement. The important part played by Brabant at this crisis of the history of the southern Netherlands was marked in 1831 by the adoption of the ancient Brabançon colours to form the national flag, and of the lion of Brabant as the armorial bearings of Belgium. The title of duke of Brabant has been revived as the style of the eldest son of the king of the Belgians.

(G. E.)

BRABANT, the central and metropolitan province of Belgium, is formed out of part of the ancient duchy. From 1815 to 1830, that is to say, during the existence of the kingdom of the Netherlands, Belgian Brabant was distinguished from Dutch by the employment of the geographical terms South and North. The surface of Brabant is undulating, and the highest points, some 400 ft. in altitude, are to be found at and near Mont St Jean. The province is well cultivated, and the people are well known for their industry. There are valuable stone quarries, and many manufactures flourish in the smaller towns, such as Ottignies, as well as in the larger cities of Brussels and Louvain. Brabant contains 820,740 acres or 1268 sq. m. Its principal towns are Brussels, Louvain, Nivelles, Hal, Ottignies, and its three administrative divisions are named after the first three of those towns. They are subdivided into 50 cantons and 344 communes. In 1904 the population of the province was 1,366,389 or a proportion of 1077 per sq. m.

BRABANT, NORTH, the largest province in Holland, bounded S. by Belgium, W. and N.W. by the Scheldt, the Eendracht, the Volkerak and the Hollandsch Diep, which separate it from Zealand and South Holland, N. and N. E. by the Merwede and Maas, which separate it from South Holland and Gelderland, and E. by the province of Limburg. It has an area of 231 sq. m. and a pop. (1900) of 553,842. The surface of the province is a gentle slope from the south-east (where it ranges between 80 and 160 ft. in height) towards the north and north-west, and the soil is composed of diluvial sand, here and there mixed with gravel, but giving place to sea-clay along the western boundary and river-clay along the banks of the Maas and smaller rivers. The watershed is formed by the north-eastern edge of the Belgian plateau of Campine, and follows a curved line drawn through Bergen-op-Zoom, Turnhout and Maastricht. The landscape consists for the most part of waste stretches of heath, occasionally slightly overlaid with high fen. Between the valleys of the Aa and the Maas lies the long stretch of heavy high-fen called the Peel ("marshy land"). Deurne, a few miles east of Helmond, the site of a prehistoric burial-ground, was an early fen colony. The work of reclamation was removed farther eastwards to

Helenaveen in the second half of the 19th century. Agriculture (potatoes, buckwheat, rye) is the main industry, generally combined with cattle-raising. On the clay lands wheat and barley are the principal products, and in the western corner of the province beetroot is largely cultivated for the beet sugar industry, factories being found at Bergen-op-Zoom, Steenbergen and Oudenbosch. There is a special cultivation of hops in the district north-west of ’s Hertogenbosch. The large majority of the population is Roman Catholic. The earliest development of towns and villages took place along the river Maas and its tributaries, and the fortified Roman camps which were the origin of many such afterwards developed in the hands of feudal lords. The chief town of the province, ’s Hertogenbosch, may be cited as an interesting historical example. Geertruidenberg, Heusden, Ravestein and Grave are all similarly situated. Breda is the next town in importance to the capital. Bergen-op-Zoom had originally a more maritime importance. Rozendaal, Eindhoven and Bokstel (or Boxtel) are important railway junctions. Bokstel was formerly the seat of an independent barony which came into the possession of Philip the Good in 1439. The castle was restored in modern times. The precarious position of the province on the borders of the country doubtless militated against an earlier industrial development, but since the separation from Belgium and the construction of roads, railways and canals there has been a general improvement, Tilburg, Eindhoven and Helmond all having risen into prominence in modern times as industrial centres. Leather-tanning and shoe-making are especially associated with the district called Langstraat, which is situated between Geertruidenberg and ’s Hertogenbosch, and consists of a series of industrial villages along the course of the Old Maas.

BRACCIANO, a town in the province of Rome, Italy, 25 m. N.W. of Rome by rail, situated on the S.W. shore of the Lake of Bracciano, 915 ft. above sea-level. Pop. (1901) 3987. It is chiefly remarkable for its fine castle (built by the Orsini in 1460, and since 1696 the property of the Odescalchi) which has preserved its medieval character. The beautiful lake is the ancient *Lacus Sabatinus*, supposed to derive its name from an Etruscan city of the name of Sabate, which is wrongly thought to be mentioned in the Itineraries; the reference is really to the lake itself, which bore this name and gave it to one of the Roman tribes, the *tribus Sabatina*, founded in 387 B.C. (O. Cuntz in *Jahreshefte des Österr. Arch. Instituts*, ii., 1899, 85). It is 22 sq. m. in area, 538 ft. above sea-level, and 530 ft. deep; it is almost circular, but is held to be, not an extinct crater, but the result of a volcanic subsidence. The tufa deposits which radiate from it extend as far as Rome; various small craters surround it, while the existence of warm springs in the district (especially those of Vicarello, probably the ancient *Aquae Apollinares*) may also be noted. Many remains of ancient villas may be seen round the lake: above its west bank is the station of Forum Clodii, and on its north shore the village of Trevignano, which retains traces of the fortifications of an ancient town of unknown name. About half-a-mile east of it was a post station called Ad Novas. The site of Anguillara, on the south shore, was occupied by a Roman villa. The water of the lake partly supplies the Acqua Paola, a restoration by Paul V. of the Aqua Traiana.

(T. As.)

BRACCIOLINI, FRANCESCO (1566-1645), Italian poet, was born at Pistoia, of a noble family, in 1566. On his removing to Florence he was admitted into the academy there, and devoted himself to literature. At Rome he entered the service of Cardinal Maffeo Barberini, with whom he afterwards went to France. After the death of Clement VIII. he returned to his own country; and when his patron Barberini was elected pope, under the name of Urban VIII., Bracciolini repaired to Rome, and was made secretary to the pope’s brother, Cardinal Antonio. He had also the honour conferred on him of taking a surname from the arms of the Barberini family, which were bees; whence he was afterwards known by the name of *Bracciolini dell’ Api*. During Urban’s pontificate the poet lived at Rome in considerable reputation, though at the same time he was censured for his sordid avarice. On the death of the pontiff he returned to Pistoia, where he died in 1645. There is scarcely any species of poetry, epic, dramatic, pastoral, lyric or burlesque, which Bracciolini did not attempt; but he is principally noted for his mock-heroic poem *Lo Scherno degli Dei*, published in 1618, similar but confessedly inferior to the contemporary work of Tassoni, *Secchia Rapita*. Of his serious heroic poems the most celebrated is *La Croce Racquistata*.

For the Italian humanist Poggio Bracciolini see Poggio.

BRACE, CHARLES LORING (1826-1890), American philanthropist, was born on the 19th of June 1826 in Litchfield, Connecticut. He graduated at Yale in 1846, studied theology there in 1847-1848, and graduated from Union Theological Seminary in 1849. From this time he practically devoted his life to

social work among the poor of New York, and to Christian propaganda among the criminal classes; and he became well known as a social reformer, at home and abroad. He started in 1852 to hold “boys’ meetings,” and in 1853 helped to found the Children’s Aid Society, establishing workshops, industrial schools and lodging-houses for newsboys. In 1872 he was a delegate to the international prison congress which met in London. He died at Campfer, in Tirol, on the 11th of August 1890. He published from time to time several volumes embodying his views on practical Christianity and its application to the improvement of social conditions.

See *The Life and Letters of Charles Loring Brace* (New York, 1894), edited by his daughter, Emma Brace.

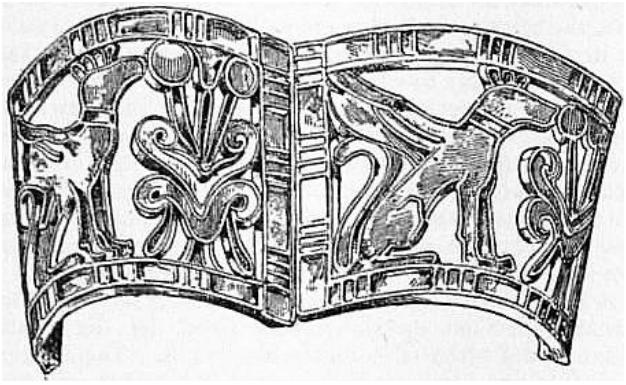
BRACE, JULIA (1806-1884), American blind deaf-mute, was born at Newington, Connecticut, on the 13th of June 1806. In her fifth year she became blind and deaf, and lost the power of speech. At the age of eighteen she entered the asylum for the deaf and dumb at Hartford. The study of blind deaf-mutes and their scientific training was then in its infancy; but she learnt to sew well, was neat in her dress, and had a good memory. Dr S.G. Howe’s experiments with her were interesting as leading to his success with Laura Bridgman. She died at Bloomington, Conn., on the 12th of August 1884.

BRACE (through the Fr. from the plural of the Lat. *bracchium*, the arm), a measure of length, being the distance between the extended arms. From the original meaning of “the two arms” comes that of something which secures, connects, tightens or strengthens, found in numerous uses of the word, as a carpenter’s tool with a crank handle and socket to hold a bit for boring; a beam of wood or metal used to strengthen any building or machine; the straps passing over the shoulders to support the trousers; the leathern thong which slides up and down the cord of a drum, and regulates the tension and the tone; a writing and printing sign ({) for uniting two or more lines of letterpress or music; a nautical term for a rope fastened to the yard for trimming the sails (cf. the corresponding French term *bras de vergue*). As meaning “a couple” or “pair” the term was first applied to dogs, probably from the leash by which they were coupled in coursing. In architecture “brace mould” is the term for two ressaunts or ogees united together like a brace in printing, sometimes with a small bead between them.

BRACEGIRDLE, ANNE (*c.* 1674-1748), English actress, is said to have been placed under the care of Thomas Betterton and his wife, and to have first appeared on the stage as the page in *The Orphan* at its first performance at Dorset Garden in 1680. She was Lucia in Shadwell’s *Squire of Alsatia* at the Theatre Royal in 1688, and played similar parts until, in 1693, as Araminta in *The Old Bachelor*, she made her first appearance in a comedy by Congreve, with whose works and life her name is most closely connected. In 1695 she went with Betterton and the other seceders to Lincoln’s Inn Fields, where, on its opening with Congreve’s *Love for Love*, she played Angelica. This part, and those of Belinda in Vanbrugh’s *Provoked Wife*, and Almira in Congreve’s *Mourning Bride*, were among her best impersonations, but she also played the heroines of some of Nicholas Rowe’s tragedies, and acted in the contemporary versions of Shakespeare’s plays. In 1705 she followed Betterton to the Haymarket, where she found a serious competitor in Mrs Oldfield, then first coming into public favour. The story runs that it was left for the audience to determine which was the better comedy actress, the test being the part of Mrs Brittle in Betterton’s *Amorous Widow*, which was played alternately by the two rivals on successive nights. When the popular vote was given in favour of Mrs Oldfield, Mrs Bracegirdle quitted the stage, making only one reappearance at Betterton’s benefit in 1709. Her private life was the subject of much discussion. Colley Cibber remarks that she had the merit of “not being unguarded in her private character,” while Macaulay does not hesitate to call her “a cold, vain and interested coquette, who perfectly understood how much the influence of her charms was increased by the fame of a severity which cost her nothing.” She was certainly the object of the adoration of many men, and she was the innocent cause of the killing of the actor William Mountfort (*q.v.*), whom Captain Hill and Lord Mohun regarded as a rival for her affections. During her lifetime she was suspected of being secretly married to Congreve, whose mistress she is also said to have been. He was at least always her intimate friend, and left her a legacy. Rightly or wrongly, her reputation for virtue was remarkably high, and Lord Halifax headed a subscription list of 800 guineas, presented to her as a tribute to her virtue. Her charity to the poor in Clare Market and around Drury Lane was conspicuous, “insomuch that she would not pass that neighbourhood without the thankful acclamations of people of all degrees.” She died in 1748, and was buried in the cloisters of Westminster Abbey.

See Genest, *History of the Stage*; Colley Gibber, *Apology* (edited by Bellchambers); Egerton, *Life of Anne Oldfield*; Downes, *Roscius Anglicanus.*

BRACELET, or ARMLET, a personal ornament for the arm or wrist, made of different materials, according to the fashion of the age and the rank of the wearer. The word is the French *bracelet*, a diminutive of *bracel*, from *brac(c)hiale*, formed from the Latin *bracchium*, the arm, on which it was usually worn. By the Romans it was called *armilla, brachiale, occabus*; and in the middle ages *bauga, armispatha*.



From *La Grande Encyclopédie.*

FIG. 1.—Egyptian Bracelet, Louvre.

In the Bible there are three different words which the authorized version renders by "bracelet." These are—(1) הרעצא *'eṣ'adah*, which occurs in Num. xxxi. 50, 2 Sam. i. 10, and which being used with reference to men only, may be taken to be the *armlet*; (2) דימצ *ṣamīd*, which is found in Gen. xxiv. 22, Num. xxxi. 50, Ezek. xvi. 11;—where these two words occur together (as in Num. xxxi. 50) the first is rendered by "chain," and the second by "bracelet"; (3) תורש *sheroth*, which occurs only in Isa. iii. 19. The first probably meant armlets worn by men; the second, bracelets worn by women and sometimes by men; and the third a peculiar bracelet of chain-work worn only by women. In 2 Sam. i. 10 the first word denotes the royal ornament which the Amalekite took from the arm of the dead Saul, and brought with the other regalia to David. There is little question that this was such a distinguishing band of jewelled metal as we still find worn as a mark of royalty from the Tigris to the Ganges. The Egyptian kings are represented with armlets, which were also worn by the Egyptian women. These, however, are not jewelled, but of plain or enamelled metal, as was in all likelihood the case among the Hebrews.

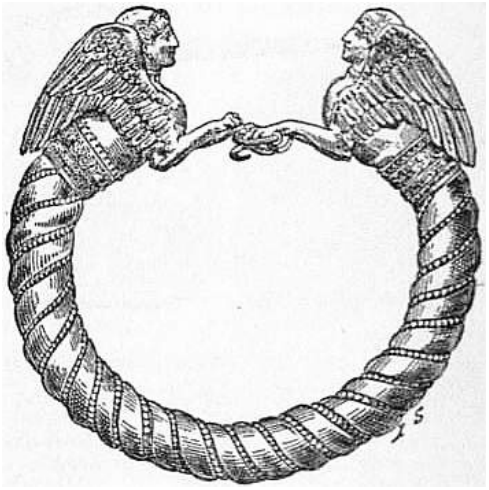
In modern times the most celebrated armlets are those which form part of the regalia of the Persian kings and formerly belonged to the Mogul emperors of India, being part of the spoil carried to Persia from Delhi by Nadir Shah in 1739. These ornaments are of dazzling splendour, and the jewels in them are of such large size and immense value that the pair have been reckoned to be worth a million sterling. The principal stone of the right armlet is famous in the East under the name of the *Darya-i-nur*, "sea (or river) of light." It weighs 186 carats, and is considered the diamond of finest lustre in the world. The principal jewel of the left armlet, although of somewhat inferior size (146 carats) and value, is renowned as the *Tāj-e-mah*, "crown of the moon." The imperial armlets, generally set with jewels, may also be observed in most of the portraits of the Indian emperors.

Bracelets have at all times been much in use among barbaric nations, and the women frequently wear several on the same arm. The finer kinds are of mother-of-pearl, fine gold or silver; others of less value are made of plated steel, horn, brass, copper, beads, &c. Chinese bracelets are sometimes cut out of single pieces of jade.

This species of personal ornament has been exceedingly common in Europe from prehistoric times onward. The bracelets of the Bronze Age were of either gold or bronze, silver being then unknown. In shape they were oval and penannular with expanding or trumpet-shaped ends, having an opening between them of about half an inch to enable them to be easily slipped over the wrist. Those of gold were generally plain, hammered rods, bent to the requisite shape, but those of bronze were often chased with decorative designs. Some forms of spiral armlets of bronze, peculiar to Germany and Scandinavia, covered the whole fore-arm, and were doubtless intended as much for defence against a sword-stroke as for ornament. Among the nations of classical antiquity, bracelets

were worn by both sexes of the Etruscans; by women only among the Greeks, except in orientalized communities. Among the Romans they were worn by women only as a rule, but they are also recorded to have been used during the empire by *nouveaux riches*, and by some of the emperors. It should also be mentioned that bracelets were conferred as a military decoration in the field.

The bracelets of the Greeks are of two leading types, both of which were also familiar to the Assyrians. The one class were in the form of coiled spirals, usually in the form of snakes, a term which Pollux gives as a synonym for bracelet. The other class were stiff penannular hoops, capable of being slightly opened. In such examples the terminals are finely finished as rams' heads, lions' heads, or (as in the accompanying figure from a bracelet found at Kuloba) as enamelled sphinxes. In late Etruscan art the bracelet may be formed of consecutive panels, as often in modern jewelry.



From *La Grande Encyclopédie*.

FIG. 2.—Greek Bracelet, Hermitage.

From La Grande Encydopédie.

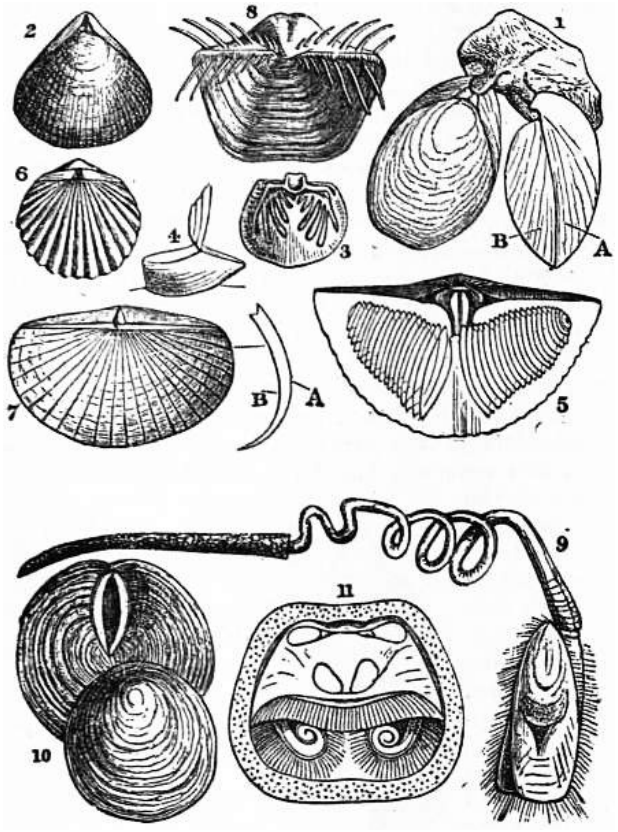
FIG. 3.—Etruscan Bracelet, Louvre.

The spiral forms were common in the Iron Age of northern Europe, while silver bracelets of great elegance, formed of plaited and intertwisted strands of silver wire, and plain penannular hoops, round or lozenge-shaped in section and tapering to the extremities, became common towards the close of the pagan period. The late Celtic period in Britain was characterized by serpent-shaped bracelets and massive armlets, with projecting ornaments of solid bronze and perforations filled with enamel. In the middle ages bracelets were much less commonly used in Europe, but the custom has continued, to prevail among Eastern nations to the present time, and many of the types that were common in Europe in prehistoric times are still worn in central Asia.

A treatise, *De Armillis Veterum*, by Thomas Bartholinus, was published at Amsterdam in 1676.

BRACHIOPODA, an important and well-defined but extremely isolated class of invertebrates. The group may be defined as follows: Sessile solitary *Coelomata* with bivalved shells usually of unequal size and arranged dorso-ventrally. The head is produced into ciliated arms bearing tentacles. They reproduce sexually, and with doubtful exceptions are of separate sexes.

The name Brachiopod (βραχίων, an arm, and πούς, ποδός, a foot) was proposed for the class by F. Cuvier in 1805, and by A.M.C. Dumeril in 1809, and has since been very extensively adopted. The division of the group into *Ecardines* (*Inarticulata*), with no hinge to the shell and with an alimentary canal open at both ends, and *Testicardines* (*Articulata*), with a hinge between the dorsal and ventral valves and with no anus, was proposed by Owen and has been adopted by nearly all authors. In a later scheme based on our increased knowledge of fossil forms, the Brachiopoda are divided into four primary groups (orders). This is given at the end of the article, but it must not be forgotten that the existing forms with an anus (Ecardines) differ markedly from the aproctous members of the group (Testicardines).



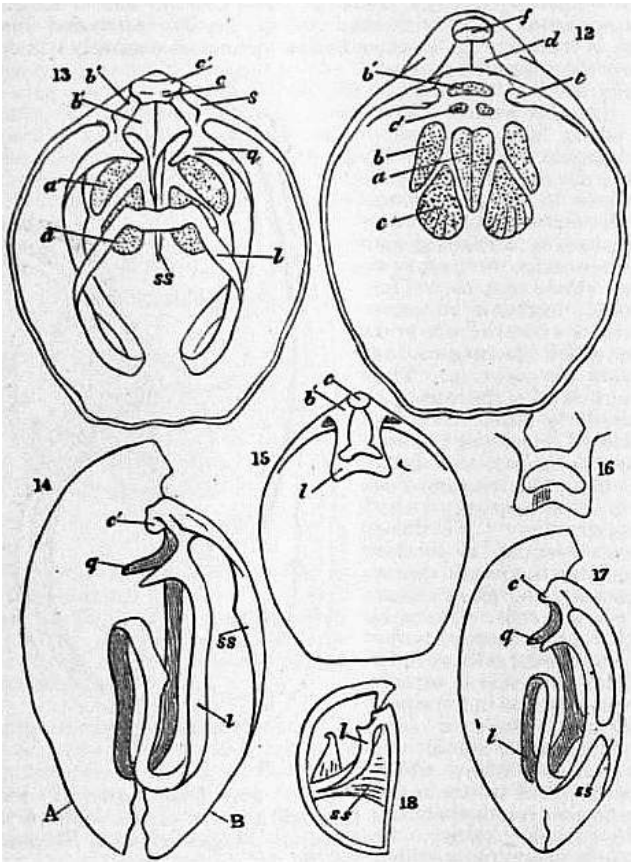
FIGS. 1-11.—Various forms of Brachiopoda.

1. *Magellania* [*Waldheimia*] *cranium*. A, ventral, B, dorsal valve.
2. *Rhynchonella (Hemithyris) psittacea*.
3. and 4. *Thecidea*.
5. *Spirifer*. Dorsal valve, showing calcareous spiral coils.
6. *Orthis calligramma*.
7. *Leptaena transversalis*. A, ventral, B, dorsal valve.
8. *Productus horridus*.
9. *Lingula pyramidata* (after Morse).
10. *Discinisca lamellosa*.
11. *Crania anomala* Interior of dorsal valve, showing muscular impressions and labial appendages.

The soft body of the Brachiopod is in all cases protected by a shell composed of two distinct valves; these valves are always, except in cases of malformation, equal-sided, but not equivalved. The valves are, consequently, essentially symmetrical, which is not the case with the Lamellibranchiata,—so much so, that certain Brachiopod shells were named *Lampades*, or lamp shells, by some early naturalists; but while such may bear a kind of resemblance to an antique Etruscan lamp, by far the larger number in no way resemble one. The shell is likewise most beautiful in its endless shapes and variations. In some species it is thin, semi-transparent and glassy, in others massive. Generally the shell is from a quarter of an inch to about 4 in. in size, but in certain species it attains nearly a foot in breadth by something less in length, as is the case with *Productus giganteus*. The valves are also in some species very unequal in their respective thickness, as may be seen in *Productus* (*Daviesiella*)[1] *llangollensis*, *Davidsonia verneuilii*, &c., and while the space allotted to the animal is very great in many species, as in *Terebratula sphaeroidalis*, it is very small in others belonging to *Strophomena*, *Leptaena*, *Chonetes*, &c. The ventral valve is usually the thickest, and in some forms is six or seven times as great as the opposite one. The outer surface of many of the species presents likewise the most exquisite sculpture, heightened by brilliant shades, or spots of green, red, yellow and bluish black. Traces of the original colour have also been preserved in some of the fossil forms; radiating bands of a reddish tint have been often seen in well-preserved examples of *Terebratula* (*Dielasma*) *hastata*, *T.* (*Dielasma*) *sacculus*, *T. communis*, *T. biplicata*, and of several others. Some specimens of *T. carnea* are of a beautiful pale pink colour when first removed from their matrix, and E. Deslongchamps has described the tint of several Jurassic species.

The valves are distinguished as *dorsal* and *ventral*. The ventral valve is usually the larger, and in many genera, such as *Terebratula* and *Rhynchonella*, has a prominent beak or umbo, with a circular or otherwise shaped foramen at or near its extremity, partly bounded by one or two plates, termed a deltidium. Through the foramen passes a peduncle, by which the animal is in many species attached to submarine objects during at least a portion of its existence. Other forms show no indication of ever having been attached, while some that had been moored by means of a peduncle during the early portion of their existence have become detached at a more advanced stage of life, the opening becoming gradually cicatrized, as is so often seen in *Leptaena rhomboidalis*, *Orthisina anomala*, &c. Lastly, some species adhere to submarine objects by a larger or smaller portion of their ventral valve, as is the case with many forms of *Crania*, *Thecidium*, *Davidsonia*, &c. Some *Cranias* are always attached by the whole surface of their lower or ventral valve, which models itself and fills up all the projections or

depressions existing on either the rock, shell or coral to which it adhered. These irregularities are likewise, at times, reproduced on the upper or dorsal valve. Some species of *Strophalosia* and *Productus* seem also to have been moored during life to the sandy or muddy bottoms on which they lived, by the means of tubular spines often of considerable length. The interior of the shell varies very much according to families and genera. On the inner surface of both valves several well-defined muscular, vascular and ovarian impressions are observable; they form either indentations of greater or less size and depth, or occur as variously shaped projections. In the *Trimerellidae*, for example, some of the muscles are attached to a massive or vaulted platform situated in the medio-longitudinal region of the posterior half or umbonal portion of both valves. In addition to these, there exists in the interior of the *dorsal* valve of some genera a variously modified, thin, calcified, ribbon-shaped skeleton for the support of the ciliated arms, and the form of this ribbon serves as one of the chief generic characters of both recent and extinct forms. This brachial skeleton is more developed in some genera than in others. In certain forms, as in *Terebratula* and *Terebratulina*, it is short and simple, and attached to a small divided hinge-plate, the two riband-shaped lamina being bent upwards in the middle (fig. 15). The cardinal process is prominent, and on each side of the hinge-plate are situated the dental sockets; the loop in *Terebratulina* becomes annular in the adult by the union of its crural processes (fig. 16). In *Magellania* [*Waldheimia*] it is elongated and reflected; the hinge-plate large, with four depressions, under which originates a median septum, which extends more or less into the interior of the shell (figs. 13 and 14). In *Terebratella* the loop is attached to the hinge-plate and to the septum (fig. 17). In
Megerlia it is three times attached, first to the hinge-plate, and then to the septum by processes from the diverging and reflected positions of the loop. In *Magas* the brachial skeleton is composed of an elevated longitudinal septum reaching from one valve to the other, to which are affixed two pairs of calcareous lamellae, the lower ones riband-shaped; attached first to the hinge-plate, they afterwards proceed by a gentle curve near to the anterior portion of the septum, to the sides of which they are affixed; the second pair originate on both sides of the upper edge of the septum, extending in the form of two triangular anchor-shaped lamellae (fig. 18). In *Bouchardia* the septum only is furnished with two short anchor-shaped lamellae. Many more modifications are observable in different groups of which the great family *Terebratulidae* is composed. In *Thecidium* (figs. 3,4) the interior of the dorsal valve is variously furrowed to receive the lophophore folded in two or more lobes. In the family *Spiriferidae* there are two conical spires directed outwards, and nearly filling the cavity of the shell (fig. 5); while in *Atrypa* the broad spirally coiled lamellae are vertical, and directed toward the centre of the dorsal valve. In the *Rhynchonellidae* there are two short slender curved laminae, while in many genera and even families, such as the *Productidae, Strophomenidae, Lingulidae, Discinidae*, &c., there exists no calcified support for the labial appendages. The ventral valve in many of the genera is provided with two curved hinge-teeth, which fit into corresponding sockets in the opposite valve, so that the valves cannot be separated without breaking one of the teeth.



FIGS. 12-18.

12. *Magellania* [*Waldheimia*] *flavescens*. Interior of ventral valve. *f*, foramen; *d*, deltidium; *t*, teeth; *a*, adductor impressions (=occlusors, *Hancock*); *c*, divaricator (=cardinal muscles, *King*, = muscles diducteurs principaux, *Gratiolet*); *c'*, accessory divaricators (muscles diducteurs accessoires, *Gratiolet*); *b*, ventral adjuster (= ventral peduncular muscles, or muscles du pedoncule paire supérieure, *Gratiolet*); *b'*, peduncular muscle.

13. *Magellania* [*Waldheimia*] *flavescens*. Interior of dorsal valve. *c, c′*, cardinal process; *b′, b′*, hinge-plate; *s*, dental sockets; *l*, loop; *q*, crura; *a, a′*, adductor impressions; *c*, accessory divaricator; *b*, peduncle muscles; *ss*, septum.
14. *Magellania* [*Waldheimia*] *flavescens*. Longitudinal section of valves. A, ventral, B, dorsal valves; *l*, loop; *q*, crura; *ss*, septum; *c*, cardinal process.
15. *Terebratula (Liothyris) vitrea*. Interior of dorsal valve. *l*, loop; *b*, hinge-plate; *c*, cardinal process.
16. Loop of *Terebratulina caput serpentis*.
17. Longitudinal section of *Terebratella dorsata*. (References as in fig. 14.)
18. Longitudinal section of *Magas pumilus*.

Each valve of the shell is lined by a mantle which contains prolongations of the body cavity. The outer surfaces of the mantle secrete the shell, which is of the nature of a cuticle impregnated by calcareous salts. These often have the form of prisms of calcite surrounded by a cuticular mesh work; the whole is nourished and kept alive by processes, which in *Crania* are branched; these perforate the shell and permit the access of the coelomic fluid throughout its substance. These canals are closed externally and are absent in *Rhynchonella*, where the amount of calcareous deposit is small. In *Lingula* the shell is composed of alternate layers of chitin and of phosphate of lime. The free edges of the mantle often bear chitinous bristles or setae which project beyond the shell. As in the case of the Lamellibranchiata, the shell of the adult is not a direct derivative of the youngest shell of the larva. The young Brachiopod in all its species is protected by an embryonic shell called the "protegulum," which sometimes persists in the umbones of the adult shells but is more usually worn off. In all species it has the same shape, a shape which has been retained in the adult by the Lower Cambrian genus *Iphidea*.

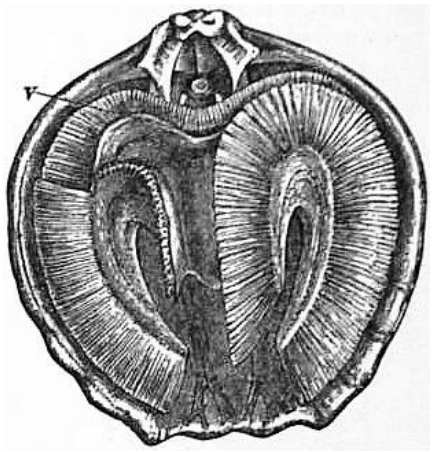


FIG. 19.—*Magellania* [*Waldheimia*] *flavescens*. Interior of dorsal valve, to show the position of the labial appendages. *v*, Mouth. (A portion of the fringe of cirri is removed to show the brachial membrane and a portion of the spiral extremities of the arms.)

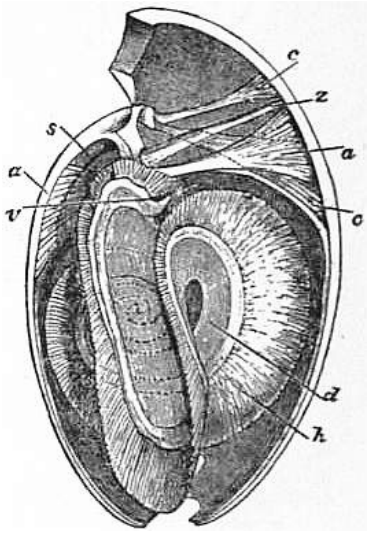


FIG. 20.—*Magellania* [*Waldheimia*] *flavescens*. Logitudinal section with a portion of the animal.

d, h, Brachial appendages.
a, Adductor.
c, c′, Divaricator muscles.
s, Septum.
v, Mouth.
z, Exremity of alimentary tube.

The penduncular muscules have been purposely omitted.

The body of the Brachiopod usually occupies about the posterior half of the space within the shell. The anterior half of this space is lined by the inner wall of the mantle and is called the mantle cavity. This cavity lodges the arms, which are curved and coiled in different ways in different genera. The water which bears the oxygen for respiration and the minute organisms upon which the Brachiopod feeds is swept into the mantle cavity by the action of the cilia which cover the arms, and the eggs and excreta pass out into the same cavity. The mouth lies in the centre of the anterior wall of the body. Its two lips fusing together at the corners of the mouth are prolonged into the so-called arms. These arms, which together form the lophophore, may be, as in *Cistella*, applied flat to the inner surface of the dorsal mantle fold, but more usually they are raised free from the body like a pair of moustaches, and as they are usually far too long to lie straight in the mantle cavity, they are folded or coiled up. The brachial skeleton which in many cases supports the arms has been mentioned above.

A transverse section through the arm (fig. 22) shows that it consists of a stout base, composed of a very hyaline connective tissue not uncommon in the tissues of the Brachiopoda, which is traversed by certain canals whose nature is considered below under the section (*The Body Cavity*) devoted to the coelom. Anteriorly this base supports a gurrie or gutter, the pre-oral rim of which is formed by a simple lip, but the post-oral rim is composed of a closely set row of tentacles. These may number some thousands, and they are usually bent over and tend to form a closed cylinder of the gutter. Each of these tentacles (fig. 22) is hollow, and it contains a diverticulum from the coelom, a branch of the vascular system, a nerve and some muscle-fibres. Externally on two sides and on the inner surface the tentacles are ciliated, and the cilia are continued across the gutter to the lip and even on

the outer surface of the latter. These cilia pass on any diatoms and other minute organism which come within their range of action to the capacious oval mouth, which appears as a mere deepening of the gutter in the middle line. In *Terebratulina, Rhynchonella, Lingula*, and possibly other genera, the arms can be unrolled and protruded from the opened shell; in this case the tentacles also straighten themselves and wave about in the water.

The Body Cavity.—The various internal organs of the brachiopod body, the alimentary canal and liver, the excretory organs, the heart, numerous muscles and the reproductive organs, are enclosed in a cavity called the body cavity, and since this cavity (i.) is derived from the archicoel and is from the first surrounded by meroblast, (ii.) communicates with the exterior through the nephridia or excretory organs, and (iii.) gives rise by the proliferation of the cells which line it to the ova and spermatoza, it is of the nature of a true coelom. The coelom then is a spacious chamber surrounding the alimentary canal, and is continued dorsally and ventrally into the sinuses of the mantle (fig. 21). Some of the endothelial cells lining the coelom are ciliated, the cilia keeping the corpusculated fluid contents in movement. Others of the endothelial cells show a great tendency to form muscle fibres. Besides this main coelomic cavity there are certain other spaces which F. Blochmann regards as coelomic, but it must be remembered that his interpretation rests largely on histological grounds, and at present embryological confirmation is wanting. These spaces are as follows:—(i.) the great arm-sinus; (ii.) the small arm-sinus together with the central sinus and the peri-oesophageal sinus, and in *Discinisca* and *Lingula*, and, to a less extent, in *Crania*, the lip-sinus; (iii.) certain portions of the general body cavity which in *Crania* are separated off and contain muscles, &c.; (iv.) the cavity of the stalk when such exists. The great arm-sinus of each side of the lophophore lies beneath the fold or lip which together with the tentacles forms the ciliated groove in which the mouth opens. These sinuses are completely shut off from all other cavities, they do not open into the main coelomic space nor into the small arm-sinus, nor does the right sinus communicate with the left. The small arm-sinus runs along the arms of the lophophore at the base of the tentacles, and gives off a blind diverticulum into each of these. This diverticulum contains the blood-vessel and muscle-fibres (fig. 22). In the region of the mouth where the two halves of the small arm-sinus approach one another they open into a central sinus lying beneath the oesophagus and partly walled in by the two halves of the ventral mesentery. This sinus is continued round the oesophagus as the peri-oesophageal sinus, and thus the whole complex of the small arm-sinus has the relations of the so-called vascular system of a Sipunculid. In *Crania* it is completely shut off from the main coelom, but in *Lingula* it communicates freely with this cavity. In *Discinisca* and *Lingula* there is further a lip-sinus or hollow system of channels which traverses the supporting tissue of the edge of the mantle and contains muscle-fibres. It opens into the peri-oesophageal sinus. It is better developed and more spacious in *Lingula* than in *Discinisca.* In *Crania*, where only indications of the lip-sinus occur, there are two other closed spaces. The posterior occlusor muscles lie in a special closed space which Blochmann also regards as coelomic. The posterior end of the intestine is similarly surrounded by a closed coelomic space known as the peri-anal sinus in which the rectum lies freely, unsupported by mesenteries. All these spaces contain a similar coagulable fluid with sparse corpuscles, and all are lined by ciliated cells. There is further a great tendency for the endothelial cells to form muscles, and this is especially pronounced in the

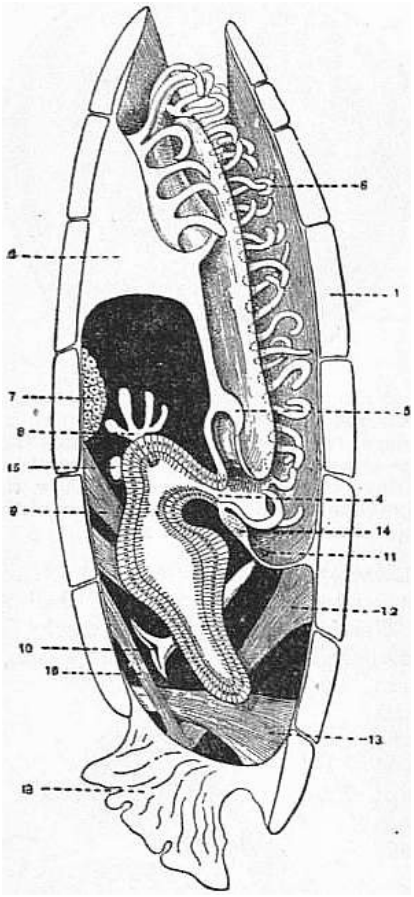


FIG. 21.—A diagram of the left half of an *Argiope* (*Megathyris*), which has been bisected in the median plane.

1. The ventral valve.
2. The dorsal valve.
3. The pedicle.
4. The mouth.
5. Lip which overhangs the mouth and runs all round the lophophore.
6. Tentacles.
7. Ovary in dorsal valve.
8. Liver diverticula.
9. Occlusor muscle—its double origin is shown.
10. Internal opening of left nephridium.
11. External opening of the same.
12. Ventral adjustor.
13. Divaricator muscle.
14. Sub-oesophageal nerve ganglion.
15. The heart.
16. Dorsal adjustor muscle.

small arm-sinus, where a conspicuous muscle is built up. The mantle-sinuses which form the chief spaces in the mantle are diverticula of the main coelomic cavity. In *Discinisca* they are provided with a muscular valve placed at their point of origin. They contain the same fluid as the general coelom. The stalk is an extension of the ventral body-wall, and contains a portion of the coelom which, in *Discinisca* and *Lingula*, remains in communication with the general body cavity.

The Alimentary Canal.— The mouth, which is quite devoid of armature, leads imperceptibly into a short and dorsally directed oesophagus. The latter enlarges into a spherical stomach into which open the broad ducts of the so-called liver. The stomach then passes into an intestine, which in the Testicardines (Articulata) is short, finger-shaped and closed, and in the Ecardines (Inarticulata) is longer, turned back upon its first course, and ends in an anus. In *Lingula* and *Discina* the anus lies to the right in the mantle-cavity, but in *Crania* it opens medianly into a posterior extension of the same. Apart from the asymmetry of the intestine caused by the lateral position of the anus in the two genera just named, Brachiopods are bilaterally symmetrical animals.

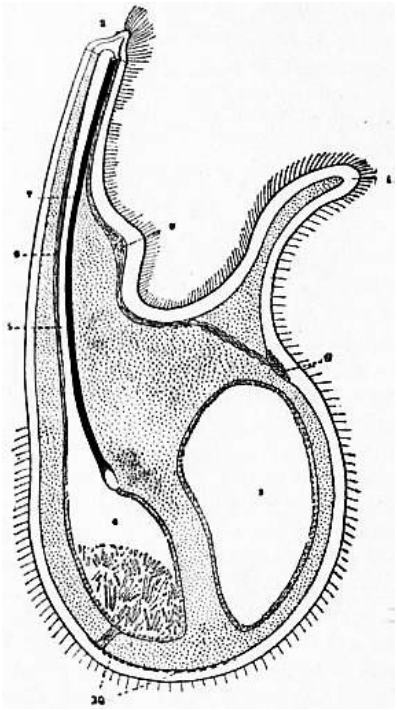


FIG. 22.—Diagrammatic section through an arm of the lophophore of *Crania*. Magnified; after Blochmann.

1. The lip.
2. The base of a tentacle bisected in the middle line.
3. Great arm-sinus.
4. Small arm-sinus, containing muscle-fibres.
5. Tentacular canal.
6. External tentacular muscle.
7. Tentacular blood-vessel arising from the cut arm-vessel in the small arm-sinus.
8. Chief arm-nerve.
9. Secondary arm-nerve.
10. Under arm-nerve.

The liver consists of a right and left half, each opening by a broad duct into the stomach. Each half consists of many lobes which may branch, and the whole takes up a considerable proportion of the space in the body cavity. The food passes into these lobes, which may be found crowded with diatoms, and without doubt a large part of the digestion is carried on inside the liver. The stomach, oesophagus and intestine are ciliated on their inner surface. The intestine is slung by a median dorsal and ventral mesentery which divides the body cavity into two symmetrically shaped halves; it is “stayed” by two transverse septa, the anterior or gastroparietal band running from the stomach to the body wall and the posterior or ileoparietal band running from the intestine to the body wall. None of these septa is complete, and the various parts of the central body cavity freely communicate with one another. In *Rhynchonella*, where there are two pairs of kidneys, the internal opening of the anterior pair is supported by the gastroparietal band and that of the posterior pair by the ileoparietal band. The latter pair alone persists in all other genera.

The kidneys or nephridia open internally by wide funnel-shaped nephridiostomes and externally by small pores on each side of the mouth near the base of the arms. Each is short, gently curved and devoid of convolutions. They are lined by cells charged with a yellow or brown pigment, and besides their excretory functions they act as ducts through which the reproductive cells leave the body.

Circulatory System.—The structures formerly regarded as pseudohearts have been shown by Huxley to be nephridia; the true heart was described and figured by A. Hancock, but has in many cases escaped the observation of later zoologists. F. Blochmann in 1884, however, observed this organ in the living animal in species of the following genera:—*Terebratulina, Magellania* [*Waldheimia*], *Rhynchonella, Megathyris* (*Argiope*), *Lingula*, and *Crania* (fig. 21). It consists of a definite contractile sac or sacs lying on the dorsal side of the alimentary canal near the oesophagus, and in preparations of *Terebratulina* made by quickly removing the viscera and examining them in sea-water under a microscope, he was able to count the pulsations, which followed one another at intervals of 30-40 seconds.

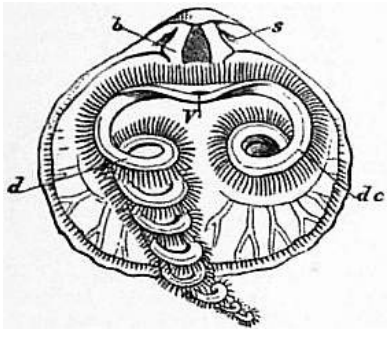


FIG. 23.—*Rhynchonella* (*Hemithyris*) *psittacea*. Interior of dorsal valve, *s*, Sockets; *b*, dental plates; *V*, mouth; *de*, labial appendage in its natural position; *d*, appendage extended or

A vessel—the dorsal vessel—runs forward from the heart along the dorsal surface of the oesophagus. This vessel is nothing but a split between the right and left folds of the mesentery, and its cavity is thus a remnant of the blastocoel. A similar primitive arrangement is thought by F. Blochmann to obtain in the genital arteries. Anteriorly the dorsal vessel splits into a right and a left half, which enter the small arm-sinus and, running along it, give off a blind branch to each tentacle (fig. 21). The right and left halves are connected ventrally to the oesophagus by a short vessel which supplies these tentacles in the immediate neighbourhood of the mouth. There is thus a vascular ring around the oesophagus. The heart gives off posteriorly a second median vessel which divides almost at once into a right and a left half, each of which again divides into two vessels which run to the dorsal and ventral mantles respectively. The dorsal branch sends a blind twig into each of the diverticula of the dorsal mantle-

unrolled.

sinus, the ventral branch supplies the nephridia and neighbouring parts before reaching the ventral lobe of the mantle. Both dorsal and ventral branches supply the generative organs.

The blood is a coagulable fluid. Whether it contains corpuscles is not yet determined, but if so they must be few in number. It is a remarkable fact that in *Discinisca*, although the vessels to the lophophore are arranged as in other Brachiopods, no trace of a heart or of the posterior vessels has as yet been discovered.

Muscles.—The number and position of the muscles differ materially in the two great divisions into which the Brachiopoda have been grouped, and to some extent also in the different genera of which each division is composed. Unfortunately almost every anatomist who has written on the muscles of the Brachiopoda has proposed different names for each muscle, and the confusion thence arising is much to be regretted. In the Testicardines, of which the genus *Terebratula* may be taken as an example, five or six pairs of muscles are stated by A. Hancock, Gratiolet and others to be connected with the opening and closing of the valves, or with their attachment to or movements upon the peduncle. First of all, the adductors or occlusors consist of two muscles, which, bifurcating near the centre of the shell cavity, produce a large quadruple impression on the internal surface of the small valve (fig. 13, *a*, *a´*), and a single divided one towards the centre of the large or ventral valve (fig. 12, *a*). The function of this pair of muscles is the closing of the valves. Two other pairs have been termed *divaricators* by Hancock, or *cardinal muscles* (“muscles diducteurs” of Gratiolet), and have for function the opening of the valves. The divaricators proper are stated by Hancock to arise from the ventral valve, one on each side, a little in advance of and close to the adductors, and after rapidly diminishing in size become attached to the cardinal process, a space or prominence between the sockets in the dorsal valve. The *accessory divaricators* are, according to the same authority, a pair of small muscles which have their ends attached to the ventral valve, one on each side of the median line, a little behind the united basis of the adductors, and again to the extreme point of the cardinal process. Two pairs of muscles, apparently connected with the peduncle and its limited movements, have been minutely described by Hancock as having one of their extremities attached to this organ. The *dorsal adjusters* are fixed to the ventral surface of the peduncle, and are again inserted into the hinge-plate in the smaller valve. The *ventral adjusters* are considered to pass from the inner extremity of the peduncle, and to become attached by one pair of their extremities to the ventral valve, one on each side and a little behind the expanded base of the divaricators. The function of these muscles, according to the same authority, is not only that of erecting the shell; they serve also to attach the peduncle to the shell, and thus effect the steadying of it upon the peduncle. By alternate contracting they can cause a slight rotation of the animal in its stalk.

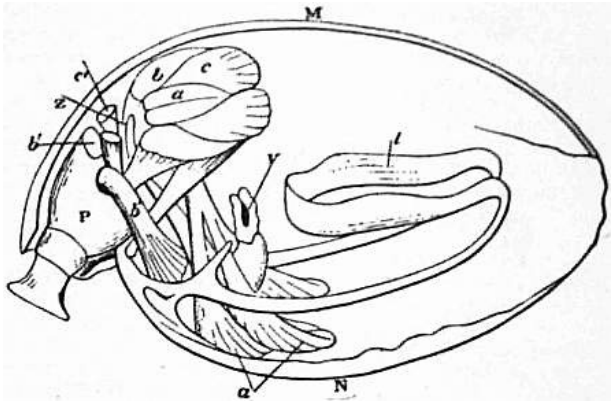
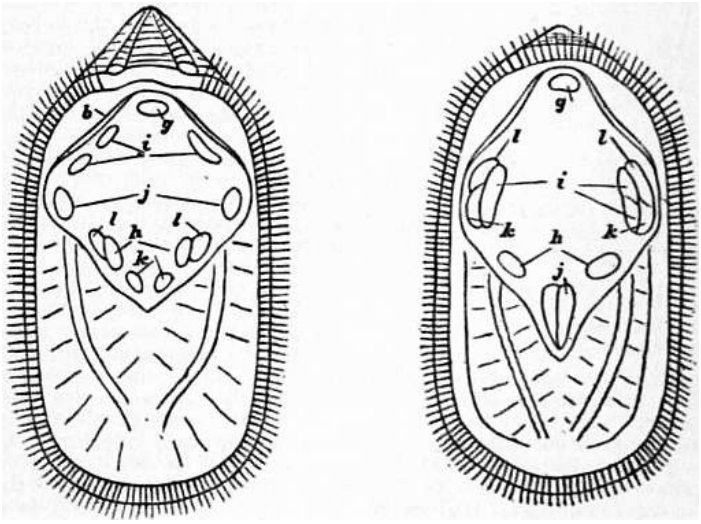


FIG. 24.—*Magellania* [*Waldheimia*] *flavescens*. Diagram showing the muscular system. (After Hancock.)

M, Ventral,
N, Dorsal valve,
l, Loop.
V, Mouth.
Z, Extremity of intestine,
c, Divaricators.
c´, Accessory divaricators.
a, Adductor.
b, Ventral adjusters.
b´, Peduncular muscles.
b˝, Dorsal adjusters.
P, Peduncle.

Such is the general arrangement of the shell muscles in the division composing the articulated Brachiopoda, making allowance for certain unimportant modifications observable in the animals composing the different families and genera thereof. Owing to the strong and tight interlocking of the valves by the means of curved teeth and sockets, many species of Brachiopoda could open their valves but slightly. In some species, such as *Thecidea*, the animal could raise its dorsal valve at right angles to the plane of the ventral one (fig. 4).



FIGS. 25, 26. *Lingula anatina.*

25, Interior of ventral valve.
26, Interior of dorsal valve.
g, Umbonal muscular impressions (open valves).
h, Central muscles (close valves).
i, Transmedial or sliding muscles.
b, Parietal band.
j, *k*, *l*, Lateral muscles (*j*, anteriors; *k*, middles; *l*, outsiders), enabling the valves to move forward and backward on each other.

(After King.)

In the Ecardines, of which *Lingula* and *Discina* may be quoted as examples, the myology is much more complicated. Of the shell or valvular muscles W. King makes out five pairs and an odd one, and individualizes their respective functions as follows:—Three pairs are *lateral*, having their members limited to the sides of the shell; one pair are *transmedians*, each member passing across the middle of the reverse side of the shell, while the odd muscle occupies the umbonal cavity. The *central* and *umbonal* muscles effect the direct opening and closing of the shell, the *laterals* enable the valves to move forward and backward on each other, and the *transmedians* allow the similar extremities (the rostral) of the valves to turn from each other to the right or the left on an axis subcentrically situated, that is, the medio-transverse region of the dorsal valve. It was long a matter in discussion whether the animal could displace its valves sideways when about to open its shell, but this has been actually observed by Professors K. Semper and E.S. Morse, who saw the animal perform the operation. They mention that it is never done suddenly or by jerks, as the valves are at first always pushed to one side several times and back again on each other, at the same time opening gradually in the transverse direction till they rest opposite to one another and widely apart. Those who have not seen the animal in life, or who did not believe in the possibility of the valves crossing each other with a slight obliquity, would not consent to appropriating any of its muscles to that purpose, and consequently attributed to all the lateral muscles the simple function of keeping the valves in an opposite position, or holding them adjusted. We have not only the observations of Semper and Morse, but the anatomical investigations of King, to confirm the sliding action or lateral divarication of the valves of *Lingula*.

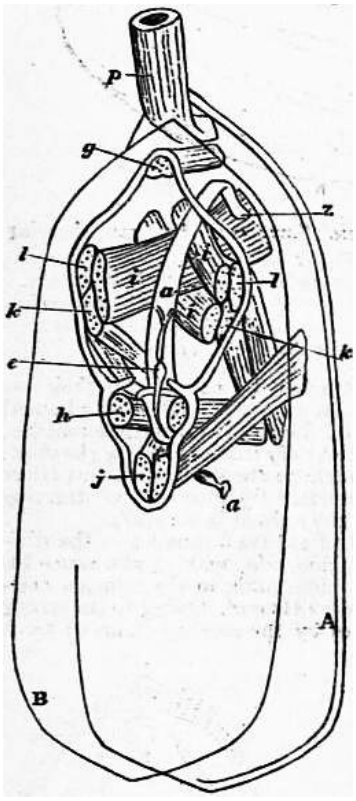


FIG. 27.—*Lingula anatina*. Diagram showing the muscular system. (After Hancock.) The letters indicate the muscles as in figs. 25 and 26.

A, Dorsal,
B, Ventral valve.
p, Peduncle.
e, Heart.
a, Alimentary tube.
z, Anal aperture.

In the Testicardines, where no such sliding action of the valves was necessary or possible, no muscles for such an object were required, consequently none took rise from the lateral portions of the valves as in *Lingula*; but in an extinct group, the *Trimerellidae*, which seems to be somewhat intermediate in character between the Ecardines and Testicardines, have been found certain scars, which appear to have been produced by rudimentary lateral muscles, but it is doubtful (considering the shells are furnished with teeth, though but rudely developed) whether such muscles enabled the valves, as in *Lingula*, to move forward and backward upon each other. *Crania* in life opens its valves by moving upon the straight hinge, without sliding the valve.

The *nervous system* of Brachiopods has, as a rule, maintained its primitive connexion with the external epithelium. In a few places it has sunk into the connective-tissue supporting layer beneath the ectoderm, but the chief centres still remain in the ectoderm, and the fibrils forming the nerves are for

the most part at the base of the ectodermal cells. Above the oesophagus is a thin commissure which passes laterally into the chief arm-nerve. This latter includes in its course numerous ganglion cells, and forms, according to F. Blochmann, the immensely long drawn out supra-oesophageal ganglion. The chief arm-nerve traverses the lophophore, being situated between the great arm-sinus and the base of the lip (figs. 22 and 28); it gives off a branch to each tentacle, and these all anastomose at the base of the tentacles with the second nerve of the arm, the so-called secondary arm-nerve. Like the chief arm-nerve, this strand runs through the lophophore, parallel indeed with the former except near the middle line, where it passes ventrally to the oesophagus. The lophophore is supplied by yet a third nerve, the under arm-nerve, which is less clearly defined than the others, and resembles a moderate aggregation of the nerve fibrils, which seem everywhere to underlie the ectoderm, and which in a few cases are gathered up into nerves. The under arm-nerve, which lies between the small arm-sinus and the surface, supplies nerves to the muscles of both arm-sinuses (figs. 22 and 28). Medianly, it has its origin in the sub-oesophageal ganglion, which, like the supra-oesophageal, is drawn out laterally, though not to the same extent. In the middle line the sub-oesppphageal nerve mass is small; the ganglion is in fact drawn out into two halves placed on either side of the body. From each of these sub-oesophageal ganglia numerous nerves arise. Passing from the middle line outwards they are—(i.) the median pallial nerve to the middle of the dorsal mantle; (ii.) numerous small nerves—the circum-oesophageal commissures—which pass round the oesophagus to the chief arm-nerve or supra-oesophageal ganglion; (iii.) the under arm-nerve to the lophophore and its muscles; (iv.) the lateral pallial nerve to the sides of the dorsal mantle. Laterally, the sub-oesophageal ganglia give off (v.) nerves to the ventral mantle, and finally they supply (vi.) branches to the various muscles. There is a special marginal nerve running round the edge of the mantle, but the connexion of this with the rest of the nervous system is not clear; probably it is merely another concentration of the diffused sub-ectodermal nervous fibrils.

The above account applies more particularly to *Crania*, but in the main it is applicable to the other Inarticulata which have been investigated. In *Discinisca* and *Lingula*, however, the sub-oesophageal ganglion is not drawn out, but lies medianly; it gives off two posteriorly directed nerves to the stalk, which in *Lingula* unite and form a substantial nerve. Sense organs are unknown in the adult. The larval forms are provided with eye-spots, but no very specialized sense organs are found in the adult.

The *histology* of Brachiopods presents some peculiar and many primitive features. As a rule the cells are minute, and this has especially stood in the way of embryological research. The plexus of nerve-fibrils which underlie the ectoderm and are in places gathered up into nerves, and the great development of connective tissue, are worthy of notice. Much of the latter takes the form of hyaline supporting tissue, embedded in which are scattered cells and fibres. The lophophore and stalk are largely composed of this tissue. The ectodermal cells are large, ciliated, and amongst the ciliated cells glandular cells are scattered. The chitinous chaetae have their origin in special ectodermal pits, at the base of which is one large cell which is thought to secrete the chaeta, as in Chaetopods. These pits are not isolated, but are connected by an ectodermal ridge, which grows in at the margin of the mantle and forms a continuous band somewhat resembling the ectodermal primordium of vertebrate teeth.

The ovary and testes are heaped-up masses of red or yellow cells due to a proliferation of the cells lining the coelom. There are four of such masses, two dorsal and two ventral, and as a rule they extend between the outer and inner layer of the mantle lining the shells. The ova and the spermatozoa dehisce into the body cavity and pass to the exterior through the nephridia. Fertilization takes place outside the body, and in some species the early stages of development take place in a brood-pouch which is essentially a more or less deep depression of the body-wall median in *Thecidea*, while in *Cistella* (? *Argiope*) there is one such pouch on each side, just below the base of the arms, and into these the nephridia open. The developing ova are attached by little stalks to the walls of these pouches. In spite of some assertions to the contrary, all the Brachiopods which have been carefully investigated have been found to be male or female. Hermaphrodite forms are unknown.

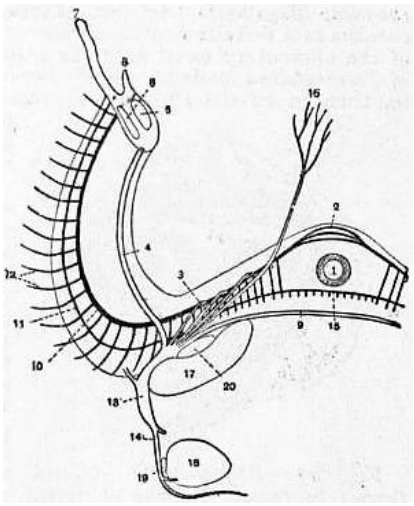


FIG. 28.—Diagram of nervous system of *Crania*; from the dorsal side. The nerves running to the dorsal parts are white, with black edges; those running to the ventral parts are solid black. Magnified. (After Blochmann.)

1. Oesophagus.
2. Supra-oesophageal commisure.
3. Circum-oesophageal commisure.
4. Under arm-nerve.
5. Great arm-sinus.
6. Small arm-sinus.
7. Tentacle.
8. Lip of lophophore.
9. Infra-oesophageal commisure.
10. Chief arm-nerve.
11. Secondary arm-nerve.
12. Nerves to tentacles.
13. Sub-oesophageal ganglion.
14. Dorsal lateral nerve.
15. Sub-oesophageal portion of the secondary arm-nerve.
16. Median pallial nerve of dorsal lobe of mantle.
17. Anterior occlusor muscle.
18. Posterior occlusor muscle.
19. Obliquus superior muscle.
20. Levator brachii muscle.

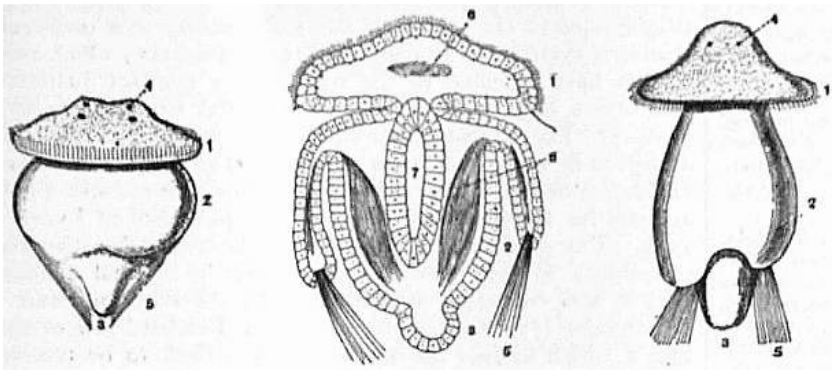


FIG. 29.—Three larvae stages of *Megathyris* (*Argiope*). A, Larva which has just left brood-pouch; B, longitudinal section through a somewhat later stage; C, the fully formed embryo just before fixing—the neo-embryo of Beecher. Highly magnified.

1. Anterior segment.
2. Second or mantle-forming segment.
3. Third or stalk-forming segment.
4. Eye-spots.
5. Setae.
6. Nerve mass (?).
7. Alimentary canal.
8. Muscles.

Embryology.—With the exception of Yatsu's article on the development of *Lingula* (*J. Coll. Sci., Japan*, xvii., 1901-1903) and E.G. Conklin's on "Terebratulina septentrionalis" (*P. Amer. Phil. Soc.* xli., 1902), little real advance has been made in our knowledge of the embryology of the Brachiopoda within recent years. Kovalevsky's researches (Izv. Obshch. Moskov, xiv., 1874) on *Megathyris* (*Argiope*) and Yatsu's just mentioned are the most complete as regards the earlier stages. Segmentation is complete, a gastrula is formed, the blastopore closes, the archenteron gives off two coelomic sacs which, as far as is known, are unaffected by the superficial segmentation of the body that divides the larva into three segments. The walls of these sacs give rise at an early stage to muscles which enable the parts of the larva to move actively on one another (fig. 29, B). About this stage the larvae leave the brood-pouch, which is a lateral or median cavity in the body of the female, and lead a free swimming life in the ocean. The anterior segment broadens and becomes umbrella-shaped; it has a powerful row of cilia round the rim and smaller cilia on the general surface. By the aid of these cilia the larva swims actively, but owing to its minute size it covers very little distance, and this probably accounts for the fact that where brachiopods occur there are, as a rule, a good many in one spot. The head bears four eye-spots, and it is continually testing the ground (fig. 29, A, C). The second segment grows downwards like a skirt surrounding the third segment, which is destined to form the stalk. It bears at its rim four bundles of very pronounced chaetae. After a certain time the larva fixes itself by its stalk to some stone or rock, and the skirt-like second segment turns forward over the head and forms the mantle. What goes on within the mantle is unknown, but presumably the head is absorbed. The chaetae drop off, and the lophophore is believed to arise from thickenings which appear in the dorsal mantle lobe. The Plankton Expedition brought back, and H. Simroth (*Ergeb. Plankton Expedition*, ii., 1897) has described, a few larval brachiopods of undetermined genera, two of which at least were pelagic, or at any rate taken far from the coast. These larvae, which resemble those described by Fritz Müller (*Arch. Naturg.*, 1861-1862), have their mantle turned over their head and the larval shell well developed. No stalk has been seen by Simroth or Fritz Müller, but in other respects the larva resembles the stages in the development of *Megathyris* and *Terebratulina* which immediately precede fixation. The cirri or tentacles, of which three or four pairs are present, are capable of being protruded, and the minute larva swims by means of the ciliary action they produce. It can retract the tentacles, shut its shell, and sink to the bottom.

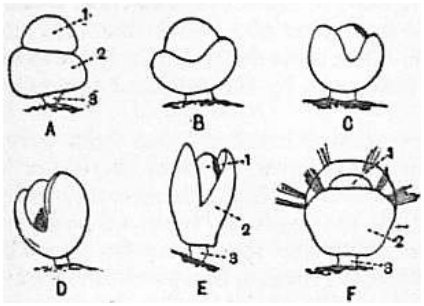


FIG. 30.—Stages in the fixing and metamorphosis of *Terebratulina*. Highly magnified. (From Morse.)

A, Larva (neo-embryo) just come to rest.
B, C, D, Stages showing the turning forward of the second or mantle segment.
E, Completion of this.
F, Young Brachiopod.
1, 2, 3, The first, second and third segments.

C.E.E. Beecher (*Amer. Jour. Sci.* ser. 3, xli. and xliv.) has classified with appropriate names the various stages through which Brachiopod larvae pass. The last stage, that in which the folds of the second segment are already reflected over the first, he calls the Typembryo. Either before or just after turning, the mantle develops a larval shell termed the protegulum, and when this is completed the larva is termed the Phylembryo. By this time the eyes have disappeared, the four bundles of chaetae have dropped off, and the lophophore has begun to appear as an outgrowth of the dorsal mantle lobe. The protegulum has been found in members of almost all the families of Brachiopod, and it is thought to occur throughout the group. It resembles the shell of the Cambrian genus *Iphidea* [*Paterina*], and the Phylembryo is frequently referred to as the *Paterina* stage. In some orders the Phylembryo is succeeded by an *Obolella* stage with a nearly circular outline, but this is not universal. The larva now assumes specific characters and is practically adult.

Classification.—Beecher's division of the Brachiopoda into four orders is based largely on the

character of the aperture through which the stalk or pedicle leaves the shell. To appreciate his diagnoses it is necessary to understand certain terms, which unfortunately are not used in the same sense by all authors. The triangular pedicle-opening seen in *Orthis*, &c., has been named by James Hall and J.M. Clarke the delthyrium. In some less primitive genera, *e.g. Terebratula*, that type of opening is found in the young stages only; later it becomes partly closed by two plates which grow out from the sides of the delthyrium. These plates are secreted by the ventral lobe of the mantle, and were named by von Buch in 1834 the “deltidium.” The form of the deltidium varies in different genera. The two plates may meet in the middle line, and leave only a small oval opening near the centre for the pedicle, as in *Rhynchonella*; or they may meet only near the base of the delthyrium forming the lower boundary of the circular pedicle-opening, as in *Terebratula*; or the right plate may remain quite distinct from the left plate, as in *Terebratella*. The pro-deltidium, a term introduced by Hall and Clarke, signifies a small embryonic plate originating on the dorsal side of the body. It subsequently becomes attached to the ventral valve, and develops into the pseudo-deltidium, in the Neotremata and the Protremata. The pseudo-deltidium (so named by Bronn in 1862) is a single plate which grows from the apex of the delthyrium downwards, and may completely close the aperture. The pseudo-deltidium is sometimes reabsorbed in the adult. In the Telotremata neither pro-deltidium nor pseudo-deltidium is known. In the Atremata the pro-deltidium does not become fixed to the ventral valve, and does not develop into a pseudo-deltidium. The American use of the term deltidium for the structure which Europeans call the pseudo-deltidium makes for confusion. The development of the brachial supports has been studied by Friele, Fischer and Oehlert. A summary of the results is given by Beecher (*Trans. Connect. Acad.* ix., 1893; reprinted in *Studies in Evolution*, 1901).

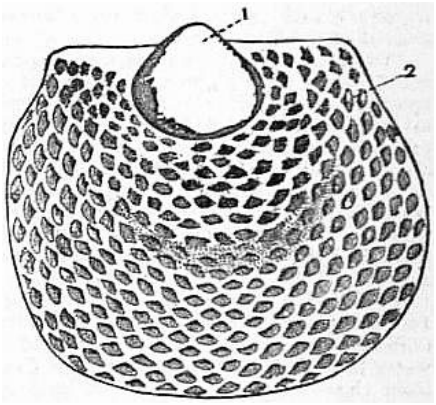


FIG. 31.—Shell of larval Brachiopod. Phylembryo stage. (From Simroth.) 1, Protegulum; 2, permanent shell.

The orders Atremata and Neotremata are frequently grouped together, as the sub-class Inarticulata or Ecardines—the Tretenterata of Davidson—and the orders Protremata and Telotremata, as the Articulata or Testicardines— the Clistenterata of Davidson. The following scheme of classification is based on Beecher’s and Schubert’s. Recent families are printed in italic type.

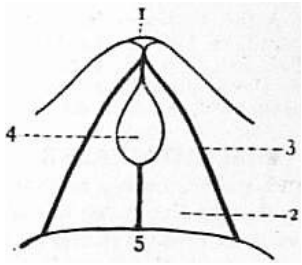


FIG. 32.—Diagram of the pedicle-opening of *Rhynchonella*. Magnified.

1. Umbo of ventral valve.
2. Deltidium.
3. Margin of delthyrium.
4. Pedicle-opening.
5. Dorsal valve.

Class I. ECARDINES (INARTICULATA)

ORDER I. Atremata (Beecher).—Inarticulate Brachiopoda, with the pedicle passing out between the umbones, the opening being shared by both valves. Pro-deltidium attached to dorsal valves. FAMILIES.—PATERINIDAE, OBOLIDAE, TRIMERELLIDAE, LINGULELLIDAE, *LINGULIDAE*, LIGULASMATIDAE.

ORDER II. Neotremata (Beecher).—More or less circular, cone-shaped, inarticulate Brachiopoda. The pedicle passes out at right angles to the plane of junction of the valves of the shell; the opening is confined to the ventral valve, and may take the form of a slit, or may be closed by the development of a special plate called the listrium, or by a pseudo-deltidium. Pro-deltidium attached to ventral valve. FAMILIES.—ACROTRETIDAE, SIPHONOTRETIDAE, TREMATIDAE, *DISCINIDAE, CRANIIDAE*.

Class II. TESTICARDINES (ARTICULATA)

ORDER III. Protremata (Beecher).—Articulate Brachiopoda, with pedicle-opening restricted to ventral valve, and either open at the hinge line or more or less completely closed by a pseudo-deltidium, which may disappear in adult. The pro-deltidium originating on the dorsal surface later becomes anchylosed with the ventral valve. FAMILIES.—KUTORGINIDAE, EICHWALDIIDAE, BILLINGSELLIDAE, STROPHOMENIDAE, *THECIDIIDAE*, PRODUCTIDAE, RICHTHOFENIDAE, ORTHIDAE, CLITAMBONITIDAE, SYNTROPHIIDAE, PORAMBONITIDAE, PENTAMERIDAE.

ORDER IV. Telotremata (Beecher).—Articulate Brachiopoda, with the pedicle-opening, confined in later life to the ventral valve, and placed at the umbo or beneath it. Deltidium present, but no pro-deltidium. Lophophore supported by calcareous loops, &c. FAMILIES.—PROTORHYNCHIDAE, *RHYNCHONELLIDAE*, CENTRONELLIDAE, *TEREBRATULIDAE*, STRINGOCEPHALIDAE, MEGALANTERIDAE, *TEREBRATELLIDAE*, ATRYPIDAE, SPIRIFERIDAE, ATHYRIDAE.

Affinities.—Little light has been thrown on the affinities of the Brachiopoda by recent research, though speculation has not been wanting. Brachiopods have been at various times placed with the Mollusca, the Chaetopoda, the Chaetognatha, the Phoronidea, the Polyzoa, the Hemichordata, and the Urochordata. None of these alliances has borne close scrutiny. The suggestion to place Brachiopods with the Polyzoa, *Phoronis, Rhabdopleura* and *Cephalodiscus*, in the Phylum Podaxonia made in *Ency. Brit.* (vol. xix, ninth edition, pp. 440-441) has not met with acceptance, and until we have a fuller account of the embryology of some one form, preferably an Inarticulate, it is wiser to regard the group

as a very isolated one. It may, however, be pointed out that Brachiopods seem to belong to that class of animal which commences life as a larva with three segments, and that tri-segmented larvae have been found now in several of the larger groups.

Distribution.—Brachiopods first appear in the Lower Cambrian, and reached their highest development in the Silurian, from which upwards of 2000 species are known, and were nearly as numerous in the Devonian period; at present they are represented by some 140 recent species. The following have been found in the British area, as defined by A.M. Norman, *Terebratulina caput-serpentis* L., *Terebratula* (*Gwynia*) *capsula* Jeff., *Magellania* (*Macandrevia*) *cranium* Müll., *M. septigera* Lovén, *Terebratella spitzbergenensis* Dav., *Megathyris decollata* Chemn., *Cistella cistellula* S. Wood, *Cryptopora gnomon* Jeff., *Rhynchonella* (*Hemithyris*) *psittacea* Gmel., *Crania anomala* Müll., and *Discinisca atlantica* King. About one-half the 120 existing species are found above the 100-fathoms line. Below 150 fathoms they are rare, but a few such as *Terebratulina wyvillei* are found down to 2000 fathoms. *Lingula* is essentially a very shallow water form. As a rule the genera of the northern hemisphere differ from those of the southern. A large number of specimens of a species are usually found together, since their only mode of spreading is during the ciliated larval stage, which although it swims vigorously can only cover a few millimetres an hour; still it may be carried some little distance by currents.

Undue stress is often laid on the fact that *Lingula* has come down to us apparently unchanged since Cambrian times, whilst *Crania*, and forms very closely resembling *Discina* and *Rhynchonella*, are found from the Ordovician strata onwards. The former statement is, however, true of animals from other classes at least as highly organized as Brachiopods, *e.g.* the Gasteropod *Capulus*, whilst most of the invertebrate classes were represented in the Ordovician by forms which do not differ from their existing representatives in any important respect.

A full bibliography of Brachiopoda (recent and fossil) is to be found in Davidson's Monograph of British Fossil Brachiopods, *Pal. Soc. Mon.* vi., 1886. The Monograph on Recent Brachiopoda, by the same author, *Tr. Linn. Soc. London*, Zool. ser. ii. vol. iv., 1886-1888, must on no account be omitted.

(A. E. S.)

1 Subgenera are indicated by round, synonyms by square brackets.

BRACHISTOCHRONE (from the Gr. βράχιστος, shortest, and χρόνος, time), a term invented by John Bernoulli in 1694 to denote the curve along which a body passes from one fixed point to another in the shortest time. When the directive force is constant, the curve is a cycloid (*q.v.*); under other conditions, spirals and other curves are described (see Mechanics).

BRACHYCEPHALIC (Gr. for short-headed), a term invented by Andreas Retzius to denote those skulls of which the width from side to side was little less than the length from front to back, their ratio being as 80 to 100, as in those of the Mongolian type. Thus taking the length as 100, if the width exceeds 80, the skull is to be classed as brachycephalic. The prevailing form of the head of civilized races is brachycephalic. It is supposed that a brachycephalic race inhabited Europe before the Celts. Among those peoples whose heads show marked brachycephaly are the Indo-Chinese, the Savoyards, Croatians, Bavarians, Lapps, Burmese, Armenians and Peruvians. (See Craniometry.)

BRACKYLOGUS (from Gr. βραχύς, short, and λόγος, word), title applied in the middle of the 16th century to a work containing a systematic exposition of the Roman law, which some writers have assigned to the reign of the emperor Justinian, and others have treated as an apocryphal work of the 16th century. The earliest extant edition of this work was published at Lyons in 1549, under the title of *Corpus Legum per modum Institutionum*; and the title *Brachylogus totius Juris Civilis* appears for the first time in an edition published at Lyons in 1553. The origin of the work may be referred with great probability to the 12th century. There is internal evidence that it was composed subsequently to the reign of Louis le Débonnaire (778-840), as it contains a Lombard law of that king's, which forbids the testimony of a clerk to be received against a layman. On the other hand its style and reasoning is far superior to that of the law writers of the 10th and 11th centuries; while the circumstance that the method of its author has not been in the slightest degree influenced by the school of the Gloss-writers (Glossatores) leads fairly to the conclusion that he wrote before that school became dominant at Bologna. Savigny, who traced the history of the *Brachylogus* with great care, is disposed to think that it is the work of Irnerius himself (*Geschichte des röm. Rechts im Mittelalter*). Its value is chiefly historical,

as it furnishes evidence that a knowledge of Justinian's legislation was always maintained in northern Italy. The author of the work has adopted the *Institutes* of Justinian as the basis of it, and draws largely on the *Digest*, the *Code* and the *Novels*; while certain passages, evidently taken from the *Sententiae Receptae* of Julius Paulus, imply that the author was also acquainted with the Visigothic code of Roman law compiled by order of Alaric II.

An edition by E. Bocking was published at Berlin in 1829, under the title of *Corpus Legum sive Brachylogus Juris Civilis*. See also H. Fitting, *Über die Heimath und das Alter des sogenannten Brachylogus* (Berlin, 1880).

BRACKET, in architecture and carpentering, a projecting feature either in wood or metal for holding things together or supporting a shelf. The same feature in stone is called a "console" (*q.v.*). In furniture it is a small ornamental shelf for a wall or a corner, to bear knick-knacks, china or other bric-à-brac. The word has been referred to "brace," clamp, Lat. *bracchium*, arm, but the earliest form "bragget" (1580) points to the true derivation from the Fr. *braguette*, or Span. *bragueta* (Lat. *bracae*, breeches), used both of the front part of a pair of breeches and of the architectural feature. The sense development is not clear, but it has no doubt been influenced by the supposed connexion with "brace."

BRACKET-FUNGI. The term "bracket" has been given to those hard, woody fungi that grow on trees or timber in the form of semicircular brackets. They belong to the order *Polyporeae*, distinguished by the layer of tubes or pores on the under surface within which the spores are borne. The mycelium, or vegetable part of the fungus, burrows in the tissues of the tree, and often destroys it; the "bracket" represents the fruiting stage, and produces innumerable spores which gain entrance to other trees by some wound or cut surface; hence the need of careful forestry. Many of these woody fungi persist for several years, and a new layer of pores is superposed on the previous season's growth.

BRACKLESHAM BEDS, in geology, a series of clays and marls, with sandy and lignitic beds, in the Middle Eocene of the Hampshire Basin, England. They are well developed in the Isle of Wight and on the mainland opposite; and receive their name from their occurrence at Bracklesham in Sussex. The thickness of the deposit is from 100 to 400 ft. Fossil mollusca are abundant, and fossil fish are to be found, as well as the *Palaeophis*, a sea-snake. Nummulites and other foraminifera also occur. The Bracklesham Beds lie between the Barton Clay above and the Bournemouth Beds, Lower Bagshot, below. In the London Basin these beds are represented only by thin sandy clays In the Middle Bagshot group. In the Paris Basin the "Calcaire grossier" lies upon the same geological horizon.

See F. Dixon, *Geology of Sussex* (new ed., 1878); F.E. Edwards and S.V. Wood, "Monograph of Eocene Mollusca," *Palaeontographical Soc.* vol. i. (1847-1877); "Geology of the Isle of Wight," *Mem. Geol. Survey* (2nd ed., 1889); C. Reid, "The Geology of the Country around Southampton," *Mem. Geol. Survey* (1902).

BRACKLEY, THOMAS EGERTON, Viscount (*c.* 1540-1617), English lord chancellor, was a natural son of Sir Richard Egerton of Ridley, Cheshire. The exact date of his birth is unrecorded, but, according to Wood,[1] when he became a commoner at Brasenose College, Oxford, in 1556, he was about seventeen. He entered Lincoln's Inn in 1559, and was called to the bar in 1572, being chosen a governor of the society in 1580, Lent reader in 1582, and treasurer in 1588. He early obtained legal renown and a large practice, and tradition relates that his skilful conduct of a case against the crown gained the notice of Elizabeth, who is reported to have declared: "In my troth he shall never plead against me again." Accordingly, on the 26th of June 1581, he was made solicitor-general. He represented Cheshire in the parliaments of 1585 and 1586, but in his official capacity he often attended in the House of Lords. On the 3rd of March 1589 the Commons desired that he should return to their house, the Lords refusing on the ground that he was called by the queen's writ to attend in the Lords before his election by the House of Commons.[2] He took part in the trial of Mary, queen of Scots, in 1586, and advised that in her indictment she should only be styled "commonly called queen of Scots," to avoid scruples about judging

a sovereign. He conducted several other state prosecutions. On the 2nd of June 1592 he was appointed attorney-general, and was knighted and made chamberlain of Chester in 1593. On the 10th of April 1594 he became master of the rolls, and on the 6th of May 1596 lord keeper of the great seal and a privy councillor, remaining, however, a commoner as Sir Thomas Egerton, and presiding in the Lords as such during the whole reign of Elizabeth. He kept in addition the mastership of the rolls, the whole work of the chancery during this period falling on his shoulders and sometimes causing inconvenience to suitors[3]. His promotion was welcomed from all quarters. “I think no man,” wrote a contemporary to Essex, “ever came to this dignity with more applause than this worthy gentleman.”[4]

Egerton became one of the queen’s most trusted advisers and one of the greatest and most striking figures at her court. He was a leading member of the numerous special commissions, including the ecclesiastical commission, and was the queen’s interpreter in her communications to parliament. In 1598 he was employed as a commissioner for negotiating with the Dutch, obtaining great credit by the treaty then effected, and in 1600 in the same capacity with Denmark. In 1597, in consequence of his unlawful marriage with his second wife, in a private house without banns, the lord keeper incurred a sentence of excommunication, and was obliged to obtain absolution from the bishop of London.[5] He was a firm friend of the noble but erratic and unfortunate Essex. He sought to moderate his violence and rashness, and after the scene in the council in July 1598, when the queen struck Essex and bade him go and be hanged, he endeavoured to reconcile him to the queen in an admirable letter which has often been printed.[6] On the arrival of Essex in London without leave from Ireland, and his consequent disgrace, he supported the queen’s just authority, avoiding at the same time any undue severity to the offender. Essex was committed to his custody in York House from the 1st of October 1599 till the 5th of July 1600, when the lord keeper used his influence to recover for him the queen’s favour and gave him kindly warnings concerning the necessity for caution in his conduct. On the 5th of June 1600 he presided over the court held at his house, which deprived Essex of his offices except that of master of the horse, treating him with leniency, not pressing the charge of treason but only that of disobedience, and interrupting him with kind intentions when he attempted to justify himself. After the trial he tried in vain to bring Essex to a sense of duty. On the 8th of February 1601, the day fixed for the rebellion, the lord keeper with other officers of state visited Essex at Essex House to demand the reason of the tumultuous assemblage. His efforts to persuade Essex to speak with him privately and explain his “griefs,” and to refrain from violence, and his appeal to the company to depart peacefully on their allegiance, were ineffectual, and he was imprisoned by Essex for six hours, the mob calling out to kill him and to throw the great seal out of the window. Subsequently he abandoned all hope of saving Essex, and took an active part in his trial. On the 13th of February he made a speech in the Star Chamber, exposing the wickedness of the rebellion, and of the plot of Thomas Lea to surprise Elizabeth at her chamber door.[7] In July 1602, a few months before her death, Elizabeth visited the lord keeper at his house at Harefield in Middlesex, and he was one of those present during her last hours who received her faltering intimation as to her successor.

On the accession of James I., Sir Thomas Egerton was reappointed lord keeper, resigning the mastership of the rolls in May 1603, and the chamberlainship of Chester in August. On the 21st of July he was created Baron Ellesmere, and on the 24th lord chancellor. His support of the king’s prerogative was too faithful and undiscriminating. He approved of the harsh penalty inflicted upon Oliver St John in 1615 for denying the legality of benevolences, and desired that his sentencing of the prisoner “might be his last work to conclude his services.”[8] In May 1613 he caused the committal of Whitelocke to the Fleet for questioning the authority of the earl marshal’s court. In 1604 he came into collision with the House of Commons. Sir Francis Goodwin, an outlaw, having been elected for Buckinghamshire contrary to the king’s proclamation, the chancellor cancelled the return when made according to custom into chancery, and issued writs for a new election. The Commons, however, considering their privileges violated, restored Goodwin to his seat, and though the matter was in the present instance compromised by the choice of a third party, they secured for the future the right of judging in their own elections. He was at one with James in desiring to effect the union between England and Scotland, and served on the commission in 1604; and the English merchants who opposed the union and community of trade with the Scots were “roundly shaken by him.” In 1608, in the great case of the Post Nati, he decided, with the assistance of the fourteen judges, that those born after the accession of James I. to the throne of England were English subjects and capable of holding lands in England; and he compared the two dissentient judges to the apostle Thomas, whose doubts only confirmed the faith of the rest. He did not, however, always show obedience to the king’s wishes. He opposed the latter’s Spanish policy, and in July 1615, in spite of James’s most peremptory commands and threats, refused to put the great seal to the pardon of Somerset. In May 1616 he officiated as high steward in the trial of the latter and his countess for the murder of Overbury. He was a rigid churchman, hostile to both the Puritans and the Roman Catholics. He fully approved of the king’s unfriendly attitude towards the former, adopted at the Hampton Court conference in 1604, and declared, in admiration of James’s theological reasoning on this occasion, that he had never understood before the meaning of the legal maxim, *Rex est mixta persona cum sacerdote*. In 1605 he opposed the petition for the restitution of deprived Puritan ministers, and obtained an opinion from the judges that the petition was illegal. He supported the party of Abbot against Laud at Oxford, and represented to the king the unfitness of the latter to be president of St John’s College. In 1605 he directed the judges to enforce the penal laws against the Roman Catholics.

His vigorous and active public career closed with a great victory gained over the common law and his formidable antagonist, Sir Edward Coke. The chancellor’s court of equity had originated in the necessity for a tribunal to decide cases not served by the common law, and to relax and correct the rigidity and insufficiency of the latter’s procedure. The two jurisdictions had remained bitter rivals, the common-law

bar complaining of the arbitrary and unrestricted powers of the chancellor, and the equity lawyers censuring and ridiculing the failures of justice in the courts of common law. The disputes between the courts, concerning which the king had already in 1615 remonstrated with the chancellor and Sir Edward Coke,[9] the lord chief justice, came to a crisis in 1616, when the court of chancery granted relief against judgments at common law in the cases of *Heath v. Rydley* and *Courtney v. Granvil*. This relief was declared by Coke and other judges sitting with him to be illegal, and a counter-attack was made by a praemunire, brought against the parties concerned in the suit in chancery. The grand jury, however, refused to bring in a true bill against them, in spite of Coke's threats and assurances that the chancellor was dead, and the dispute was referred to the king himself, who after consulting his counsel and on Bacon's advice decided in favour of equity. The chancellor's triumph was a great one, and from this time the equitable jurisdiction of the court of chancery was unquestioned. In June 1616 he supported the king in his dispute with and dismissal of Coke in the case of the *commendams*, agreeing with Bacon that it was the judge's duty to communicate with the king, before giving judgments in which his interests were concerned, and in November warned the new lord chief justice against imitating the errors of his predecessor and especially his love of "popularity."[10] Writing in 1609 to Salisbury, the chancellor had described Coke (who had long been a thorn in his flesh) as a "frantic, turbulent and idle broken brayned fellow," apologizing for so often troubling Salisbury on this subject, "no fit exercise for a chancellor and a treasurer."[11] He now summoned Coke before him and communicated to him the king's dissatisfaction with his *Reports*, desiring, however, to be spared further service in his disgracing. After several petitions for leave to retire through failing health, he at last, on the 3rd of March 1617, delivered up to James the great seal, which he had held continuously for the unprecedented term of nearly twenty-one years. On the 7th of November 1616 he had been created Viscount Brackley, and his death took place on the 15th of March 1617. Half an hour before his decease James sent Bacon, then his successor as lord keeper, with the gift of an earldom, and the presidentship of the council with a pension of £3000 a year, which the dying man declined as earthly vanities with which he had no more concern. He was buried at Dodleston in Cheshire.

As Lord Chancellor Ellesmere he is a striking figure in the long line of illustrious English judges. No instance of excessive or improper use of his jurisdiction is recorded, and the famous case which precipitated the contest between the courts was a clear travesty of justice, undoubtedly fit for the chancellor's intervention. He refused to answer any communications from suitors in his court,[12] and it was doubtless to Ellesmere (as weeding out the "enormous sin" of judicial corruption)[13] that John Donne, who was his secretary, addressed his fifth satire. He gained Camden's admiration, who records an anagram on his name, "Gestat Honorem." Bacon, whose merit he had early recognized, and whose claims to the office of solicitor-general he had unavailingly supported both in 1594 and 1606, calls him "a true sage, a salvia in the garden of the state," and speaks with gratitude of his "fatherly kindness." Ben Jonson, among the poets, extolled in an epigram his "wing'd judgements," "purest hands," and constancy. Though endowed with considerable oratorical gifts he followed the true judicial tradition and affected to despise eloquence as "not decorum for judges, that ought to respect the Matter and not the Humours of the Hearers."[14] Like others of his day he hoped to see a codification of the laws,[15] and appears to have had greater faith in judge-made law than in statutes of the realm, advising the parliament (October 27, 1601) "that laws in force might be revised and explained and no new laws made," and describing the Statute of Wills passed in Henry VIII.'s reign as the "ruin of ancient families" and "the nurse of forgeries." In the thirty-eighth year of Elizabeth he drew up rules for procedure in the Star Chamber,[16] restricting the fees, and in the eighth of James I. ordinances for remedying abuses in the court of chancery. In 1609 he published his judgment in the case of the Post Nati, which appears to be the only certain work of his authorship. The following have been ascribed to him:—*The Privileges and Prerogatives of the High Court of Chancery* (1641); *Certain Observations concerning the Office of the Lord Chancellor* (1651)—denied by Lord Chancellor Hardwicke in *A Discourse of the Judicial Authority of the Master of the Rolls* (1728) to be Lord Ellesmere's work; *Observations on Lord Coke's Reports*, ed. by G. Paul (about 1710), the only evidence of his authorship being apparently that the MS. was in his handwriting; four MSS., bequeathed to his chaplain, Bishop Williams, viz. *The Prerogative Royal, Privileges of Parliament, Proceedings in Chancery* and *The Power of the Star Chamber; Notes and Observations on Magna Charta, &c.*, Sept. 1615 (Harl. 4265, f. 35), and *An Abridgment of Lord Coke's Reports* (see MS. note by F. Hargrave in his copy of *Certain Observations concerning the Office of Lord Chancellor*, Brit. Mus. 510 a 5, also *Life of Egerton*, p. 80, note T, catalogue of Harleian collection, and Walpole's *Royal and Noble Authors*, 1806, ii. 170).

He was thrice married. By his first wife, Elizabeth, daughter of Thomas Ravenscroft of Bretton, Flintshire, he had two sons and a daughter. The elder son, Thomas, predeceased him, leaving three daughters. The younger, John, succeeded his father as 2nd Viscount Brackley, was created earl of Bridgewater, and, marrying Lady Frances Stanley (daughter of his father's third wife, widow of the 5th earl of Derby), was the ancestor of the earls and dukes of Bridgewater (*q.v.*), whose male line became extinct in 1829. In 1846 the titles of Ellesmere and Brackley were revived in the person of the 1st earl of Ellesmere (*q.v.*), descended from Lady Louisa Egerton, daughter and co-heir of the 1st duke of Bridgewater.

No adequate life of Lord Chancellor Ellesmere has been written, for which, however, materials exist in the Bridgewater MSS., very scantily calendared in *Hist. MSS. Comm.* 11th Rep. p. 24, and app. pt. vii. p. 126. A small selection, with the omission, however, of personal and family matters intended for a separate projected *Life* which was never published, was edited by J.P. Collier for the Camden Society in 1840.

1 *Athenae Oxon.* (Bliss), ii. 197.

2 D’Ewes’s *Parliaments of Elizabeth*, 441, 442.

3 *Cal. of St. Pap., Dom.*, 1601-1603, p. 191.

4 Birch’s *Mem. of Queen Elizabeth*, i. 479.

5 *Hist. MSS. Comm.* 11th Rep. p. 24.

6 T. Birch’s *Mem. of Queen Elizabeth*, ii. 384.

7 *Cal. of St. Pap., Dom.*, 1598-1601, pp. 554, 583.

8 *State Trials*, ii. 909.

9 *Cal. St. Pap., Dom.*, 1611-1618, p. 381.

10 *Cal. St. Pap., Dom.*, 1611-1618, p. 407.

11 *Lansdowne MS.* 91, f. 41.

12 *Hist. MSS. Comm.* app. pt. vii. p. 156.

13 *Life of Donne*, by E. Gosse, i. 43.

14 Judgment on the Post Nati.

15 Speech to the parliament, 24th of October 1597.

16 *Harleian MS.* 2310, f. i.; Gardiner’s *Hist. of England*, ix. 56.

BRACKLEY, a market town and municipal borough in the southern parliamentary division of Northamptonshire, England, 59 m. N.W. by W. from London by the Great Central railway; served also by a branch of the London & North-Western railway. Pop. (1901) 2467. The church of St Peter, the body of which is Decorated and Perpendicular, has a beautiful Early English tower. Magdalen College school was founded in 1447 by William of Waynflete, bishop of Winchester, bearing the name of his great college at Oxford. Of a previous foundation of the 12th century, called the Hospital of St John, the transitional Norman and Early English chapel remains. Brewing is carried on. The borough is under a mayor, 4 aldermen and 12 councillors. Area, 3489 acres.

Brackley (Brachelai, Brackele) was held in 1086 by Earl Alberie, from whom it passed to the earl of Leicester and thence to the families of De Quinci and Holand. Brilliant tournaments were held in 1249 and 1267, and others were prohibited in 1222 and 1244. The market, formerly held on Sunday, was changed in 1218 to Wednesday, and in answer to a writ of *Quo Warranto* Maud de Holand claimed in 1330 that her family had held a fair on St Andrew’s day from time immemorial. In 1553 Mary granted two fairs to the earl of Derby. By charter of 1686 James II. incorporated the town under a mayor, 6 aldermen, and 26 burgesses, granted three new fairs and confirmed the old fair and market. In 1708 Anne granted four fairs to the earl of Bridgewater, and in 1886 the borough had a new charter of incorporation under a mayor, 4 aldermen and 12 councillors under the Municipal Corporations Act of 1882. Camden (*Brit.* p. 430) says that Brackley was formerly a famous staple for wool. It first sent members to parliament in 1547, and continued to send two representatives till disfranchised by the Reform Act of 1832. The town formerly had a considerable woollen and lace-making trade.

BRACQUEMOND, FÉLIX (1833-), French painter and etcher, was born in Paris. He was trained in early youth as a trade lithographer, until Guichard, a pupil of Ingres, took him to his studio. His portrait of his grandmother, painted by him at the age of nineteen, attracted Théophile Gautier’s attention at the Salon. He applied himself to engraving and etching about 1853, and played a leading and brilliant part in the revival of the etcher’s art in France. Altogether he has produced over eight hundred plates, comprising portraits, landscapes, scenes of contemporary life, and bird-studies, besides numerous interpretations of other artists’ paintings, especially those of Meissonier, Gustave Moreau and Corot. After having been attached to the Sèvres porcelain factory in 1870, he accepted a post as art manager of the Paris *atelier* of the firm of Haviland of Limoges. He was connected by a link of firm friendship with Manet, Whistler, and all the other fighters in the impressionist cause, and received all the honours that await the successful artist in France, including the grade of officer of the Legion of Honour in 1889.

BRACTON, HENRY DE (d. 1268), English judge and writer on English law. His real name was Bratton, and in all probability he derived it either from Bratton Fleming or from Bratton Clovelly, both of them villages in Devonshire. It is only after his death that his name appears as “Bracton.” He seems to have entered the king’s service as a clerk under the patronage of William Raleigh, who after long service as a royal justice died bishop of Winchester in 1250. Bracton begins to appear as a justice in 1245, and from 1248 until his death in 1268 he was steadily employed as a justice of assize in the south-western counties, especially Somerset, Devon and Cornwall. During the earlier part of this period he was also sitting as a judge in the king’s central court, and was there hearing those pleas which “followed the king”; in other words, he was a member of that section of the central tribunal which was soon to be distinguished as the king’s bench. From this position he retired or was dismissed in or about the year 1257, shortly before the meeting of the Mad Parliament at Oxford in 1258. Whether his disappearance is to be connected with the political events of this turbulent time is uncertain. He continued to take the assizes in the south-west, and in 1267 he was a member of a commission of prelates, barons and judges appointed to hear the complaints of the disinherited partisans of Simon de Montfort. In 1259 he became rector of Combe-in-Teignhead, in 1261 rector of Barnstaple, in 1264 archdeacon of Barnstaple, and, having resigned the archdeaconry, chancellor of Exeter cathedral; he also held a prebend in the collegiate church at Bosham. Already in 1245 he enjoyed a dispensation enabling him to hold three ecclesiastical benefices. He died in 1268 and was buried in the nave of Exeter cathedral, and a chantry for his soul was endowed out of the revenues of the manor of Thorverton.

His fame is due to a treatise on the laws and customs of England which is sufficiently described elsewhere (see English Law). The main part of it seems to have been compiled between 1250 and 1256; but apparently it is an unfinished work. This may be due to the fact that when he ceased to be a member of the king’s central court Bracton was ordered to surrender certain judicial records which he had been using as raw material. Even though it be unfinished his book is incomparably the best work produced by any English lawyer in the middle ages.

The treatise was published in 1569 by Richard Tottel. This text was reprinted in 1640. An edition (1878-1883) with English translation was included in the Rolls Series. Manuscript copies are numerous, and a critical edition is a desideratum. See Bracton’s *Note-Book* (ed. Maitland, 1887); *Bracton and Azo* (Selden Society, 1895).

(F. W. M.)

BRADAWL (from “brad,” a flat nail, and “awl,” a piercing tool), a small tool used for boring holes (see Tool).

BRADDOCK, EDWARD (1695?-1755), British general, was born in Perthshire, Scotland, about 1695. He was the son of Major-General Edward Braddock (d. 1725), and joined the Coldstream Guards in 1710. In 1747 as a lieutenant-colonel he served under the prince of Orange in Holland during the siege of Bergen-op-Zoom. In 1753 he was given the colonelcy of the 14th foot, and in 1754 he became a major-general. Being appointed shortly afterwards to command against the French in America, he landed in Virginia in February 1755. After some months of preparation, in which he was hampered by administrative confusion and want of resources, he took the field with a picked column, in which George Washington served as a volunteer officer, intended to attack Fort Duquesne (Pittsburg, Pa.). The column crossed the Monongahela river on the 9th of July and almost immediately afterwards fell into an ambuscade of French and Indians. The troops were completely surprised and routed, and Braddock, rallying his men time after time, fell at last mortally wounded. He was carried off the field with difficulty, and died on the 13th. He was buried at Great Meadows, where the remnant of the column halted on its retreat to reorganize. (See Seven Years’ War.)

BRADDOCK, a borough of Allegheny county, Pennsylvania, U.S.A., on the Monongahela river, 10 m. S.E. of Pittsburg. Pop. (1890) 8561; (1900) 15,654, of whom 5111 were foreign-born; (1910 census) 19,357. Braddock is served by the Pennsylvania, the Baltimore & Ohio, and the Pittsburg & Lake Erie railways. Its chief industry is the manufacture of steel—especially steel rails; among its other manufactures are pig-iron, wire rods, wire nails, wire bale ties, lead pipe, brass and electric signs, cement and plaster. In 1905 the value of the borough’s factory products was $4,199,079. Braddock has a Carnegie library. Kennywood Park, near by, is a popular resort. The municipality owns and operates

the water-works. Braddock was named in honour of the English general Edward Braddock, who in 1755 met defeat and death near the site of the present borough at the hands of a force of French and Indians. The borough was first settled at the close of the 18th century, and was incorporated in 1867.

BRADDON, MARY ELIZABETH (1837-), English novelist, daughter of Henry Braddon, solicitor, of Skirdon Lodge, Cornwall, and sister of Sir Edward Braddon, prime minister of Tasmania, was born in London in 1837. She began at an early age to contribute to periodicals, and in 1861 produced her first novel, *The Trail of the Serpent*. In the same year appeared *Garibaldi*, accompanied by *Olivia*, and other poems, chiefly narrative, a volume of extremely spirited verse, deserving more notice than it has received. In 1862 her reputation as a novelist was made by a favourable review in *The Times of Lady Audley's Secret*. *Aurora Floyd*, a novel with a strong affinity to *Madame Bovary*, followed, and achieved equal success. Its immediate successors, *Eleanor's Victory, John Marchmont's Legacy, Henry Dunbar*, remain with her former works the best-known of her novels, but all her numerous books have found a large and appreciative public. They give, indeed, the great body of readers of fiction exactly what they require; melodramatic in plot and character, conventional in their views of life, they are yet distinguished by constructive skill and opulence of invention. For a considerable time Miss Braddon conducted *Belgravia*, in which several of her novels appeared. In 1874 she married Mr John Maxwell, publisher, her son, W.B. Maxwell, afterwards becoming known as a clever novelist and newspaper correspondent.

BRADFORD, JOHN (1510?-1555), English Protestant martyr, was born at Manchester in the early part of the reign of Henry VIII., and educated at the local grammar school. Being a good penman and accountant, he became secretary to Sir John Harrington, paymaster of the English forces in France. Bradford at this time was gay and thoughtless, and to support his extravagance he seems to have appropriated some of the money entrusted to him; but he afterwards made full restitution. In April 1547 he took chambers in the Inner Temple, and began to study law; but finding divinity more congenial, he removed, in the following year, to St Catharine's Hall, Cambridge, where he studied with such assiduity that in little more than a year he was admitted by special grace to the degree of master of arts, and was soon after made fellow of Pembroke Hall, the fellowship being "worth seven pound a year." One of his pupils was John Whitgift. Bishop Ridley, who in 1550 was translated to the see of London, sent for him and appointed him his chaplain. In 1553 he was also made chaplain to Edward VI., and became one of the most popular preachers in the kingdom, earning high praise from John Knox. Soon after the accession of Mary he was arrested on a charge of sedition, and confined in the Tower and the king's bench prison for a year and a half. During this time he wrote several epistles which were dispersed in various parts of the kingdom. He was at last brought to trial (January 1554/5) before the court in which Bishop Gardiner sat as chief, and, refusing to retract his principles, was condemned as a heretic and burnt, with John Leaf, in Smithfield on the 1st of July 1555.

His writings, which consist chiefly of sermons, meditations, tracts, letters and prayers, were edited by A. Townsend for the Parker Society (2 vols. 8vo, Cambridge, 1848-1853).

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