NELSON'S ENCYCLO= PÆDIA

NELSON'S ENCYCLO-PÆDIA

NELSON'S ENCYCLOPÆDIA

VOL. III.

B—Blewfields

LIST OF CONTRACTIONS USED IN THIS WORK.

ac., acres.
agric., agricultural.
alt., altitude.
anc., ancient.
ann., annual.
Ar., Arabic.
Aram., Aramaic.
arr., arrondissement.
A.S., Anglo-Saxon.
aver., average.
bor., borough.
bur., burgh.
c. (**circa**), about.
cap., capital.
cf., compare.
co., county.
Com., Commission.
comm., commune.
cub. ft., cubic feet.
Dan., Danish.
dep., department.
dist., district.
div., division.
Du., Dutch.
E., east.
eccles., ecclesiastical.
ed., edition; edited.
e.g., for example.
Eng., English.
episc., episcopal.
est., estimated.
et seq., and following.
F., Fahrenheit.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ger., German.
gov., government.
Gr., Greek.
Heb., Hebrew.
I., **isl.**, island.
ibid., the same.
i.e., that is.
in., inches.
Ital., Italian.
Lat., Latin.
lat., latitude.
l. bk., left bank.
lit., literally.
long., longitude.
m., miles.
mrkt. tn., market-town.
Mt., **mts.**, mount, mountain, -s.
munic., municipal.
N., north.
N.T., New Testament.
O.T., Old Testament.
par., parish.
parl., parliamentary.
Per., Persian.
pop., population.
Port., Portuguese.
prov., province.
q.v., which see.
R., **riv.**, river.
r. bk., right bank.
R.V., Revised Version.
ry., railway.
ry. jn., railway junction.
S., south.
Sans., Sanskrit.
seapt., seaport.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square miles.
stn., station.
s.v., under the word.
Syr., Syriac.
temp., temperature.
terr., territory.
trans., translated.
trib., tributary.
U.S.A., United States of America.
vil., village.
vol., volume.
W., west.
wat.-pl., watering-place.
yds., yards.

Railways—C.R., Caledonian Railway; **C.P.R.**, Canadian Pacific Railway; **G.E.R.**, Great Eastern Railway; **G. & S.W.R.**, Glasgow and South-Western Railway; **L. & N.W.R.**, London and North-Western Railway; **N.B.R.**, North British Railway, etc., etc.

Bibliography—Biog. Dict., Biographical Dictionary; **Encyc. Brit.**, Encyclopædia Britannica; **Proc. Royal Geog. Soc.**, Proceedings of the Royal Geographical Society; **Jour.**, Journal; **Hist.**, History; **Mag.**, Magazine, etc., etc.

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B

B. This letter represents a sound which differs very slightly in different languages. Before utterance the stream of breath is stopped by the lips, hence the modern classification of B as a stop consonant; it is the voiced labial stop. Like other stop consonants, it tends to change into the corresponding spirant, *v*. In this way the letter may come to represent the sound *v*. It did so partially in Latin from the 2nd century, and the usage passed to Britain also. In modern Greek, β has the value of *v*. In Irish, B is *b* mutated—*i.e.* *v* or *w*. Similarly, Hebrew בּ is B, ב *v*. In English, *b* has shown a tendency to become silent before *t* and after *m* ('debt,' 'lamb'). B is the Greek form of the sign, and became the Latin also. Except as a 'capital,' it is now supplanted by other forms. b is a Roman modification, which perhaps originated when the loops of B were written from the bottom. ℓ is a cursive variation of b (14th century). β and ϐ are the principal Greek minuscule variants. The Semitic original, 𐤁, was open at the bottom on the left. The Aramaic alphabet opened the top loop, and finally lost it entirely. Hence Hebrew בּ is the lower part of English B, in Arabic reduced to ـبـ. The Semitic name *beth* means 'house;' Greek *beta* is the same word.

B, in music, is the seventh degree or 'leading note' of the natural scale of C. In French and Italian it is called *si;* in German, H (*Ha*), with B for our B♭. The key of B natural has five sharps; that of B♭ has two flats.

Baader, Franz Xaver von (1765–1841), German Roman Catholic mystic and philosopher, professor of philosophy and theology at Munich (1826), was a spiritual descendant of Boehme, with whose works he became acquainted when travelling in England (1792–6). His works, with *Life* (vol. xv.), were published in 16 vols. (1850–60); and a selection, with *Life*, ed. Claassen, in 2 vols. (1886–7).

Baal (Heb. 'lord'), the name of the chief male deity of the N. Semiticnations, typifying the sun as the owner and fructifier of the soil. There was a magnificent temple to *the* Baal at Tyre. The worship of the Sidonian Baal was introduced into Israel by Jezebel, Ahab's Syrian wife. It spread in spite of the remonstrances of Elijah, but was finally banished by

Jehu in 884 B.C. Allied to Baal worship were the cults of the Babylonian god Bel and the Tyrian god Mel. The name Baal appears frequently in the composition of names both of places and of persons — *e.g.* Baalbek, Jezebel, Hasdrubal, Hannibal ('Baal is gracious'). See W. R. Smith's *Religion of the Semites* (ed. 1894) and Sayce's *Hibbert Lectures* (1887). See PHŒNICIA.

Baalbek (Gr. *Heliopolis*, 'city of the sun;' Scrip. *Baalath*), ancient city of Syria, on the plateau (alt. 4,500 ft.) of El Beka'a, at the foot of Anti-Libanus, 35 m. N. by W. of Damascus; chiefly remarkable for the magnificence of its ruins, which occupy a site analogous to that of the Acropolis of Athens. The temple of Jupiter (Little Temple), or the Sun, stands to the S. of the Great Temple. A third ruin is known as the Circular Temple. Elsewhere are numerous columns, altars, and the remains of the city walls (2 m. in circuit). The older portions of the acropolis wall are probably of Phœnician or kindred origin, and date from a time when the worship of Baal was supreme. The early history of Baalbek is lost in the mists of antiquity; but as it stood on the route between Tyre and Palmyra, it early became a great entrepôt of Oriental commerce. Under Alexander the Great it rose to a high degree of prosperity, and Augustus made it a Roman colony. Antoninus Pius erected the Great Temple, which Theodosius converted into a Christian church. The Arabs conquered Baalbek in 636, after a stubborn resistance; in 1139, and again in 1260, it was captured by the Mongols; and Timur Beg (Tamerlane) utilized the temple as a fortress (1400). From this period the decline of Baalbek was rapid, and an earthquake (1759) completed the devastation begun by Tartars, Turks, and Damascene pashas. During the Crusades the city was frequently the centre of warlike operations. It is now a poverty-stricken little village, with about a hundred mean houses. The Germans excavated the site of the acropolis in 1900–2. See Wood's *The Ruins of Balbec* (1757; new ed. 1827); Lortet's *La Syrie d'aujourd'hui* (1884); Frauberger's *Die Akropolis von Baalbek* (1891); Puchstein's *Die Ruinen v. Baalbek* (1905); and *The Builder*, 11th Feb. 1905.

Baasha, a man of humble origin, who, having slain Nadab, son of Jeroboam I., ascended the throne of Israel about 914 B.C. His reign was marked by his active hostility to Asa, king of Judah, who had to seek the help of Syria. See 1 Kings 15:27–16:7.

Baba, title of respect = 'papa;' applied to ecclesiastic and secular dignitaries in Western Asia.

Baba (Slav. 'old woman'), the name of a fantastic being who plays a great rôle in the folklore of the Slavonic peoples, especially the Russian, where she is called Iaga-Baba. See Ralston's *Russian Folk-tales* (1873).

Babahan, or BEHBEHAN, tn., Persia, 150 m. S.W. of Ispahan. Pop. 10,000.

Babahoyo. See BODEGAS.

Babbacombe, or BABBICOMBE, seaside resort, Devonshire, England, 2 m. N.E. of Torquay; near is Kent's Cavern, noted for its numerous fossil remains of prehistoric fauna. Pop. 1,800.

Babbage, CHARLES (1791–1871), a scientific mechanician, who, with Herschel and Peacock, gave the first impulse to an English mathematical revival. He is famous for his unfinished calculating machines. Babbage was Lucasian professor of mathematics at Cambridge University (1828–39), and wrote a good little book called *Economy of Machinery* (1833), also *Tables of Logarithms*

Temple of Jupiter, Baalbek.

(1827; new ed. 1889). See Weld's *Hist. of Roy. Soc.*, vol. ii. ch. 11 (1848).

Babel, Tower of. The narrative of Gen. 11:1–9 is obviously intended to explain the different varieties of race and language, and the name Babel (Aram. *balbel*, 'confound') seemed to the writer a corroboration of the story. But it is probable that the legend arose from the name, which is really *Bâb-îli*, 'gate of God,' and has no connection whatever with the Aramaic word for 'confound.' Recent scholarship is disposed to identify the 'Tower of Babel' with the *zikkurrat* of the temple E-sagilla, the extensive ruins of which are now known as Amran, in Babylon itself. See Sayce's *Fresh Light from the Ancient Monuments* (1884), and his edition of G. Smith's *Chaldæan Account of Genesis* (1880). See also Babylonia.

Bab-el-Mandeb, strait uniting the Red Sea with the Indian Ocean (14½ m. wide). The island of Perim divides it into two unequal channels (the western 12¼ m. and the eastern 2 m. wide). The cape of the same name is on the Arabian side of the strait.

Babelthuap, volcanic isl., largest of the Pelew group (German), Pacific Ocean, about 7° 30′ N. and 134° E. Length, 30 m. Pop. about 2,500.

Baber (the Tiger), Zehir ed-Din Mohammed (1483–1530), first Mogul emperor in India, and founder of the Mogul dynasty, which lasted to the beginning of the 19th century, was a descendant of Timur-Beg (Tamerlane), and succeeded his father, Sheik Mirza, at the age of twelve on the throne of Andijan in Fergana. In 1504 he conquered Kandahar and Kabul, and thence made four expeditions against India between 1508 and 1525. In 1526 he appeared in the Punjab, defeated his opponents near Delhi, and occupied Delhi and Agra, and in the following year pushed his conquests as far as Bengal. He made Agra his favourite residence. Baber was also a poet, writing in both Turkish and Persian; but the most important of his literary works is his *Autobiography* or *Memoirs*, which he wrote in Turkish, at the end of his life: trans. into English by J. Leyden and Erskine under the title *Memoirs of Zehir ed-Din Mohammed Baber, Emperor of Hindustan* (1826). See Lane Poole's *Babar* (1899).

Babeuf, François Noel (1760–97), a French revolutionist who formed a plot against the French Directory, and was executed. See Advielle's *Histoire de Babeuf* (1884).

Babi and Babiism. The term Babiism denotes the tenets of a school of religious reformers who arose in Persia in the middle of the 19th century. The founder was a young sayid, Mirza Ali, son of Mohammed, who was born at Shiraz in 1819, and who, while resident near Bagdad, in 1844, began to preach a faith which differed in many respects from the orthodox Sufism of Persia. Regarding himself as the latest prophet of God, he took the title of *Bab al-Din* ('gate' or intermediary between the Twelfth Imam and the faithful), whence he became known as 'the Bab,' and his disciples as 'Babis.' Later he styled himself the *Nuqta* ('point,' 'centre,' or 'focus'), believing that in him all previous dispensations centred. Mohammed, Christ, and Moses he revered as prophets, but as *his* forerunners. The doctrine which he preached was largely a healthy protest against the ideas of the Persian hierarchy. He forbade polygamy and concubinage, as degrading to womanhood, and he placed women on the same level as men. Asceticism and mendicancy he equally con-

demned; and although disapproving of the use of intoxicating liquors, he advocated a life of generosity to oneself as well as to one's neighbours. But his creed was also strongly tinctured with Gnostic, Pantheistic, and Buddhist ideas. The numbers 7 and 19, for example, are regarded as of great significance. The latter number, indeed, expressed the name of the Deity, whom he believed to be incarnate in himself and his eighteen fellow-prophets or colleagues, but chiefly in himself. The preaching of doctrines such as these quickly aroused the antagonism of the orthodox mullahs. It was in 1843–4 that the Bab distinctly declared himself. By the year 1848 he and his followers were in open rebellion against their persecutors; but after a brave resistance they were defeated and dispersed, and the prophet himself was, on July 8, 1850, put to death at Tabriz. An attempt against the life of Shah Nasr ed-Din in 1852, attributed to the Babis, led to renewed severities; and they were deported (1863) to Constantinople, and shortly after to Adrianople, and again in 1868 to Famagusta in Cyprus. Since 1868 Acre has been the home of a section led by Baha, who now number between half a million and a million. A new schism ensued upon the death of Baha. There are some 3,000 Babis in the United States. See E. G. Browne, *A Traveller's Narrative, written to illustrate the Episode of the Bab* (1891), *The New History of the Bab* (1893), and his *Persian Revolution* (1910); and Khayru'llah and H. MacNutt, *Beha'u'llah* (Chicago, 1900).

Babi Island, Sumatra. See SIMALU.

Babington, ANTHONY (1561–86), English Roman Catholic conspirator, served as page to Queen Mary of Scotland, to whom he was devoted. Having been selected by an association of youths for the purpose, he led the conspiracy to kill Elizabeth and release Mary. Babington confided their plot to Mary, who wrote her approval (July 17, 1586) in the letter which brought her, Babington, and the other conspirators to the scaffold. See W. D. Cooper's *Notices of Anthony Babington* (1862), repr. from the *Reliquary* for April 1862; *State Trials*, vol. i.; Turnbull's *Letters of Mary Stuart* (1845); and Froude and Lingard's *Hists. of England*.

Babington, CHARLES CARDALE (1808–95), professor of botany at Cambridge; wrote *Manual of British Botany* (1843; 8th ed. 1881). He left his herbarium of 50,000 specimens and his library to Cambridge University. See his *Memorials, Journal*, etc. (1897).

Babington, WILLIAM (1756–1833), physician and mineralogist; was the founder of the Geological Society, and author of *A Systematic Arrangement of Minerals reduced to the Form of Tables* (1795), and *A New System of Mineralogy* (1799).

Babinski Phenomenon. A recently discovered physical sign of disease of the central nervous system. In normal conditions, when the sole of the foot is gently stroked the great toe bends towards the sole (so-called flexor response); in some organic diseases of the nervous system a similar stroking causes the great toe to bend away from the sole (extensor response). This extensor response, or Babinski sign, is not invariably an indication of organic disease, but it is nevertheless a useful test in differentiating functional from organic disease of the nervous system.

Babirusa, or BABYROUSSA, an interesting mammal closely allied to the common pig, but found only in Celebes and Buru, in the E. Indies. Its special peculiarity lies in the fact that the canine

teeth in the male go on growing throughout life, and form huge, curved, hornlike structures arching over the snout. The upper canines do not enter the mouth at all, but perforate the skin of the face, and arch backwards over the forehead. Though undoubtedly homologous with the tusks and horns often present in the male sex in hoofed animals, the exact use of these remarkable teeth is quite uncertain, and has given rise to much discussion. See A. R. Wallace's *The Malay Archipelago* (1890).

Baboon, a name which should strictly be applied only to African monkeys of the genus Cynocephalus. These monkeys are distinguished by the fact that the fore and hind limbs are nearly equal, and that the animals are thus adapted for quadrupedal progression on the ground, rather than for arboreal life like other monkeys. The face and jaws are large, and the brain-case relatively small, giving rise to the name dog-faced monkeys (*Cynocephalus*). The baboon which was sacred to the ancient Egyptians is supposed to have been the hamadryad. For examples, see MANDRILL, CHACMA, DRILL.

Babrius, a Greek poet, probably before the time of Augustus. His work, called *Fables*, in ten books, was a version of *Æsop's Fables*, and seems to have been the base of all the various Æsopean fables which have come down to us. In 1842 a Greek named Minas discovered 123 fresh *Æsop's Fables*, under the name of Babrius, in a MS. at Mount Athos; and others were discovered in MSS. in the Vatican library by Knöll in 1877; and yet others on wax tablets at Palmyra by Von Assendelft in 1891. Ninety-five other fables brought forward by Minas in 1857 have been pronounced forgeries by Conington and others. The best editions are those of Rutherford (1883) and Cruzius (1897). See Bentley's *Dissertation on the Fables of Æsop* (1776); Tyrwhitt's *Dissertatio de Babri* (1776); Conington's *Miscellaneous Writings*, vol. ii. (1872).

Babu, a native of India who possesses a superficial education in English; though, strictly speaking, the term is equivalent to 'Mr.' For an admirable travesty of 'Babu' English, see Anstey's *Baboo Jabberjee, B.A.* (1897).

Babul Tree, of India (*Acacia arabica*), 30 to 40 feet high, yields a transparent gum which is used medicinally and also as food. The wood is used for railway sleepers, and the bark yields a brown tanning dye.

Babuyanes, fertile island group, largely volcanic, Philippines, N. of Luzon. The most important are Babuyan-Claro (with an active volcano), Calayan, and Camiguin, one of the largest (54 sq. m.), which yields large supplies of sulphur. Products: tobacco, rice, maize, and tropical fruits. Area, 212 sq. m. Pop. 10,000.

Baby. See INFANT.

Baby Farming. See INFANT LIFE PROTECTION.

Babylonia. This name is derived, through the Greek Βαβυλωνια, from the native *Bâb-îli* (rarely *Bâb-îlāni*), 'gate of God' (or 'of the gods'), the name of the city which, after the accession of the royal house known as the first dynasty of Babylon, became the capital of the country. The history of the name Bâb-îli is unknown, but it is not improbably due to a folk etymology, as is suggested by the fact that Nebuchadnezzar the Great often gives the name as Babilam (a form ending with *a*, and provided with the 'mimmation'), a way of writing it which bears a likeness to a city name read as Babalam, mentioned in an inscription of King Gaddas. Both form and meaning, however,

are of sufficient antiquity, as is shown by the fact that it was at an early date translated into the primitive language of the country under the form of Ka-dingira, with the same meaning.

In its widest extent the country stretched from about the 31st degree N. lat. in a S.E. direction to the Persian Gulf, having on the W. the Arabian desert, on the N. Mesopotamia and Assyria, and on the E. the plains at the foot of the mountains of Elam. It was anciently divided into different districts, which were inhabited by various tribes, in some cases speaking languages of a widely divergent nature. On the N. were the two districts of Sumer and Akkad, called by the non-Semitic inhabitants Kingi-Ura, corresponding with the Shinar of the Old Testament, which is derived either from Sumer, or from a dialectic form of Kingi-Ura, by the change of K into S. In Gen. 14:1, 9, the tract of which Ellasar (Larsa; the modern Senkara) was capital is mentioned as if it did not form part of Shinar, or Babylonia proper. The tract in the extreme S. was called *mât Tâmtim*, 'the country of the sea,' and had its own native governors until a comparatively late date. In addition to the above names, the district immediately bordering on Assyria was called Karing Dunias; and at least a portion of this, where Sippar and the city of Babylon lay, bore the name of Edina, or 'the plain' (*cf.* Gen. 10:2), and was, according to Fried. Delitzsch, the original of the Eden of Gen. 2:8, etc.

Besides the city of Babylon, which was the capital of the country in later days, Babylonia contained a number of other cities of the most remote antiquity, equalling, or perhaps exceeding, in that respect, Babylon itself. These were Sippar and Akkad, the Accad of Gen. 10:10; Uriwa or Ur, identified by ancient writers and modern scholars with the 'Ur of the Chaldees' of Gen. 11:28, now Muqayyar or Mugheir; Nippuru, stated by the rabbins to be the Calneh of Gen. 10:10, now Niffer; Unuga or Uruk, the Erech of Gen. 10:10, now Warka; Larsa=Ellasar (see above); Lagas, now Tel-loh (Tello), from which some very fine sculptures of ancient date have been obtained; Kis, now Hymer, near Babylon; Borsippa, now represented by the ruins of Birs-Nimrud, the celebrated tower identified (probably incorrectly) with the Biblical Tower of Babel; the sacred city of Eridu; Nisin or Isin; Dûr-îli; Aratta; Marad; and many others.

This fertile region is watered by two great rivers, which, rising in the mountains of Armenia, run through extensive districts before entering Babylonia, and fall ultimately into the Persian Gulf. Flowing through many hundreds of miles of territory, they have, in the course of centuries, brought down with them extensive alluvial deposits, of which a considerable stretch of country at the upper extremity of the gulf has been formed. Indeed, so great has been the addition of territory that a proper understanding of the statements referring to this part, in legend and in history, is only possible by bearing the fact in mind.

Numerous inscriptions found in the ruins of the cities testify to the success of the ancient Babylonians as agriculturists. The plain is still covered with a network of old canals, some of them of considerable extent, which anciently not only irrigated but also drained the land, keeping the inundation within due limits, and rendering healthier and more cultivable what is at present in too many cases a marsh. The digging of a new canal was considered, 2000 B.C., as being of sufficient importance to date by.

As is indicated by the tablets and the sculptures, at least two races anciently inhabited the country, each speaking its own language, and living side by side, until, in the course of centuries, they became one people. These two races were the Semitic Babylonians, who spoke a language akin to Hebrew and Arabic; and the non-Semitic population, speaking an agglutinative tongue generally regarded as Turanian, and akin to Finnish, Tartar, and Chinese. Which nationality was the first to enter the country and whether the entry of those who were not the aborigines was a peaceful one or not, is unknown. It is probably not without significance in this connection, however, that Nimrod or Merodach, the founder (according to Gen. 10:10 and the bilingual account of the creation) of the great cities of Babylonia, is described in Gen. 10:8 as a son of Cush, and therefore not of Semitic race, as his name likewise indicates. The great majority of the archaic inscriptions of the country are, moreover, in the non-Semitic language of the country, often called in Britain Akkadian, and generally, on the Continent, Sumerian. There were at least two dialects of this language, which was finally superseded by Semitic Babylonian about 2000 B.C., though isolated compositions in it of a later date are known. The earlier basreliefs of Babylonia also show types of the inhabitants of the time which are certainly not Semitic.

The beginnings of Babylonian history are lost in obscurity, but were certainly of considerable antiquity. According to the American explorers, the rubbish accumulations of the ancient city Nippuru (Niffer) go back no less than 10,000 years—that is to say, as far as 8000 B.C. Naturally this is disputed, though the site is certainly one of the most ancient in the land, as were also the Babel (Babylon), Erech, and Accad of Gen. 10:10, together with others less renowned. In the earliest period of which any record has been preserved, Babylonia was divided into a number of small states of varying extent and power. These were Kis, Girsu or Lagas (Tel-loh), Upe or Opis, Uriwa or Ur (Muqayyar), Unuga or Uruk (Erech), Ararma or Larsa (Ellasar), Agadé, Nisin or Isin, Babylon, and Asnunna or Esnunna, with one or two others. The earliest king is one whose monuments have been found at Niffer, and who calls himself 'lord of Kengi'—*i.e.* Sumer, or the south. He bore the name of En-sag-kus-anna, and is regarded as having reigned before 4500 B.C. The one historical event of his reign which is known is that he attacked the city of Kis, and dedicated the spoils which he captured to the god Ellila or Bel. Naturally, the small kingdom of Kis, against which En-sag-kus-anna fought, was of as great antiquity, and a state not without influence, as may be judged from the fact that its conquest was a thing worth boasting about, and that, at a later date, it attained to considerable power—its king, Mesilim (about 4000 B.C.), triumphing over a district whose name has not yet been read with certainty, but which seems to have lain near Opis. Equally glorious with the other states of Babylonia, however, was the little territory of which Lagas (Tel-loh) was the capital. Beginning with Uru-ka-gina, about 4500 B.C., this district possessed a line of rulers, sometimes called kings, but generally bearing the title of *patesi* or *issaku* (headman), who ruled the district wisely and well for a long series of years, until, as with the other states of Babylonia, the little kingdom was absorbed

into the great Babylonian empire. Whilst they reigned, however, they watched over the welfare of their subjects, and at the same time gained glory by foreign conquest. Thus Gudea, who reigned about 2700 B.C. or earlier, and who was one of the most renowned of the *issaku*, says that the god E-girsu (Nin-girsu), the patron deity of Lagas, 'delivered all things unto him from the upper sea to the lower sea' (the Mediterranean and the Persian Gulf). From Amalum (regarded as Amanus, in N. Syria) he brought cedar and other trees of large size; stone, among other places, from Musalla or Supsalla, in the mountains of Martu (the land of the Amorites). From Tidalum, a mountain in the same district, he brought a kind of limestone; from Melahha, identified with the peninsula of Sinai, gold dust; and from Til-Barsip, now Bir or Birajik, a material the nature of which is uncertain. Besides this, he claims to have smitten the city of Ansan, in Elam, with the sword, and to have dedicated its spoils to his deity E-girsu.

Exceedingly interesting is the history of the northern kingdom of Akkad. As far as can at present be ascertained, it was the state in which Semitic influence predominated, and seems, therefore, to have given to Babylonia its first dynasty of Semitic kings. Of these, the now celebrated ruler Sargani-sar-ali, known as Sargon of Agadé (Akkad), son of Itti-Bel, was the most renowned. According to a tablet of omens referring to his reign, he carried the arms of Akkad as far as the Mediterranean and Cyprus, in which island he seems to have set up an image of himself. To do this, he had to subjugate the land of the Amorites. This is the ruler of whom it is recorded that his mother placed him in a little ark on the Euphrates, and he was brought up by a canal overseer (?) who found him. Notwithstanding his popularity, he had on one occasion to put down a revolt which took place among all the elders of the land. His son, Naram-Sin, was no less renowned than he was, it being stated of him that he conquered Apirak and Maganna. The little recorded by this omen-tablet concerning the reign of Sargon is supplemented by recent French excavations at Susa, which show that he invaded Elam, an old Semitic colony.

It is noteworthy that though Sargon of Agadé came into contact with Babylon, that city does not appear as a place of importance until a comparatively late date; and that when it does come to the front, its kings gradually reduce all the other petty states to subjection, and the latter are not heard of afterwards except as integral parts of the Babylonian empire. Yet the city of Babylon must have had a past as glorious as any of the others. As is well known, the patron divinity of Babylon was Merodach, called, in Gen. 10:8 and elsewhere, Nimrod, who, as the reputed founder of the great cities of Babylonia, was in all probability the first really renowned king of the city and its district.

The city's history practically begins with the royal house called the dynasty of Babylon, consisting of eleven kings, who reigned, in all, about 290 years, beginning about 2200 B.C. Although this dynasty is called 'the dynasty of Babylon,' it was certainly not a Babylonian one. To all appearance it corresponds with what Berosus calls the Arabian dynasty, though he gives the number of the kings as nine, and makes the total of their reigns 245 years. Taking these rulers in order, the native records inform us that Sumu-abu, the first king, built or rebuilt various tem-

ples and fortifications, and destroyed Kazallu; Sumu-la-ilu or Sumu-le-el dug the 'canal of the Sun,' smote Halambu with the sword, destroyed the city of Kis, drove out Ya'zar-ilu from Kazallu, 'smote him with the sword' a few years later, and carried out several useful and defensive works, including the wall of Babylon. The next king, Zabû, among other things, restored (?) the great temple of Belus at Babylon, rebuilt (?) the walls of Kazallu, and inaugurated (?) an image of himself. Apil-Sin performed several pious works, including the setting up of a 'supreme throne' for the sun-god at Babylon; and Sinmubalit occupied himself largely with the digging of canals, building the defences of the chief towns, and other things of a similar nature. It is to Hammurabi, his son and successor, however, that the principal interest attaches. This ruler, whom a later text calls Ammurapi, is the Amraphel of Gen. 14. As there recorded, he took part, with Chedorlaomer of Elam, Arioch of Ellasar (Larsa), and Tidal, king of nations, in an attempt to reduce again to subjection the king of Sodom and his allies. There is no record in the inscriptions of Babylonia of any expedition of Hammurabi to Palestine, though there are three inscriptions which apparently refer to Kudur-Lagamar, or Chedorlaomer, one of them being in the form of a poetical legend. In the thirty-first year of his reign Hammurabi captured Rim-Sin (supposed to be the same as Arioch, with which name it agrees sufficiently well in meaning), thus putting an end to the last of the principalities independent of Babylon.

Hammurabi was succeeded by Samsu-iluna, his son, who also had a very successful reign. To all appearance he employed himself in consolidating the newly-formed kingdom, and to this end fortified certain cities. His other works were the restoration of temples (notably that of Belus at Babylon), the dedication of thrones, etc., to the gods, and the digging of canals. In the mutilated list of colophon dates there is a reference seemingly to the destruction of the city Eres; but as this place was, to all appearance, on Babylonian soil, warlike operations are doubtful. Of the other kings of the dynasty of Babylon little is known.

The names of many kings occur, but very little history, until the time of the Kassite dynasty, the first ruler of which was named Gandas or Gaddas (*c.* 1800 B.C.). This ruler calls himself 'king of the four regions, king of Sumer and Akkad, king of Babalam (for this last name see the opening section above). Seven reigns later we have the name of the celebrated king Agu or Agu-kak-riem, who states his titles at length thus: 'King of Kassu and Akkadu (Accad), king of the wide land of Babylon (*mât Bâb-îli*), colonizer of Asnunnak, an extended people, king of Padan (Padan-aram) and Alman, king of the land of Guti, a rebellious (?) people, the king who has quieted (?) the four regions, the obedient one of the great gods, am I.' He then goes on to state that he had sent and fetched (the images of) Merodach and his consort, Zir-panitum, from the land of Hani, and describes with what state they were replaced in shrines at Babylon.

In the time of Kallima-Sin and Burna-burias II. (*c.* 1430–1380 B.C.) Babylonia had relations with Egypt, and a daughter of the former was given in marriage to Amenophis III. A tragic passage in the history of Babylonia is that in which Kadasman-Murus (about 1370 B.C.), after deporting

the numerous Suti (nomads of the west), and building fortresses in the land of Amurru (Amorites), was killed by Kassites in Babylonia. This brought down upon the country the vengeance of the Assyrian king Assur-ubal-lit, whose grandson he was, and Suzigas (otherwise Nazi-bugas), whom they had raised to the throne, was deposed—Kuri-galzu II., a youth, son of Burna-burias, being installed in his place. A great deal of space is devoted, in the Babylonian chronicle, to this ruler (there is just the possibility that the text speaks of two kings bearing the same name), who seems to have had a very glorious reign. Among other things recorded of him is that Hurba-tila, king of Elam, sent him a challenge to battle, and, as a result, was defeated by him at Dûr-Dungi.

Another notable ruler was Nebuchadnezzar I., son of Ninib-nadin-sumi, who warred in Elam and the east generally, and in Syria (Amurru). He is said to have been defeated in battle by the Assyrian king Assur-rês-îsi. (See ASSYRIA.) How fortune varied for the Babylonians is illustrated by this, and also by the fact that during the reign of Simmas-Sihu, about 1040 B.C., the Sutu nomads invaded Babylonia, and carried off as spoil the property of the temple of the sun-god at Sippara.

About the year 892 B.C. the kingdom fell under the dominion of Tukulti-Ninip II., king of Assyria; but native rule was restored seven years later, when he met his death in a rebellion. (See ASSYRIA.) The result of this was that Babylonia had a great advantage; for Assyria not being in a position to make a vigorous resistance, the Babylonians, to all appearance, occupied and devastated a large part of the country. The next two kings mentioned by the chronicle are Bel-nadin-sumi and Ram-manu-sarra-iddina, in whose reigns the country suffered apparently on account of the invasions of an Elamite king named Kidin-hut-rudas. This in all probability weakened the country, enabling the Assyrians to defeat a later king, Nabu-abla-iddina, who had allied himself with the Shuites. Peace was concluded between the two powers in the reign of the Assyrian king Shalmaneser II. (See ASSYRIA.)

In 747 B.C. Nabonassar came to the throne, but all that is stated of his reign is that a revolt occurred in Babylon and Borsippa, but was quelled. As to his reign having commenced a historical era, there is no trace of that in the inscriptions. Perhaps the true explanation is that systematic astronomical observations were recorded in his time.

Nabu-nadin-zēri or Nadinu (Nadios), his son, reigned two years, meeting his death at the hands of Nabu-sum-ukîn or Sum-ukin, who reigned two months. Ukinzer (Chinziros), chief of the tribe of Bît-Amukkan (731 B.C.), was taken prisoner by Tiglath-pileser III. of Assyria, after a reign of three years. The Assyrian king, having seized the throne, ruled under the same name as in Assyria, though he is called Pulu (Pul, *cf.* 2 Ki. 15:19) in the Babylonian canon. He reigned in Babylonia two years, and was succeeded by Ululâ'a (Elulæus), as the canon calls the Assyrian king Shalmaneser IV. (See ASSYRIA.) On his death, in 721 B.C., Merodach-baladan II., a native of the district of the Persian Gulf, mounted the throne, and had a great many conflicts with the Assyrians. He was captured by them about 711 B.C., and Sargon of Assyria became king of Babylonia. On the death of Sargon, in 705 B.C., his son, Sennacherib,

became king of Babylon, but was repudiated by the Babylonians in 703 B.C., when Marduk-zakir-sumi was placed on the throne. This king, however, reigned only two months; for Merodach-baladan, having escaped from prison, killed him, and once more resumed the reins of government. He was soon again deposed by Sennacherib, and fled. The Assyrian king thereupon installed Bêl-ibnî, the Belibos of Ptolemy. The rule of this last, however, not being satisfactory, he was removed by the suzerain, who placed his own son, Assur-nadin-sumi, on the throne. Whilst Sennacherib was engaged in the south against Merodach-baladan, Nergal-usêzib, whom he had once defeated, seized Babylon, and taking Sennacherib's son prisoner, sent him to Elam. The Assyrian army returning, Nergal-usêzib was defeated and captured. Sennacherib next turned his attention to Elam, and whilst he was engaged there, Musêzib-Marduk mounted the Babylonian throne. Later, the Elamite king, Umman-menanu, seems to have become the friend of the Assyrians; for he invaded Babylonia, and having taken Musêzib-Marduk prisoner, sent him to the Assyrian king. Babylonia now fell under the rule of the Assyrians for twenty-one years (688–667 B.C.).

Sennacherib was assassinated in 680 B.C., and his son, Esarhaddon, who ruled Babylonia with moderation, and tried to repair the ravages which his father had made, succeeded him. On his death, in 669 B.C., his son, Samas-sum-ukin (Saosduchinos), came to the throne of Babylonia, apparently in accordance with his father's wish. During his reign the country was invaded by the Elamite king Urtaku, who persuaded Bel-ikisa, with some other Babylonian chiefs, to join him in attacking Samas-sum-ukin and Assur-bani-apli, his brother, the king of Assyria. The result was the deposition of the Elamite king. Samas-sum-ukin, however, did not like being regarded as his brother's vassal, and therefore bribed Umman-igas, the new Elamite king, to join him in throwing off the Assyrian yoke. The result was disaster, for in 648 B.C. the Assyrian army entered Babylon, and Samas-sum-ukin, setting fire to his palace, was burnt to death. He was succeeded by Kandalanu (Kineladanos), who is regarded by some as the same as Assur-bani-apli. The rule of this king lasted twenty-two years, and he was apparently succeeded (625 B.C.) by the Assyrian king Assur-êtil-îlāni, who occupied the throne for at least four years. His successor was Sin-sarra-iskun, the Saracos of Syncellus, whose general, Nabopolassar, having been sent to drive back certain barbarians who were said to be invading the country, revolted against his master, and allying himself with the Medes and others, succeeded with them in overthrowing the Assyrian empire. See ASSYRIA.

Nabopolassar took for his share of the spoils the kingdom of Babylonia, and made the country the richest and most influential in the then known world. He and his son attacked the Egyptians and defeated them; but the son learning, whilst on this expedition, that his father had died, hastened back to Babylonia to assume the reins of government. The glory of the reign of Nebuchadnezzar II., rightly called 'the Great,' is well known. He overran the states of Palestine, and having captured Jerusalem in 587 B.C., carried away the Jews into captivity. He captured Tyre after a siege of thirteen years (573 B.C.), and defeated and deposed Hophra, king of Egypt, setting on the throne Amasis, who, however, seems to

have revolted against his suzerain later on, necessitating another expedition to Egypt to reduce him again to subjection. Nebuchadnezzar is renowned as the restorer or rebuilder of all, or nearly all, the great temples and palaces of Babylon. He died in 562 B.C., and was succeeded by his son, Evil-Merodach, who, after a short reign of only two years, was assassinated by his brother-in-law, Neriglissar, who then mounted the throne. The record of the marriage of the daughter of Neriglissar with the high priest of Nebo at E-zida exists, and is preserved in the British Museum. Neriglissar was advanced in years when he came to the throne, and only reigned three years, being succeeded by his son, Labasi-Marduk (Labarosoardochos), who was assassinated after he had been on the throne only nine months, Nabo-na'id (Nabonidos or Labynitus) being thereupon made king (556 B.C.).

Much has still to be discovered ere we know all about this remarkable ruler, to whom students of Babylonian history owe so much. The son of a princely family of Babylon, he was to all appearance learned, well read, and an antiquarian. The accounts of his researches in the foundations of the ancient temples for records of his predecessors are of the highest value. He seems to have given over the direction of the military affairs of the kingdom into the hands of his son Belshazzar. During his reign the renown of Cyrus began to be spread abroad, and the Babylonian chronicle records that this conqueror attacked a petty ruler in the neighbourhood of Arbela. In the year 539 B.C. he began the subjugation of Babylonia, and Gobryas, his general, entered the capital on the 16th of Tammuz of the following year. At this time, to all appearance, Belshazzar was at the head of affairs, and practically king, and he seems to have been killed on the night of the 11th of Marcheswan, 539 B.C., in an attack made by Gobryas. The next year the king of Anzan, as Cyrus is called, found himself completely master of Babylonia, and assumed the reins of government. Babylonia had thereafter no separate existence. From time to time she tried to revolt, but always without success. The inhabitants saw with grief their ancient glories disappearing; and the foundation of Seleucia on the Tigris by Seleucus Nicator (312–280 B.C.) completed the ruin of the city. The Semitic Babylonian language, however, continued to be spoken and used in contracts almost, if not quite, until the Christian era, and the worship of their deities is said to have been carried on at the Birs-Nimrud (the temple known as E-zida) until the 4th century of the Christian era.

Though it is uncertain whether the ancient Babylonians were more civilized than their Egyptian contemporaries, there is but little doubt that they were the pioneers of civilization in the whole of Western Asia before Greece and Rome came to the front. Four thousand years B.C. their system of writing had already been developed, and applied also to the Semitic Babylonian tongue. Fourteen hundred years B.C., as the Tell-el-Amarna tablets testify, its use extended over the whole of Western Asia as far as the Mediterranean and Egypt. (See CUNEIFORM.) Though not a warlike people, the Babylonians possessed more than once what might have been described at the time as a world-wide empire. They were energetic, intelligent, polished in their way, and fond of letters. From 4000 B.C. onwards excellent sculptures and engravings on hard stone exist

to testify to their skill and artistic instincts. Representations of musical instruments imply also that the art of harmony was not altogether unknown to them. To this must be added agriculture, mensuration, and mathematics, such as they were; and their legal enactments, codified apparently by Hammurabi, are, in their way, noteworthy productions. In the matter of literature we owe to them no less than three accounts of the creation, two accounts of the flood, one of them put into the mouth of the Babylonian Noah (Utnapistim or Atra-hasis), who is represented as relating it to the semi-mythical Gilgames (Gilgamos), a primitive king of Erech (*Uruk-suburi*). To these must be added a number of other legends, such as the story of Ura (the pestilence), Etanna, the horse and the ox, with many others—one at least, the story of Sargon of Agadé, being historical.

It is difficult to judge which was the more predominant characteristic of the Babylonians, their trading instinct or their reverence for their gods, for both are equally marked. They had intercourse by means of trade with Elam on the east, Syria on the west, and many other places on the north and south whose names are not recorded. Slavery was common, and contracts concerning the buying, selling, and hiring of slaves are frequently met with. 'Fair Gutian slaves' are spoken of at an early date; and in the time of Cambyses a Babylonian soldier speaks of an Egyptian slave woman and her child, 'the spoil of his bow.' The Babylonians seem at all times, but especially at the earlier period, to have been very prone to litigation, and the large number of tablets of this class which exist show that though the men had generally only one wife, a second was at times taken, often to wait upon the first. Whether a man had children or not, he would, if it seemed good to him, adopt sons or daughters, to whom he was then under legal obligation to give part of his property. These foster children could not deny him except under penalty of loss of all claim to his estate, and some punishment, perhaps slavery. A husband could divorce his wife by paying a fine; and in addition to this she might take away the amount of her dowry. If, however, a woman denied her husband, the penalty was death, generally by drowning, at least in earlier times.

In common with all Semites, the Babylonians were exceedingly religious, and were consequently greatly in the power of their priests, through whom tithes and offerings to their numerous gods were made. Their earliest chief divinity was apparently the god Ea, lord of the deep, possessor of unsearchable wisdom, and creator of all things. When, however, Babylon became the chief city of the united states of Babylonia, Merodach, the god of that city, assumed the first place. He was a reflection of the sun, or the light of day, and was worshipped as he who constantly sought to do good to mankind. His chief title was Bel, 'the lord.' Other divinities were Samas, the sun-god; Sin, the moon-god; Nebo, the prophet or teacher; Nergal (Ura), the god of death and the grave; Beltu (Beltis), consort of Bel or Merodach: Istar, the goddess Venus, consort of Tammuz; Eres-ki-gala, goddess of Hades; and many others. It is noteworthy that the names of most of the deities of Babylonia are not Semitic, but in the language of the early Sumero-Akkadian inhabitants of the country. See Hommel's *Geschichte Babyloniens und Assyriens* (1885); Delitzsch's similar title (1891); Geo. Smith's and

Image of the Sun-God.

Stone Tablet recording the Restoration of the Temple of the Sun-God at Sippara, by Nabu-pal-iddina, about 900 B.C.

A. H. Sayce's *Hist. of Babylonia* (1877); Maspero's *The Dawn of Civilization*, ed. by Sayce (1896), and *The Struggle of the Nations*, ed. by the same (1897); M'Curdy's *History, Prophecy, and the Monuments* (1894, 1896); Radau's *Early Babylonian Hist.* (1900); Murison's *Babylonia and Assyria* (1901); Roger's *Hist. of Babylonia and Assyria* (1901); Harper's *Assyrian and Babylonian Literature* (1901); Pinches' *The O.T. in the Light of the Records*, etc. (1902); Law's *Old Babylonian Temple Records* (1907); and for translations, *The Records of the Past*, 1st ser., ed. by Birch, vols. i., iii., v., vii., ix., xi.; 2nd ser., ed by Sayce, vols. i.–vi. (1888–92); and, from time to time, in the *Proc. of the Soc. of Bib. Archæol.*, the *Jour. of the Royal Asiatic Soc.*, and the *Trans. of the Victoria Institute.*

Babylonish Captivity. See ISRAEL, HISTORY OF.

Babyroussa. See BABIRUSA.

Baca, THE VALLEY OF, through which the pilgrims march towards Zion (Ps. 84:6).

Bacacay, pueblo, Luzon, Philippines, prov. of and 10 m. N.E. of Albany; near the active volcano of Mayon, from which it has frequently suffered. Pop. 14,000.

Bacarra, tn., 3 m. N. of Laoag, prov. Ilocos Norte, N.W. of Luzon, Philippine Is. It is in a fertile agricultural district. Pop. 15,000.

Bacau or BAKAU, tn., Roumania cap. of county of same name, on the Bistritza, 50 m. W.S.W. of Jassy; was a considerable town as early as 1400, and has paper works and a lively trade. Pop. 16,000, of whom half are Jews.

Baccarat. The origin of the game of baccarat, or baccara—called more familiarly bac—is not known. It became the French gambling game *par excellence* during the latter portion of the reign of Louis Philippe, and still retains its pre-eminence in France. There are two forms of the game—*baccarat à banque* (sometimes called *baccarat à deux tableaux*) and *baccarat chemin de fer.* For a full description see GAMBLING. It is one of the unlawful games, and is forbidden in most clubs. See GAMING.

Baccarat, tn., Meurthe-et-Moselle dep., France, 16 m. S.E. of Lunéville. It possesses one of the most celebrated artistic glass factories in Europe, founded in 1765, and employing over 2,000 men. Pop. 7,000.

Bacchæ, also called Mænades and Thyiades, the female attendants of Bacchus. The name was also applied to the priestesses in the Dionysian festivals. For the play of that name see under EURIPIDES.

Bacchante, a British first-class armoured cruiser (12,000 tons), launched at Clydebank in 1901. The ship-name is associated with the capture of Fiume and Cattaro (1813).

Bacchantes, male and female devotees of Bacchus in his festival processions.

Bacchus. See DIONYSUS.

Bacchylides (*c.* 510–450 B.C.) of Ceos, one of the great lyric poets of Greece, was a nephew of Simonides. He lived for some time at the court of Hiero at Syracuse. Until 1896 only fragments of his poetry were extant, but in that year the British Museum obtained from Egypt a papyrus which contained twenty of his poems, of which six are practically perfect. Fourteen of these poems commemorate victories in the games; of the others, two are pæans, one a dithyramb, and two hymns. Bacchylides's poetry is distinguished by elegance and smoothness; he does not possess the depth and magnificence of Pindar, nor his difficulty of thought and language. Editions: Kenyon (1897), Sir R. Jebb

(1906), Blass (1898), trans. by Poste (1898).

Bacciochi, MARIA ANNA ELISA BONAPARTE. See BONAPARTES, THE.

Baccio della Porta. See BARTOLOMMEO, FRA.

Bach, ALEXANDER ANTON STEPHAN, BARON VON (1813–93), Austrian statesman; became minister of justice (1848), and minister of the interior (1849). After the death of Schwarzenberg (1853) he became the most powerful politician in Austria, an advocate of reactionary absolutism, and a strenuous opponent of the Slavs and Hungarians. He was ambassador at Rome (1859–67).

Bach, JOHANN SEBASTIAN (b. Eisenach, Mar. 21, 1685; d. Leipzig, July 28, 1750), musical composer. Johann Ambrosius (1645–95), the father of Sebastian, was court and town musician at Eisenach, and until he died gave his son lessons on the violin. Sebastian, after having been a violinist for a short time in the orchestra of Prince Johann Ernst at Weimar, held successively the posts of organist in Arnstadt (1704), in Mühlhausen (1707), at the court chapel of Weimar (1708), and of capellmeister to Prince Leopold at Köthen (1717). In 1723 he was appointed cantor at the school of St. Thomas, Leipzig, where he also served as director of music at the university and at the churches of St. Thomas and St. Nicholas. These appointments he held until his death. Bach's development of all forms of composition marks an epoch in the history of music. His orchestral works and chamber music gave a great stimulus to those branches of art, and his solo sonatas for violin and for violoncello hold a unique position among compositions for these instruments. Bach was perhaps the greatest organist of his generation, and his numerous productions for the instrument are still unsurpassed. Among his many vocal compositions may be instanced his magnificent Mass in B minor, and the Passions of St. Matthew and St. John. His valuable compositions for the clavier, and his introduction of a new system of fingering, which made each finger of equal importance, have exerted an enormous influence upon the modern art of piano playing; but of still greater moment was the fact that Bach, who tuned his own claviers, invented our present system of equal tempo. His *Wohltemperirtes Clavier*—forty-eight preludes and fugues in all keys—exemplifies the necessity of his method of tuning for keyboard instruments, and as a musical and technical work is considered indispensable to the trained pianist. The most complete edition of his works is that issued at Leipzig by the Bach Society between 1850 and 1900, in 59 folio vols. See his *Life* by Miss Kay Shuttleworth (1873), and the greatest work on the subject, *J. S. Bach*, by Philipp Spitta (1873–80; Eng. trans. 1884–5); also *Life* by Sir Hubert Parry (1909).

Bach, JOHANN CHRISTIAN (1735–82), the youngest son of Sebastian; after the death of his father he went to Berlin, and studied the piano under his brother Emanuel. In 1754 he became organist at Milan, whence he removed to London in 1759, and was appointed conductor to the queen. He wrote many compositions for the piano; several operettas, of which *Orione* (1763) had a great success, and another, *La Clemenza di Scipione*, was played as late as 1805. His wife, Cecilia Grassi, an Italian, was *prima donna* at the London opera for some years.

Bach, KARL PHILIP EMANUEL (1714–88), the third son of Sebastian, studied music under his

father, and law at the University of Leipzig and Frankfort-on-the-Oder, where he founded a music academy for the production of his own compositions. In 1738 he went to Berlin, where he became private pianist to the king, until in 1767 he went as musical director to Hamburg, where he remained for the rest of his life. Among his many compositions are sonatas, fantasias, and various pieces for the piano and orchestra, melodies for the Psalms, and the oratorio *The Israelites in the Wilderness*. He wrote also a didactic book of great value, *Versuch über die wahre Art das Klavier zu Spielen* (1753 and 1763, 2 vols.). See Bitter's *Karl Ph. Em. und Wilh. Fried. Bach und deren Brüder* (1868).

Bach, WILHELM FRIEDEMANN (1710–84), the eldest and most talented son of the above, studied under his father; became organist at Dresden (1733) and at Halle (1746–64). After resigning the latter appointment he led an irregular bohemian life, giving concerts and lessons, and died in Berlin in great poverty.

Bacharach, tn., prov. Rhineland, dist. Koblenz, Prussia, on the l. bk. of the Rhine, 22 m. S.S.E. of Koblenz. In the middle ages the staple market for the wines of the Rheingau. Pop. 2,000.

Bachelor. See CELIBACY and DEGREES.

Bachelors' Buttons, a term applied to double flowers of buttercups, and sometimes also to double daisies and other plants, such as the campion, the burdock, the scabious, etc.

Bächtold, JAKOB (1848–97), Swiss man of letters, professor of German language and literature at Zürich (1888). He wrote a useful *Geschichte der Deutschen Litteratur in der Schweiz* (1887–90); a good biography of Gottfried Keller (1892–6); and edited Mörike's *Briefwechsel* (1885, 1890, 1891), and Goethe's *Götz von Berlichingen* (2nd ed. 1887) and *Iphigenia auf Tauris* (2nd ed. 1887).

Bacillus. In 1680, Leeuwenhoek, a Dutch investigator, discovered bacteria, which he called *animalcula*, because of their movements. A century later a Danish scientist, Müller, named several types, and applied the term *bacillus* to straight, cylindrical, rodlike species similar to those figured by Leeuwenhoek. The tendency now is to restrict the name to a genus of non-motile, rodlike forms; but it is still commonly used for all species, whether motile or not. See BACTERIOLOGY.

Back, SIR GEORGE (1796–1878), British admiral and Arctic explorer, born at Stockport; entered the navy in 1808; served with Franklin in the *Trent*, in a voyage of discovery to the Arctic regions (1818), and accompanied Franklin on his overland expedition in N. America (1819). In 1825 he again assisted Franklin in his second Arctic expedition. In 1833, as commander, he took charge of the expedition to search for Sir John Ross, in the course of which he discovered the Great Fish or Back R., in Canada. He wrote a *Narrative of an Expedition in H.M.S. 'Terror'* (1838) and a *Narrative of the Arctic Land Expedition .... in 1833-5* (1836).

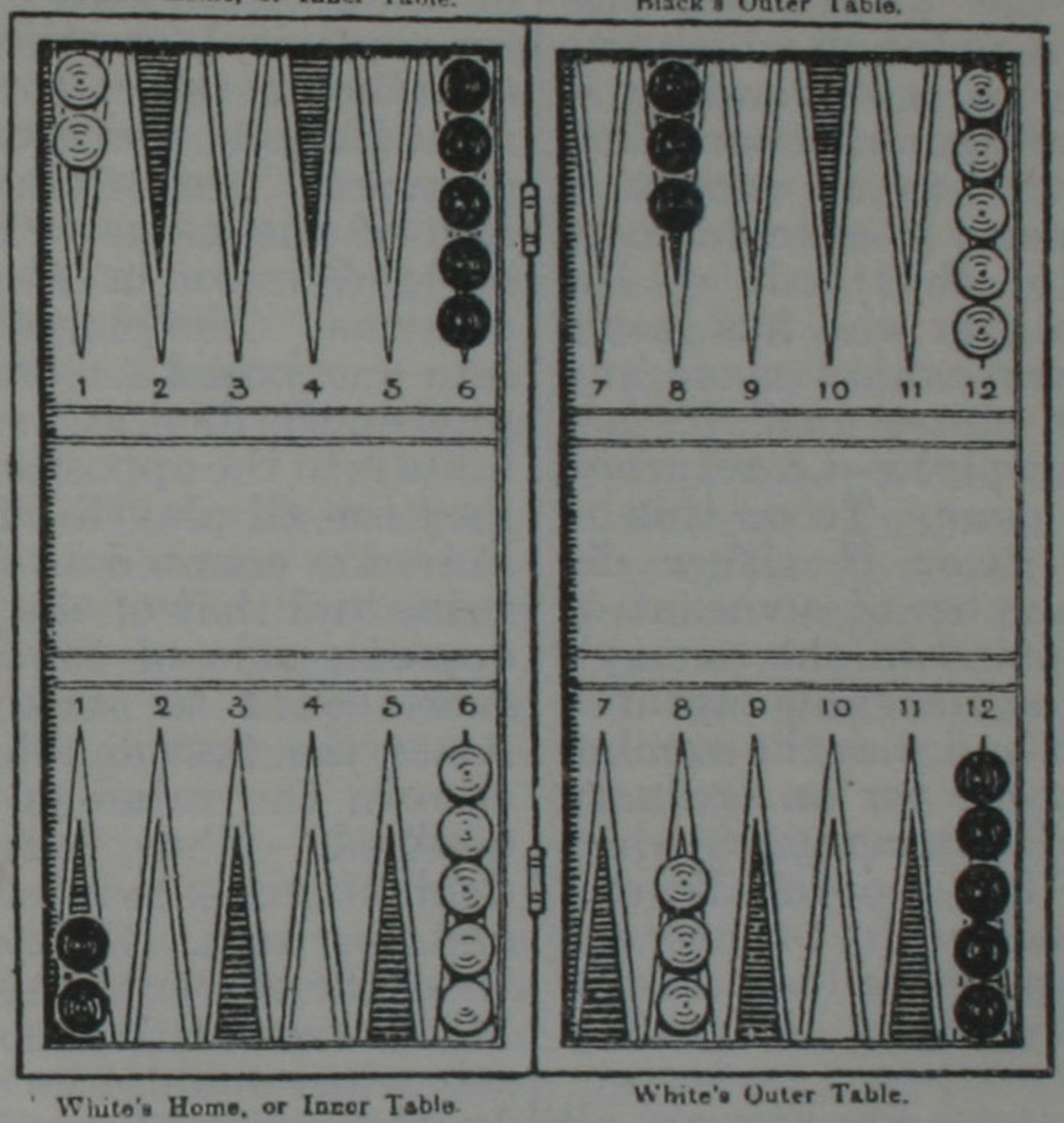
Back. See SPINE.

Backbond, in Scottish law a deed which qualifies and explains an absolute disposition reducing it to a disposition upon trust or in security.

Backergunge. See BAKARGANJ.

Backgammon. This game is played by two persons. Fifteen pieces, like those used for draughts, are placed on each side, the one set dark, the other light in colour. The board is divided into two equal compartments by

a raised border called the 'bar,' which runs from one player to the other. It is marked with twelve points (or *flèches*) in alternate colours at either end. These points are of such length that five pieces will rather more than cover them. A box and a pair of dice complete the apparatus. The arrangement of the game at its beginning is shown in the accompanying diagram, which gives the names of the points. The numbers are used only for simplifying the present article.



The Game of Backgammon.

The object of the game is for each player (1) to move all his men into his own home table, and then (2) to remove them from the board, under conditions to be explained. The line of movement for all pieces is in the direction of their own home table, from their own outer table, the enemy's outer table, and the enemy's home table, those standing in the last named having to pass through the others in the order named. The two sides, therefore, march in contrary directions.

The first move is decided by a throw of the dice. The first player then throws the two dice, and moves his pieces according to the numbers. If he throws 6, 3, he can move one piece to the sixth point in the authorized direction, and another three points; or he can move one piece six points and the same piece three more. He can take the six or the three move first, as he pleases. He *must* move as the dice decide; but if the point at which he aims is occupied, then he cannot move for that half of his throw, which is lost. The other player then casts the dice, and moves accordingly; and so on, by alternate throw of the

dice. Thus, White, beginning, throws 4, 3: he may then move one piece from point White 8 to White 4, and another piece from White 6 to White 3. Black then throws 5, 1: he may move a piece from Black 8 to Black 3, and the same piece from Black 3 to Black 2. If a point at which a player aims has a hostile piece on it, it is 'unguarded,' and the hostile piece (called a 'blot') is removed, and placed on the dividing border, while the player occupies the point. A point on which two or more pieces are standing is 'guarded,' and cannot be occupied. If the player has no vacant or unguarded point to take, he loses the move for that half of his throw. A player who has lost a piece this way cannot move any of his other pieces until he has 'entered' this piece—*i.e.* returned him to the game. To do this he throws the dice: if either die shows the number of a vacant or unguarded point in the enemy's home table, he places his captured man upon it, and uses the number of the other die for an ordinary movement. He cannot move while a 'blot' is 'hit' (captured); and till the dice allow him to enter the piece, his throws are lost. Meanwhile his opponent is steadily moving on.

When a player has brought all his pieces into his own home table, he then has to 'bear them off'—*i.e.* to remove them from the board. On each throw of the dice he may either move one or two pieces forward as usual, or may remove from the board one or two of his own pieces that are on points corresponding with one or both of the dice, or may move one and remove another from the board. If he throws a larger number than that of the largest point occupied by a piece, he may remove a piece that is on his highest occupied point. Thus, throwing a 6, and his highest occupied point being 5, he may remove the piece on point 5.

A knowledge of the 'chances' of the dice is an all-important factor in playing backgammon. The player who first 'bears off' all his pieces wins the game. If when he wins his enemy has also begun to 'bear off,' the victory is a 'hit.' If the enemy has not yet begun to 'bear off,' the victory is more glorious, and is styled a 'gammon.' If the enemy has one or more pieces still on the 'bar' (in captivity), or still in the victor's home table, the victory is most glorious, and is called 'backgammon.' An interesting variation of the game is called variously *German* or *Russian backgammon*. The pieces are played into one board according to the pips on the dice, and so round the table into the opposite board until they are all played off the table. Pairs are counted as of their own value and that of the pips on the opposite side of the die. Thus, sixes count as sixes and aces. After the first doublet has been thrown the value of doubles is doubled. Thus, after the first doublet, sixes count as four sixes and four aces. Each doublet entitles the player to another throw. Deuce ace entitles the thrower to select any doublet he may choose. In the event of a player being unable to move, his adversary must, if possible, play the move for him. Should the points available for the throw of both dice be closed, the player may direct his adversary from which die he is to move first, and, in the case of doublets, he may compel his adversary to play each move to which he is entitled by the doublet singly. Thus, 'Play one 6; play another 6,' etc. In removing the pieces, the same rules apply as in ordinary backgammon. One great object is to leave no point unguarded, as the game may be lost 'on the post' by an unguarded

piece being taken up, whilst the adversary, by a series of doublets, may clear all his pieces. See Hoffman's *Card and Table Games* (1898); Bohn's *Handbook of Games* (1884); Berkeley's *Draughts and Backgammon* (1890).

Backhuysen, or BAKHUISEN, LUDOLF (1631–1708), Dutch painter, born at Emden in Hanover; studied under Everdingen and Dubbels, and became famous as a painter of sea-pieces.

Backlash, the shock which occurs in cogwheels or other such gearing when reversed suddenly from forward running to backward.

Backnang, tn., Würtemberg, Germany, 16 m. N.N.E. of Stuttgart. Manufactures woollens and muslins. Pop. 8,300.

Backward Children. See CHILDREN, MEDICAL INSPECTOR OF SCHOOL.

Backwardation, the stock-exchange term for a sum of money paid to a person who has bought securities for the ensuing account, in consideration of his allowing delivery to be postponed until a subsequent account.

Backwell, EDWARD (d. 1683), chief founder of English banking, was a goldsmith who attained wealth chiefly by the deposit system, in which money was left for safety with goldsmiths (instead of in the Tower), who lent it at higher interest to needy merchants. Backwell had many dealings with Cromwell, Charles II., and the leading merchants and companies of those times. See Pepys's *Diary* (ed. H. B. Wheatley, 1893–9); *Trans. London and Middlesex Archæol. Soc.*, vol. vi. part i. (1883), pp. 191–230.

Bac-Ninh, cap. of prov. of same name, 17 m. N.E. of Hanoi, Tongking. Pop. about 9,000.

Bacolod, tn., N.W. coast of Negros I., Philippines; has fisheries. Pop. 12,000.

Bacolor, tn., cap. of prov. Pampanga, Luzon, Philippine Is., 40 m. N.W. of Manila; is a large trade centre. Pop. 14,000.

Bacon. See PORK.

Bacon, tn., N. coast of Camarines isthmus, Luzon, Philippine Is., in prov. of and 20 m. E. by S. of Albay; in a fertile region. Pop. 13,000.

Bacon, ANTHONY (1558–1601), eldest brother of Francis, Viscount St. Albans, was educated at Cambridge. There is a large collection of his letters in Lambeth Palace.

Bacon, DELIA SALTER (1811–59), American authoress, published the *Philosophy of the Plays of Shakespeare Unfolded* (1857), one of the first attempts to prove that Shakespeare's works were written by Francis Bacon. See *Delia Bacon: a Biographical Sketch*, by Theodore Bacon (1889); also BACON-SHAKESPEARE CONTROVERSY.

Bacon, FRANCIS (1561–1626), Baron Verulam and Viscount St. Albans, English lawyer, statesman, and philosopher, was born at York House, London. In 1576 he went to France in the *entourage* of Sir Amyas Paulett, the English ambassador, and stayed there until his father's death in 1579 recalled him to England. Then he began to study law at Gray's Inn, and in 1584 started on a parliamentary career as member for Melcombe Regis, in Dorsetshire, and soon became distinguished in the House as an orator. In 1597 appeared the first edition of his *Essays*—consisting of ten short pieces—the work by which he is most popularly known, and one which brought him into notice both in England and abroad. The great blot in his career during the reign of Elizabeth was, according to Macaulay and others, his prosecution of his friend Essex, which they maintain was undertaken 'voluntarily;' but for this there is no proof.

After the queen's death, in 1603, Bacon rapidly rose in fortune and

favour. He was knighted in 1603, became solicitor-general in 1607, attorney-general in 1613, Privy Councillor in 1616, lord high chancellor and Baron Verulam in 1618, and Viscount St. Albans in 1620. But his fall was as rapid as his rise. The Parliament of 1620 took up the question of the obnoxious patents consisting in alehouses and inns, and monopolies of gold and silver thread, in which both the king and Buckingham's family were interested. This led to their abolition, on the initiative of Bacon; and his enemies at once started a crusade against 'the reformer of abuses.' A committee was appointed to inquire into 'the abuses of the courts of justice;' and though Bacon denied that he took 'rewards to pervert justice,' and maintained that he only 'partook of the abuse of the times,' he was condemned by his peers. But the sentence on him was never carried into effect: his imprisonment lasted only four days; his huge fine of £40,000 was remitted; his pardon was passed under the Great Seal—delayed till 1623, because he refused to give up York House, the place of his birth, to Buckingham; a pension of £1,200 a year was granted to him; and he was summoned to resume his seat in the House of Lords in 1624.

Until after he retired from political life as one of the world's great philosophers Bacon's only acknowledged works had been several editions of his *Essays*—rewritten and augmented on every occasion with infinite care—his *Advancement of Learning* (1605), and his *Novum Organum* (1620). The last five years of his life were full of work. In March 1622 he produced his *History of Henry VII.;* in November 1622 his *Historia Ventorum;* in January 1623 his *Historia Vitæ et Mortis;* in October 1623 his *magnum opus*, entitled *De Augmentis Scientiarum*, a Latin translation, with large additions, of *The Advancement of Learning;* in December 1624 his *Apophthegms;* and in 1625 his *Translation of the Psalms*. His last work, *Sylva Sylvarum* (1627), was published posthumously along with the *New Atlantis*, written as early as 1617.

Bacon is honoured as the great master of inductive science. He overstated the value of his new *organon*, but it remains a landmark in the history of thought. The chief modern authority on his life and work is James Spedding, who edited *The Letters and Life of Bacon*, in 7 vols. (1862–74), and his *Works*, also in 7 vols. (1857–9). His *Evenings with a Reviewer* (new ed. 1881) is also worthy of perusal. There are many modern editions of the *Essays* and the *Advancement of Learning*. Of the *Novum Organum*, T. Fowler's edition is the most useful.

Bacon, JOHN (1740–99), an English sculptor, native of London. His best-known works are his monuments to the elder Pitt in Westminster and the Guildhall, London; his statues of Dr. Johnson and John Howard in St. Paul's, and of Blackstone at All Souls College, Oxford.

Bacon, JOHN MACKENZIE (1846–1904), English balloonist. After taking part in three eclipse expeditions on behalf of the British Astronomical Association — viz. to Vadsö in Lapland (1896), to India (1898), and to Wadesborough, N. Carolina (1900)—he devoted himself to investigations in acoustics. meteorology, etc., largely in connection with ballooning. Works: *By Land and Sky* (1900), and *The Dominion of the Air* (1902). See Gertrude Bacon's *The Record of an Aeronaut* (1907).

Bacon, SIR NICHOLAS (1509–79), Lord Keeper, father of Francis,

Viscount St. Albans, was born at Chislehurst. He was attorney of the Court of Wards from 1546 until his removal by Queen Mary. On the accession (1558) of Elizabeth he was appointed Lord Keeper of the Great Seal—an office which he held for more than twenty years. See Cooper's *Athenæ Cantabrigienses*, i. 389–396 (1858); Whetstone's *Memoir of Sir N. Bacon* (1579; reprinted 1816); and Campbell's *Lord Chancellors* (1845–7; 4th ed. 1856–7).

Bacon, ROGER (1214–94), one of the great pioneers in science and philosophy; studied at Oxford and Paris, and became a Franciscan friar. Accused of dealing in magic, as the result of his scientific discoveries, he was forbidden to lecture at Oxford, and banished to Paris. Here he was imprisoned (1257), and forbidden to write. In 1265, however, Pope Clement IV. desired to see his works. Bacon then wrote his *Opus Majus*, and forwarded it with other works to Clement, who procured Bacon's release and his return to Oxford. In 1271 Bacon made an attack on the monks in his *Compendium Studii Philosophiæ;* whereupon Jerome of Ascoli, the general of the Franciscan order, condemned (1282) Bacon's works, and ordered his imprisonment, which lasted for ten years. About 1292 he returned to Oxford, and died there two years later. The 'Admirable Doctor,' as he was called, was a believer in astrology and the philosopher's stone; but we owe to him important chemical discoveries, the invention of the magnifying-glass, and a rectified calendar. Besides the *Opus Majus* (ed. Bridges, 1897), he wrote a treatise on Old Age (trans. by Richard Browne, 1683), *Speculum Alchemiæ*, and *De Mirabili Potestate Artis et Naturæ.* See *Lives* of Bacon, by E. Charles, in French (1861); by Schneider (1873) and Held (1881), in German; and Prof. Brewer's Preface to Bacon's *Opera Inedita*, in 'Rolls Series' (1859).

Bacon Beetle (*Dermestes lardarius*), a hairy beetle, feeding on cheese, bacon, etc. Its larvæ frequently attack stuffed specimens in museums.

Bacon-Shakespeare Controversy. The theory that Bacon wrote the literature which passes under the name of Shakespeare was first brought prominently forward, though not originated, by an American lady, Miss Delia Bacon, a friend of Emerson, Hawthorne, and Carlyle, in an article in *Putnam's Monthly* in January 1856. This was afterwards expanded into a volume entitled *The Philosophy of the Plays of Shakespeare Unfolded*, published in 1857. In the same year there appeared in London *Bacon and Shakespeare: an Enquiry*, by W. H. Smith; and a large number of books have since been issued both in favour of the theory and against it. In 1884, Mr. W. H. Wyman of Cincinnati published a *Bibliography* of the controversy.

The Baconian theory is that Bacon wrote the plays, and adopted Shakespeare and his name as a mask, as playwriting, if revealed, would have entailed on him social and political ruin. The best books on the subject are the first volume of Donnelly's *Great Cryptogram* (1888) and Edwin Reed's *Francis Bacon our Shakespeare* (1902). See Pitt-Lewis's *The Shakespeare Story* (1904); Bompas's *The Problem of Shakespeare Plays* (1902); Sutton's *The Shakespeare Enigma* (1903); Greenwood's *Shakespeare Problem* (1908); Beeching's *Reply* to Greenwood (1908); and Bleibtreu's *Der Wahre Shakespeare* (1907).

Baconthorpe, BACON, or BACHO, JOHN (d. 1346), 'the Resolute Doctor,' elected (1329) head of the Carmelite order in England. He advocated the soundness of

Averrhoes's doctrines, and, anticipating Wycliffe, held that the priestly power should be subordinate to the kingly. He wrote commentaries on the Scriptures and on Aristotle, and treatises on Anselm and Augustine.

Bacsanyi, JANOS (1763–1845), Hungarian poet, whose first work was *The Valour of the Magyars* (1785), and who founded the periodical called the *Magyar Museum*. A collection of his poems was published in 1827.

Bacterioids, involution forms of bacteria which produce the tubercles on the roots of leguminous plants.

Bacteriological Treatment of Sewage. See SEWAGE.

Bacteriology. By definition, bacteriology is the science which treats of bacteria (*bacterium*, Low Lat. for 'a rod'), or micro-organisms. The term bacterium was originally a genus name, but is now used quite indefinitely, as are also the equivalent terms of micro-organisms, microbes, germs, all applicable to the members of the group of Schizomycetes, or split fungi. Among these Schizomycetes are included the smallest known organisms, and it is therefore obvious that no science of bacteriology based upon direct observation was possible until optical instruments had reached a relatively high state of development. Indeed, as in many cases the identification depends on staining reactions, it may be said that the rise of bacteriology has largely depended on the development of the coal-tar industry. As long ago as 1680 the Dutch naturalist Leeuwenhoek published a work in which he not only described several species of bacteria, but, what is much more remarkable, noted their rapid multiplication in certain diseases—*e.g.* in diarrhœa in man—and forestalled the modern bacteriologist in his emphasis of their wide distribution and connection with processes of decomposition and putrefaction. After Leeuwenhoek there comes a long gap, until the development and elaboration of the compound microscope gave increased facilities for the study of minute organisms in general. Thus, while Linnæus would have but little to say to micro-organisms, which he did not generically distinguish from other minute plants and animals, O. F. Müller (1786) founded two genera, in which he included many species; and at a later date Ehrenberg (1838), in his great work on infusoria, carried the classification further, and laid the foundations of the existing nomenclature. On the other hand, the question of the relation between bacteria and putrefaction and disease was much longer in receiving the attention of scientists. In 1850 Davaine observed micro-organisms in the blood of animals which had died from anthrax, but it was not until some thirteen years later that, under the stimulus of Pasteur's work on fermentation, he appreciated the significance of his own observations and carried them further.

Elaborate experiments have shown that micro-organisms do not arise *de novo*, but invariably from pre-existing germs. These are universally distributed in earth, air, and water, and are the causes of putrefactive changes, which can be indefinitely postponed if the access of micro-organisms be prevented. Again, they are the causes of many processes of fermentation, and give rise to a large number of diseases. The forms which produce disease, equally with those which give rise to particular types of fermentation, are specific, and can be recognized by a variety of tests.

Most authorities are agreed that bacteria should be placed among plants, for in their mode of life

they present considerable resemblance to fungi. Like fungi, they are devoid of chlorophyll, and must therefore live either as saprophytes (*sapros*, 'putrid;' *phyton*, 'a plant') on decaying organic matter, or as parasites upon the living tissues of plants or animals. In general terms it may be said that the result of their activity, whether as saprophytes or as parasites, is to reduce complex organic compounds to simpler forms, the energy which is set free in the process being utilized by the organisms as solar energy is utilized by green plants. In their manner of life many saprophytic bacteria recall such fungi as yeast. *Bacillus subtilis*, one of the commonest saprophytic forms, may be obtained in abundance by steeping hay in water. If an infusion be made in this fashion and filtered off from the hay, it will rapidly putrefy; and a drop of the turbid liquid placed beneath the microscope will show innumerable specimens of the bacterium. It consists of a short rod about $\frac{5}{1000}$th of a millimetre—*i.e.* 5 μ—in length. The rod is clothed in a substance which is not cellulose, but is apparently of proteid nature, and within this envelope the cavity of the rod is filled by protoplasm, in which a nucleus has not as yet been demonstrated. In the early stages the bacteria are actively motile, swimming freely through the liquid; and it is one of the triumphs of modern research that, despite the minute size of the organisms, the movements have been proved to be due to the action of cilia implanted in the cell membrane. Such cilia are not, however, universally present in micro-organisms. Some of them are indeed entirely non-motile. One of the more modern classifications of bacteria has been based upon the arrangement of the cilia, which vary both in number and in the point of insertion. In the case of *B. subtilis* the actively swarming condition endures for some time, the organisms meanwhile multiplying with great rapidity by transverse division. Eventually, however, a change takes place: the bacteria lose their motility, and, rising to the surface, there form the iridescent scum so familiar on all standing liquids. An examination of this surface film, or zoogloœa, shows that it consists of an enormous number of bacteria connected together in long strands, and with greatly swollen cell-walls. The formation of spores then takes place, the protoplasm within each rod contracting into a dense mass, which becomes surrounded by a thick cell wall. These spores are very light, are blown about in dust, and are extraordinarily resistant to heat, poisons, and the other agents which are destructive to the adult forms. In favourable conditions the spore bursts its coat, and begins life anew as a ciliated free-swimming *bacillus*.

The chief variations from this type are variations in form, the cell being sometimes more or less spherical, as in those known as *Micrococci*, and sometimes spirally twisted, as in *Spirillum* or *Spirochæte*. In *Cladothrix*, which, according to some authorities, is a doubtful bacterium, the cells are connected together to form long branched filaments. This organism commonly appears in dirty water, where it forms dense white masses.

In regard to the physiology of bacteria there is much that is supremely interesting. A number of forms, like other organisms in general, are absolutely dependent on the presence of free oxygen for continued existence: such are the bacterium of vinegar, *B. subtilis*, *B. anthracis*, and so on. On the other hand, the forms described by Pasteur as *anaerobic* can only live and flourish in the absence of

free oxygen. Of these a typical example is the bacillus of butyric acid (*B. butyricus*), which produces butyric fermentation in various organic substances. In this case the oxygen necessary for all existence is doubtless obtained by the decomposition of complex organic substances during the process of fermentation. Indeed, it is found that while the *aerobic* forms (*i.e.* those requiring free oxygen) are usually killed or checked in their multiplication by being deprived of free oxygen, certain of them at least can be made to flourish without oxygen by supplying them with a fluid in which they are capable of inducing fermentation.

Since bacteria are devoid of chlorophyll, they can obtain the requisite carbon only from complex organic compounds, such as starch, sugar, cellulose, glycerin, and so on. There are, however, possibly some exceptions to this rule, for it is stated that the nitrifying bacteria of the soil can take their carbon from such simple substances as carbonates. For their nitrogen many depend upon albuminous substances; others avail themselves of organic salts of ammonium (*e.g.* ammonium tartrate or lactate), or of nitrogen, containing organic compounds (*e.g.* urea); while the bacteria of the soil can apparently avail themselves of free nitrogen, and some bacteria can, under certain conditions, utilize the nitrates of potassium and sodium. In addition to these food-stuffs, bacteria require certain inorganic salts.

The substances produced by bacteria during their activity are the *toxines* and the *ptomaines*. The first are substances of the nature of albumin, and probably arise by a true secretory process; it is now believed that in the case of many pathogenic bacteria the characteristi symptoms are produced less by the bacteria themselves than by their toxines. Ptomaines, on the other hand, are analogous in their chemical composition to vegetable alkaloids. In some cases they have but little effect on animals into which they may be introduced, but in others they act like the strong vegetable poisons. From the point of view of the bacterium they are probably to be regarded as waste products. As to other products, it may be sufficient to notice that not a few bacteria produce pigments of different types when grown under certain given conditions, these pigments being often of considerable value as a means of recognition.

Bacteria being the cause of putrefaction, it is at once obvious that the substances commonly regarded as food preservatives are substances inimical to bacterial life. Such a substance is common salt, which ranks to the bacteriologist as a *feeble* antiseptic, but which, as is familiar to all, will for a time delay putrefaction. Such substances as corrosive sublimate, iodoform, iodine, hydrochloric acid, to mention only a few, are *strongly* antiseptic—*i.e.* they have a markedly destructive action upon micro-organisms. Again, while bacteria or their spores are exceedingly tolerant of cold, some indeed surviving the temperature of liquid air, they are fortunately much less resistant to excessive heat. Most bacteria are killed by a temperature of 60° C., but the spores will tolerate much greater heat than this. In some instances it requires prolonged heating at 100° C. before all spores are completely killed. Light has, generally speaking, an injurious effect upon bacteria.

Of the three sets of agents—heat, light, and chemical agents—which are thus at the disposal of the bacteriologist wishing to ensure the destruction of micro-organisms, the first is the one most

commonly employed in *sterilizing*, as it is termed, instruments and apparatus used in bacteriological research. One of the most necessary parts of the equipment of a bacteriological laboratory is, therefore, a means of applying continuous heat to objects which it is desired to sterilize. Small metallic objects, such as needles and pieces of platinum wire, are sterilized by brief exposure to the flame of a bunsen burner; but any well-equipped laboratory contains some form of hot-air or steam sterilizer, in which glass vessels and so forth can be kept for a prolonged period at a high temperature. The first object of the practical bacteriologist is to obtain in this way a test-tube or other vessel in which all germs of life have been destroyed. When plugged with sterilized cotton-wool, such tubes will remain permanently devoid of bacteria. If a sterile medium be introduced into such a vessel—*i.e.* a medium suitable for the growth of micro-organisms, but artificially deprived of these—then the necessary preparations for what is termed a pure culture have been made. The next step is to take a needle sterilized in the bunsen flame, and with it take up a minute portion of a preparation suspected to contain a given micro-organism. The needle is then introduced into the culture medium, and if the experiment is successful, there will appear in the medium a characteristic colony of the introduced bacterium. It may be that the needle bore the spores not of one but of several kinds of bacteria. In this case several distinct colonies will appear, and the process of culture must be repeated until it is found possible to separate these from one another. A culture medium which is very commonly employed is made by dissolving gelatin in water, adding a certain percentage of beef-juice and peptone, and in some cases of sugar, rendering the whole neutral or slightly alkaline with carbonate of soda, and filtering so that a clear jelly is obtained. Test-tubes containing such a jelly with bacterial colonies of varying colour and form, which are prevented from coming into contact with the air by a plug of cotton-wool, are the most conspicuous objects in a modern bacteriological laboratory. For other media, and for details of methods, reference must be made to some of the works cited below. While some bacteria will grow well at the temperature of the room, in spite of the variation of temperature due to the alternation of night and day, others will only form good cultures at a constant and often fairly high temperature. On this account every laboratory should contain some form of incubator, in which the cultures can be kept at a temperature best suited to their characteristics.

It may be sufficient to add to this brief account of bacteriology some notes on the more important forms. The bacillus of tuberculosis is a minute transparent rod, difficult to make out in animal tissues except after staining. It stains but slowly with the aniline dyes, unless there be added to the dye a mordant, such as an alkali or oil of aniline; but if this be done, the stain is remarkably permanent. The best temperature for the growth of cultures is about 38° C., and the most suitable media are those containing glycerin.

A much larger form is *B. anthracis*, the microbe of the much-dreaded anthrax, or wool-sorter's disease. Here the individual rods are about 6 μ—*i.e.* 6 micromillimetres, or $\frac{6}{1000}$th of a millimetre—in length, about twice the length of those of *B. tuberculosis*, and they sometimes cling together in chains which may reach a length of 20 μ. They are readily stained,

and form characteristic cultures in gelatin. Such cultures contain toxic substances, which produce the same effects as the organisms themselves if introduced into the blood. Under certain conditions cultures lose their virulence, and the modified organisms from these preparations produce immunity to the attacks of the typical form in animals inoculated with them. But into the difficult question of immunity it is not possible to enter here.

Another deadly micro-organism is the comma bacillus, or cholera bacillus (*Spirillum choleræ*), first shown (1883) by Koch to be always present in the intestines of persons who have died of Asiatic cholera. This form differs from the two preceding in its great motility and in the curved shape. When grown in a gelatin medium, it liquefies the medium, but less rapidly than in the case of a comma bacillus discovered by Finckler in patients affected by British cholera. In spite of the virulence and rapid spread of the disease, experiment shows that the cholera bacillus possesses only low vitality, and, on account of its intolerance of dryness, cannot be disseminated by dust. The great source of danger lies in the dejecta of patients, and in water or food contaminated by these. A good account of the subject is given in *Manual of Bacteriology* of Hewlett (3rd ed. 1909), and the work by Muir and Ritchie (5th ed. 1910). See also MALARIA, PLAGUE, SLEEPING SICKNESS.

Bactria, Persia. See BALKH.

Bactrites, fossil ammonites with a straight instead of a spiral shell, found in Devonian strata. The suture line is simple and uncrenulated.

Baculites, fossil ammonites with straight, conical shells, found in formations from the Neocomian to the Cretaceous, and in great abundance in the baculite limestone of Normandy. The sutures are markedly crenulated in this form.

Bacup, munic. bor. (6,400 ac.) and tn., Rossendale div., E. Lancashire, England, on L. & Y. Ry.; lies between Rochdale and Burnley. Cotton spinning and weaving occupy most of the inhabitants. There are stone quarries and coal mines in the borough. Pop. 22,000.

Badajoz, city, cap. of prov. of same name, Estremadura, Spain, 4 m. from Portuguese frontier, on railway from Lisbon to Madrid; strong fortress on l. bk. of Guadiana; anc. *Pax Augusta*, one of the principal Roman settlements in Spain. A fine Roman bridge of twenty-eight arches spans the river, and a ruined Moorish castle overlooks the town. Betrayed to the French by the Spaniards in March 1811, it was attacked by Wellington in March 1812, and stormed and captured by the British, who suffered terrible slaughter (5,000 killed), on April 6, 1812: Philippon, the French general, and his whole force, surrendered next day. Birthplace of Godoy (1767-1851) and the painter Luiz de Morales (1509-86). Pop. 32,000. The prov., the largest in Spain, has an area of 8,451 sq. m., and a pop. of 520,000.

Badakhshan, a picturesque hill country (area, 8,500 sq. m.; pop. 150,000), forming a part of Afghan Turkestan. It is enclosed on its N. side by the Amu Daria or Panj (Oxus), and on the S. by the Hindu-Kush. The district is watered by the river Panj and its tributaries the Kokcha and Kunduz. The whole country has been long celebrated for its salt, sulphur, iron, gold, rubies, lapis-lazuli, etc. The inhabitants are partly Aryans of the Tajik stock, and speak Persian, and partly Uzbegs. Chief town, Faizabad. See Yule's *Marco Polo* (1871); Vambery's *Central Asia* (1874).

Badalona (anc. *Betulo*), seapt., prov. Barcelona, Catalonia, Spain, 6 m. N.E. of Barcelona, with sugar factories and petroleum refineries. Pop. 20,000.

Baddeley's Guides. See GUIDE-BOOKS.

Baden, a grand-duchy of the German empire (area, 5,818 sq. m.), bordered by the Rhine on the S. and W., Würtemberg on the E., and Bavaria and Hesse-Darmstadt on the N. The most marked geographical feature of this hilly region is the Black Forest, which has ramifying valleys, many of great beauty, and all finely wooded, 37 per cent. of the surface of the grand-duchy being forest land. The Danube has its sources in the S., and the Neckar crosses the N. extremity. The climate varies greatly according to the elevation. Though the highest summits of the Schwarzwald lie little below the snow-line, the almond and chestnut ripen in the sheltered valleys of the W. Agriculture claims 56 per cent. of the area. Vineyards cover about 45,000 ac.; the wine averages 10,000,000 galls. annually. The country is rich in mineral springs. Several industries are carried on on a large scale, as flour-milling and sawmilling, iron smelting and working, the manufacture of chemicals, cottons and silks, tobacco and cigars, machinery, jewellery (Pforzheim), beer, porcelain, and glass. The population is slightly over 2,000,000 (344 per sq. m.), of whom three-fifths are Roman Catholics. Capital, Karlsruhe. Other large towns are Mannheim, Heidelberg, and Freiburg im Breisgau. The grand-duchy has three votes in the Federal Council, and elects fourteen deputies to the Imperial Diet. The existing grand-duchy of Baden is a continuation and development of the ancient duchy of Swabia or Alemannia, principally through the two dynasties of the margraves of Baden-Baden and Baden-Durlach. In 1803 the ruling margrave of the united (1772) dynasties was made an elector of the empire, and in 1806 he proclaimed himself a sovereign grand-duke. See Wörl and Bader's *Geographie und Statistik des Grossherzogthums Baden* (1880); Weech's *Badische Geschichte* (1890); and Neumann's *Der Schwarzwald*, vol. xiii. of *Land und Leute* Series (1902).

Baden, or BADEN-BADEN, cap. of circle Baden of the above grand-duchy, situated in a lovely valley in the N. of the Black Forest, 23 m. by rail S.S.W. of Karlsruhe, and famous for its mineral waters and baths. The principal edifice is the castle, on the side of a hill (676 ft.) above the town. The healing virtue of the waters was known to the Romans (*Aquæ Aureliæ*), but Baden only came into repute in the beginning of the 19th century; from 1808 to 1872 it was much frequented for its public gaming-tables. At the present time it is visited by over 72,000 persons annually. Pop. 16,000.

Baden, spa and tn., prov. Lower Austria, 17 m. by rail S. by W. of Vienna; is pleasantly situated amongst the outliers of the Wiener Wald, and is visited annually by some 24,000 persons. Its hot mineral springs (84° to 95° F.), were known to the Romans as the *Thermæ Pannonicæ*. Pop. 13,000.

Baden, a mediæval tn., canton Aargau, Switzerland, 13 m. by rail N.W. of Zürich, with celebrated hot springs, known to the Romans as *Aquæ Helveticæ*. From 1426 to 1712 it was practically the capital of the Confederation. Pop. 6,000.

Badeni, CASIMIR FELIX, COUNT (1846), Austrian statesman, born at Surochowo (Galicia), of a noble family, originally Italian. He

studied law at Cracow, and in 1888 became governor of Galicia. As Austrian premier (1895) he in 1897 promulgated his famous Ordinance of Languages for Bohemia and Moravia, in which he put the Czech language on an equal footing with the German. This measure, however, aroused the bitterest opposition of the Germans, and occasioned wild scenes of obstruction in the Austrian Parliament, which ended in Badeni's resignation in 1897.

Badenoch, extensive and mountainous district, E. Inverness-shire, Scotland, traversed by the river Spey.

Baden-Powell. See POWELL.

Badenweiler, tn., grand-duchy of Baden, Germany; stands (1,395 to 1,477 ft.) on the W. edge of the Schwarzwald, 18 m. N.E. of Basel. Its warm springs, equable temperature, forest walks, and whey cures attract some 5,000 visitors annually. Pop. 650.

Badge, or COGNIZANCE, in heraldry the name of a class of devices or cognizances occupying a peculiar position in that, though intimately associated with armorial bearings, they are not themselves such; nor is their use governed by the laws of heraldry. The badge is frequently though erroneously confounded with the crest, or even with the coat of arms; but though it may partake of the form of a charge or of a crest, it is not borne upon a shield, or, as a crest is, on a wreath, though a shield or a wreath may enter into its composition. An exception, more apparent than real, is found in the badge of the English baronets—viz. the 'Red Hand of Ulster,' displayed on an escutcheon, which device is borne by all English baronets in a corner of their paternal shields. This, however, is not a personal badge, but the badge of an order, and is thus borne by royal decree.

Badger (*Meles taxus*), a mammal belonging to the order Carnivora, and to the same family as the otter (Mustelidæ). It is widely distributed on the continent of Europe, and still occurs in parts of Britain. Like the bears, to which it is not distantly related, the badger is omnivorous, depending largely on fruits and roots, but mingling these with mice, reptiles, young birds, and insects. Nocturnal in habit, it spends much of the day in the spacious burrow, which has many exits, and is excavated by preference on the sunny side of a wooded hill. Though naturally inoffensive in its habits, the badger is capable of biting severely when roused. It is hunted with the help of dogs, from which it chiefly seeks to escape by burrowing. The common badger measures 2½ to 3 ft. in length, has short, stout limbs, a pointed nose, and is of a blackish-gray colour, with white markings on the head. It is also known as the 'brock' (see *Twelfth Night*, ii. 5). The sport of baiting a badger in a barrel with dogs, once common in England, was prohibited about the year 1580. Other species occur in Asia.

Badger, GEORGE PERCY (1815–88), Oriental scholar and diplomatist, was born at Colchester in Essex. He was primate delegate to the Eastern Churches (1842–4), acted as interpreter in diplomatic missions in Arabia, Persia, etc., and wrote, among other works, an excellent *Eng.-Arabic Lexicon* (1881).

Badghiz, or BADKHIZ, dist., N.W. Afghanistan, fertile along the valleys of the tributaries of the rivers Kushk and Murghab.

Badham, CHARLES (1813–84), Greek scholar, born in Glasgow, and afterwards a pupil of Pestalozzi. He became professor of classical philology and logic at Sydney University, New South Wales, where he died. His work

was chiefly confined to critical editions of Plato.

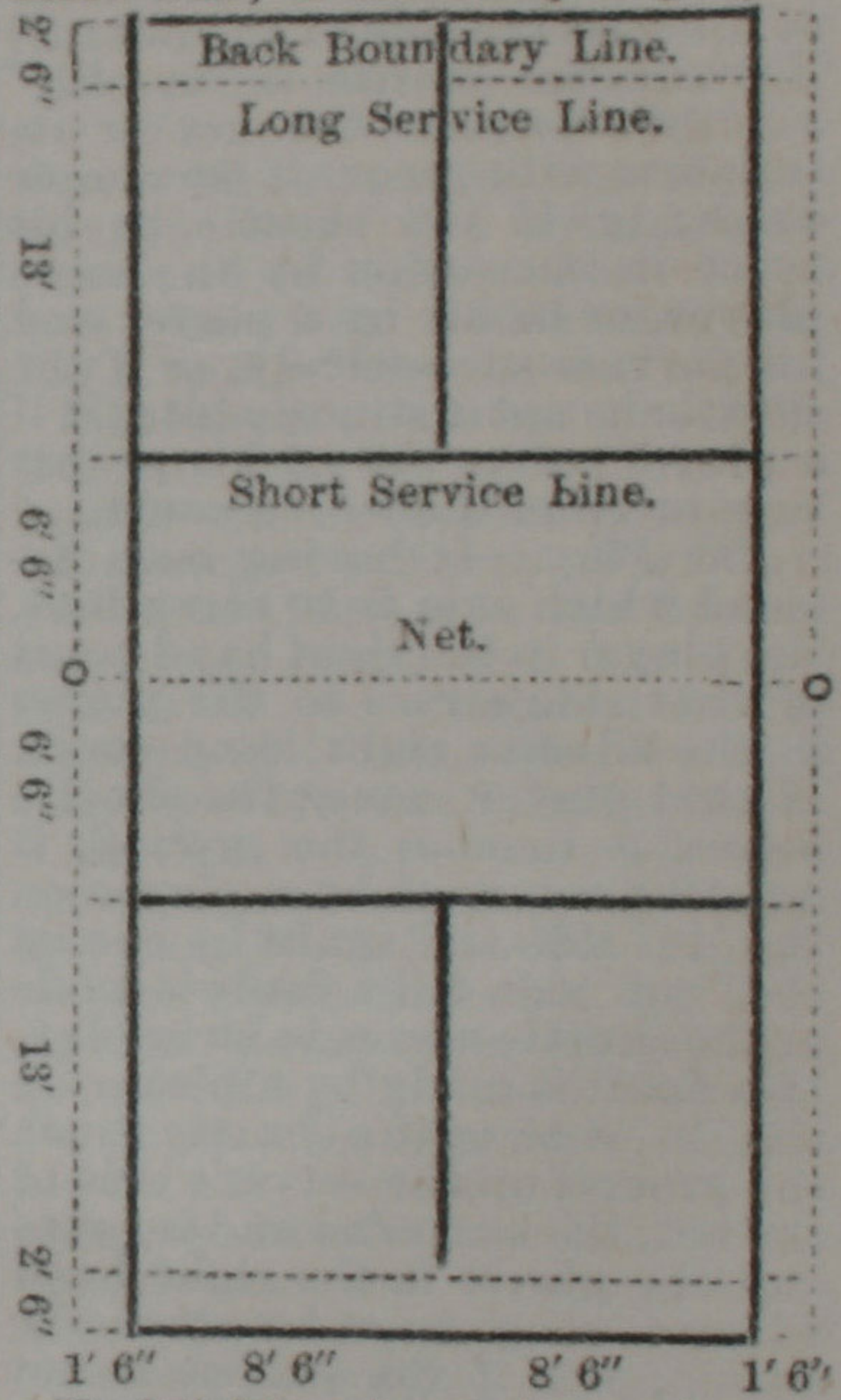
Badia y Lablich, or LEBLICH, DOMINGO (1766–1818), a Spanish traveller, born at Barcelona, who travelled (1801–7), disguised as a Mussulman, Ali Bei, through Morocco, N. Africa, and Egypt, to Mecca, being the first Christian to visit that city. On his return he joined the French party in Spain, and fled to Paris with King Joseph in 1814. In the same year he published *Voyages d'Ali Bei en Afrique et en Asie* (1814).

Bad Lands, rough and barren tracts in the west of the United States, deeply trenched by erosion, leaving table-lands or *mesas;* they contain a wonderful series of mammalian fossils. One of these regions is on the White R., another on the Lower Yellowstone and the Little Missouri, a third in S. Dakota and Nebraska.

Badminton. This game may be played either in or out of doors. The number of players varies from two to eight, four being the best number. The players, four or two in number, place themselves and carry on the game as in lawn tennis. The accompanying diagram shows how to mark out a Badminton court. The posts supporting the net are about 5 ft. 1 in. high. The net itself is 5 ft. high in the centre and 5 ft. 1 in. at the posts. and need not be above 2 ft. 6 in. wide. The shuttlecocks used weigh from 75 to 85 grains, and have from 16 to 18 feathers fixed in a cork 1 in. in diameter. The feathers have a spread of 2¼ in. at the top. Lawn tennis bats may be and are generally used, but the absolutely correct form of bat has a head of about the same size as that used in rackets.

The Four-handed Game.—The game is played by two players a side. Choice of sides is decided by toss, provided that, if the winner of the toss chooses service, the other side have choice of courts, and *vice versâ*. The game consists of 15 aces: at 13 all the side first reaching 13 has the option of setting 5, at 14 all of setting 3. The rubber is the best of three games; sides are changed after the first game, and, if the third game is played, when the leading side reaches 8.

Faults.—A fault made by a player whose side is 'in' puts a hand out; if made by a player



The dotted lines show doubles court, and black lines singles.

whose hand is 'out,' it counts an ace to the 'in' side. It is a fault (*a*) if the service is overhand—*i.e.* if the shuttle at the instant of being struck is higher than the server's waist; (*b*) when the service falls into the wrong court (*i.e.* not into the one diagonally opposite to the server), or falls short of the short service line or beyond the back service line, or outside the boundary

lines; (*c*) unless the server's feet be in his own court, and unless the feet of the player taking the service be in his own court until the service is delivered; (*d*) if either in service or in play the shuttle falls outside the bounds of the game, or passes through or under the net, or touches the roof or side walls or the person or dress of any player; (*e*) if the shuttle be struck before it crosses to the striker's side of the net; (*f*) if while the shuttle is 'in play' a player touches the net or its supports with racquet, person, or dress; (*g*) if the shuttle be hit twice in succession by the same player, or be hit by a player and his partner successively, or if the shuttle be not distinctly hit; (*h*) if a player serves out of his proper turn or from the wrong court.

The Play.—It having been decided which side is to serve first, the player in the right hand court of that side serves to the player in the adverse right hand court. If that player return the shuttle before it touches the ground, it must be returned by a player on the 'in' side and again by one on the 'out' side till a fault is made or the shuttle ceases to be in play. If a fault is made by a player on the 'in' side, or the shuttle touch the ground on the server's side of the net, the server's hand is 'out,' and the player in the right hand adverse court now becomes the server; but if the service is not taken, or the fault is made by the 'out' side, or the shuttle touches the ground on the 'out' side of the net, the 'in' side scores an ace. The 'in' side then changes courts, the server now being in the left court and serving to the adverse left court. The game is continued thus, service being made alternately from each court into the one diagonally opposite.

General Rules.—The person served to may alone take the serve, and no player may take two consecutive serves. If the server, in delivering service, makes preliminary feints, or otherwise intentionally balks his opponent, the latter shall not be bound to take the service. The side beginning a game has only one hand in the first innings. It is a 'let' if the shuttle touches the net in service, provided the service be otherwise good.

The Two-handed Game.—This is the same as the foregoing, except that both players change courts after each ace has been scored, and that the back boundary line becomes the back service line.

The Six-handed or Eight-handed Game.—The game consists of 21 aces, setting 5 at 19 all and 3 at 20 all. The back boundary line becomes the back service line.

The side beginning a game has only two hands 'in' in its first innings.

The back player may take a service after it has passed the front player.

Badminton, GREAT, par. and vil., Gloucestershire, England, 14 m. E.N.E. of Bristol. Near it is Badminton House, the seat of the Duke of Beaufort. In the church Field-marshal Lord Raglan is buried. The place gives its name to the claret cup, the game, and the sporting library (1885–1902). Pop. 500.

Badminton Club, THE, a London sporting and coaching club at 100 Piccadilly, London, founded in 1876, and consisting of 1,000 members. The entrance fee is ten guineas, and the annual subscription eight guineas.

Badminton Library, THE, a series of 29 vols. (1885–1902) on sports and pastimes; written by specialists, under the editorship of the Duke of Beaufort. The series is published by Longmans.

Badnera, tn., Berar, India, 6 m. S. of Amraoti. Has cotton factories. Pop. 11,000.

Badoc, tn., W. coast Ilocos Norte prov., N.W. Luzon, Philippine Is., 21 m. S. by W. of Laoag. Pop. 13,000.

Badrawa, tn., Kashmir, India, 50 m. E.N.E. of Jammu. Pop. 35,000.

Badrinath, peak in Garhwal dist., United Provs. of Agra and Oudh, India, 30° 44′ N. lat. and 79° 31′ E. long.; height, 23,210 ft. above the sea. On one of its slopes is a shrine of Vishnu, which attracts annually some 50,000 pilgrims.

Baduria, tn., Bengal, India, 30 m. E.N.E. of Calcutta on a branch of the Ganges. Pop. 13,000.

Bæda. See BEDE.

Baedeker, KARL (1801–59), German author and publisher, was the son of a small bookseller in Essen. Starting business in Koblenz in 1827, he issued in 1839 a small guide-book on the Rhine, the first of the admirable series of handbooks in German, French, and English. In 1872 the business was removed to Leipzig.

Baedeker's Guides. See GUIDE-BOOKS.

Bael, or BHEL, also ÆGLÉ, a plant of the orange order. The fruit is used in India as a remedy against diarrhœa and dysentery. The rind yields a perfume, as well as a yellow dye, and a cement is formed from the seeds.

Baena, tn., prov. Cordova, Spain, 30 m. S.E. of Cordova; has horse-breeding, linen weaving, and manufactures olive oil. Pop. 15,000.

Baensch, FRIEDRICH BERNHARD OTTO (1825–98), German engineer, executed the Kaiser Wilhelm (North Sea-Baltic) Canal (1880–5). Wrote *Studien aus dem Gebiet der Ostsee* (1872), etc.

Baer, KARL ERNST VON (1792–1876), German zoologist and embryologist, was appointed (1817) professor of zoology at Königsberg, and in 1834 librarian of the Academy of Sciences of St. Petersburg. Founder of the science of comparative embryology, he exploded the 'animalculist theory' by his discovery of the true laws of embryonic development of man and the vertebrates, the results of his investigations being expounded in *De Ovo Mammalium et Hominis Genesi* (1827). Next to this, the book which had most influence with his contemporaries was *Ueber Entwickelungsgeschichte der Thiere* (1828–37), to which the *Untersuchungen über die Entwickelungsgeschichte der Fische* (1835) may be regarded as a supplement. See his autobiography, *Nachrichten über Leben und Schriften* (1866; 2nd ed. 1886), and *Life* by Stieda (1878).

Baertsoen, ALBERT (b. 1867), Belgian painter and etcher, a founder of the Munich Secessionists; studied in Paris. His *Canal Flamand* (1895) is in the Luxembourg at Paris, and his *Ropemakers on the Ramparts* in the museum of Ghent. See Muther's *History of Modern Painting* (1895).

Bætica, name of a considerable part of ancient Spain, called after the river Bætis (now the Guadalquivir), which traversed it. During the Roman occupation it contained Hispalis (now Seville), Corduba (now Cordova), Gades (now Cadiz). Before the Roman conquest it was occupied by the Phœnicians and Carthaginians. After they abandoned it it fell into the possession of the Vandals, whence is derived the name of Andalusia.

Baeyer, JOHANN FRIEDRICH WILHELM ADOLPH VON (1835), German chemist, born at Berlin, was a pupil of Bunsen and Kekulé, became professor at Strassburg (1872), and since 1875 professor at Munich, where he succeeded Liebig; leading authority on the chemistry of indigo, which dye-stuff he was the first to prepare synthetically in 1878, and for which he was awarded

the Davy Medal by the Royal Society in 1881, and author of important contributions to theoretical chemistry, especially in connection with the constitution of benzene isomerism, the assimilation of carbon dioxide by plants, and fermentation.

Baeza (anc. *Beatia*), tn., Spain, prov., and 20 m. N. by E. of Jaën. Ancient walled town, with formerly famous university (1533), now disestablished. Important horse fair, May 18. Pop. 15,000.

Baffa. See PAPHOS.

Baffin, WILLIAM (1584–1622), navigator, and discoverer of the sea which bears his name, was born in London; went to the whale fishing off Spitzbergen (1613–14), and joined Captain Robert Bylot in 1615 on board the *Discovery*, to search for the N.W. Passage by Davis Strait. Unsuccessful in this, he discovered and charted Baffin Bay. His observations, discredited during the 17th and 18th centuries, were verified by Sir John Ross in 1818, and were used by the Franklin expedition. Baffin was killed at the siege of Ormuz. See *Voyages of William Baffin, 1612–22*, ed. by Markham (1881).

Baffin Bay, or, more correctly, BAFFIN SEA, lies between Greenland and Baffin Land, with the Arctic Circle for its southern limit and 75° N. lat. for its northern. On the S. it communicates with the Atlantic Ocean through Davis Strait, and on the N. with the Arctic through Smith Sound, Kennedy Channel, and Robeson Channel. Lancaster Sound and Jones Sound both lead out of it at the N.W. into the Arctic. It is about 825 m. long, and its average width is about 275 m., its greatest width being about 390 m. Its greatest depth is about 6,000 ft. It is a resort for whalers and seal hunters.

Baffin Land lies between lat. 62° and 72° N., with Lancaster Sound on the N., Baffin Bay and Davis Strait on the E., the Gulf of Boothia and Fox Channel on the W., and Hudson Bay on the S. Its area is over 200,000 sq. m.

Bafulabe, French military post (founded in 1879) in W. Africa, on the l. bk. of the Senegal, 120 m. by rail S.E. of Bakel. Pop. 4,000.

Bagagem, tn., Minas Geraes State, Brazil, 370 m. N.W. of Rio de Janeiro. Pop. about 10,000.

Bagalkot, tn., Bijapur dist., Bombay, India, on the Ghatprakka R., 44 m. S. of Bijapur. Manufactures silk and cotton goods. Pop. 20,000.

Bagamoyo. (1.) Maritime dist., German E. Africa. Pop. (Sudanese, Somalis, Abyssinians, and Swahilis), largely reduced by the famine of 1898, is about 70,000, together with Arab and Indian traders. Fruits (mangoes, oranges, lemons, guava, citrons, and papaws) grow well, and copra is exported. (2.) Seaport tn. at the mouth of the Kingani R., German E. Africa; an important trading centre in constant communication with Zanzibar. The harbour is an open roadstead, large vessels lying two miles off. Pop. 12,000.

Bagasse (Fr. 'a slat'), the refuse from sugar-cane after crushing; it is used as fuel.

Bagatelle is played on an oblong table varying in length from 6 to 10 ft., and in breadth from 1½ to 3 ft. At the semicircular upper end of the table are nine holes or cups, numbered from 1 to 9, into which it is the object of the player to drive by means of a cue the nine balls—eight white and one red—that enter into the game. Each white ball driven into a hole counts to the score of the player a number of points corresponding to the number of the hole; the red ball counts double. The red at the beginning of each round is placed on the spot about a foot nearer balk than the nearest hole; the white balls are played from

balk, the first being played upon the red, and each player in turn plays all the balls, the object being to lodge a ball in every hole. The playing of all the balls by a player is a round, and any agreed-upon number of rounds may be played for the game. In cannon bagatelle three balls only are used, and the holing of a ball counts only when it is preceded by a cannon. The striker's break ends when he fails to cannon. *Cock-amaroo*, or Russian bagatelle, is the game in which the ball is driven through and amongst an arrangement of pins, holes, arches, and bells. Other forms of bagatelle go by the names *sans égal* (or French game), Irish cannon game, Mississippi, and *trou madame*.

Bagdad, or BAGHDAD, city, Mesopotamia, Asiatic Turkey, cap. of vilayet of same name, on both banks of Tigris, 220 m. above the outfall of the Shat-el-Arab. Formerly of great importance, the deviation of ancient trade routes to Persia has reduced its transit trade, which is still, however, considerable. But the Bagdad railway, connecting the Persian Gulf with the Mediterranean, when completed, will probably increase its commerce. The only part of the city of the caliphs that remains is the dome of the tomb of Zobeida, wife of Haroun al-Raschid. The present city is ruinous and neglected. Several holy Mohammedan tombs in the vicinity attract large numbers of pilgrims. Bagdad suffered from the plague in 1773, and again in 1831, when the population was reduced to one-third. Imports: Manchester goods, also continental and Indian cotton cloths, sugar, coffee, indigo, pepper, and tobacco. Exports: wool, gum, galls, skins and hides, opium, carpets, and dates. The yearly trade amounts to about £3,000,000, of which 75 per cent. is import trade. River craft ply between Bagdad and Basra, the port of transhipment to ocean steamers. The climate is very trying in summer, and is also subject to great extremes. Pop. about 150,000. It was built out of the ruins of Ctesiphon by Al-Mansur in 763. Subsequently it became the capital of the caliphate, and was enlarged and improved in the 9th century by Haroun al-Raschid (immortalized in the *Arabian Nights*). The city was sacked by Hulaku, grandson of Jenghiz Khan, in 1258, and again by Tamerlane in 1400, and after many vicissitudes, and at least one memorable siege (1627), came into the hands of the Turks (1638). The province (area, 54,500 sq. m.) is in the basin of the Lower Euphrates and Tigris, and includes the ancient Mesopotamia and Babylonia. It has a mixed population (about 620,000) of Persians, Armenians, Turks, Jews, Arabs, and Kurds. See Le Strange's *Baghdad during the Abbasid Caliphate* (1900); Hunt's *Histoire de Bagdad dans les temps modernes;* and Rivoire's *Bagdad* (1884).

Bagdad Railway. At the end of 1899 the Anatolian Railway Company obtained a concession from the Turkish government for the construction of a railway line from Konieh, the extreme E. point of the Anatolian Ry., to Bagdad and Basra (Bussorah), and thence to the Persian Gulf. The length of the line, including its branches, will be some 1,550 m. It starts at Konieh and goes S.E. to Adana, thence E. to Aintab and Birejik, where it crosses the Euphrates, afterwards further E. to Mosul, and again S. down the r. bk. of the Tigris to Bagdad. Principal branches will be from Aintab to Aleppo, and from Mardin to Sivas. The concession is for ninety-nine years, and the entire line must be completed in eight years. The Turkish gov-

ernment guarantees net receipts to the amount of £500 per kilometre (·621 of a mile) per annum, and £180 per kilometre for working expenses. The railway will be built of the normal gauge of 1·44 metres (4 ft. 8¾ in.), with a single line. In 1903 the British government refused to be a party to the scheme which, according to the convention (signed Mar. 5, 1903), put the railway entirely under German control. A new financial agreement was announced on November 16, whereby the German group controlled 40 per cent. of the capital and the French group 20 per cent. A company was floated at Frankfort, November 25, with a capital of £150,000 to construct the first section (Konieh-Eregli-Bugurlu), 124 m., and this was completed and opened in October 1904. At the general meeting held in June 1910 in Berlin, the chairman said that they had at present to deal with the continuation of the first section of the line for a further 105 miles from Bugurlu to Aleppo and Elhelif. This work had been undertaken by a company founded at Glarus, in Switzerland, in 1909. The chairman said the work was making rapid progress, and was being carried out in three directions—the first from Adana eastward to Amanus, the second from Adana westward to the Taurus Mountains, and the third from Bugurlu eastward to the Taurus Mountains.

Although it was expected that work on the Bagdad Railway from Adana towards Bugurlu and towards Osmanieh would have begun in 1909, nothing was achieved, and it is impossible to foretell with any accuracy when operations will really commence. Engineers and surveyors have been on the spot for a long time, and surveying in all directions around Adana, Yenidje, Missis, and Hamidieh is being actively carried on. The present difficulty, however, appears to lie in the fact that it has not been settled as to whether the railway, on leaving Adana, shall run directly to Aleppo *viâ* Hamidieh-Osmanieh-Baghshe, a most expensive and difficult route, or *viâ* Alexandretta. The new Bagdad line on approaching Adana, will meet the Mersina-Tarsus-Adana line at a point called Yenidje, about half-an-hour's journey from Adana. It is also expected that a connection with the Russian system in Northern Persia will be made by the Khanakin branch. The proposed terminus of the Bagdad railway on the Persian Gulf is Koweit. An alternative route has been proposed from Homs (on the already completed French railway from Tripoli to Aleppo) to Bagdad 510 miles in length, with a branch from Damscus to Palmyra 125 miles in length, Palmyra is 85 miles east of Homs.

Bage, tn., Brazil, state of, and 120 m. W.N.W. of Rio Grande de Sul. Pop. 22,000.

Bagehot, WALTER (1826–77), English economist and journalist, was born at Langport, in Somersetshire. Though called to the bar in 1852, he joined his father in the business of banker at Langport. Taking to literature, however, he became a contributor to and one of the editors of the *National Review* from 1855 until the close of its career. From 1858 to the end of his life he was also editor of the *Economist*. Bagehot's essays are brilliant in style; his most important work is *Lombard Street* (1873; new ed. 1895), a fresh and lucid description of the money market. Next to it in popular estimation is *The English Constitution* (1867; new ed. 1872). *Physics and Politics* (1869) is an attempt to apply the principles of natural selection and inheritance to political society. After his death two volumes

of *Literary Studies* (1879) and one of *Economic Studies* (1880 were published. See the Memoir prefixed to his *Literary Studies*, and the *Economist* for March 1877.

Bagelen, a residency of central Java, E. Indies, on the S. coast. Area, 1,323 sq. m. Pop. 1,500,000.

Baggara, a people of Arab origin in the Nile valley, in the Anglo-Egyptian Sudan, and in the S. of Dar Fur. They are Mohammedans. These people helped to form the backbone of the dervish armies against which the Egyptians and British fought in the various Sudan wars of the years 1881–99.

Baggesen, JENS EMMANUEL (1764–1826), Danish author, who wrote also in German. In 1813 he began a literary feud with Oehlenschläger, the chief Danish representative of the rising tide of romanticism. Baggesen was a satirical humorist of the first rank, and a perfect master of his native tongue. His best works are *Labyrinthen eller Digtervandringer* (1792–3), a description of his travelling impressions; his polemical poems, *Gjengangeren* and *Per Vrövler* (1816); *Parthenais oder die Alpenreise* (1804); a humorous epic, *Adam und Eve* (1826). See collected *Danish Works* (new ed. 1845–8); *German Works* (1836); and a new ed. of his *Poetiske Skrifter* (ed. Arland, 1889, etc.); A. Baggesen, *Jens Baggesens Biografi* (1843–56); Arentzen, *Baggesen og Oehlenschläger* (1870–8).

Baggs, CHARLES MICHAEL (1806–45), English Roman Catholic bishop, educated at the English College at Rome, where he became professor of Hebrew, vice-rector, and rector, in succession to Wiseman. He was appointed bishop in 1844, and vicar-apostolic of the west of England at Bath.

Baghal, BAGUL, or BAGHUL, a hill state in the Punjab; area, 124 sq. m. Pop. 25,000.

Baghelkhand, tract of country under the Central India Agency; comprises the native states of Rewa, Nagode, Maihar, Sohawal, and Kothi. Area, 11,324 sq. m. Pop. 1,550,000.

Bagheria, or BAGARIA, decayed tn. of Sicily, prov. Palermo, 8 m. by rail S.E. of Palermo. Pop. 18,000.

Baghirmi, BEGHARMI, or BAGIRMI, territory (sultanate), Central Africa, within the French military territory of Lake Chad (since 1900); is fairly fertile, and is inhabited by the Barmaghé (Mohammedans). Its area is about 65,000 sq. m. Pennisetum, sorghum, and sesamum are cultivated. Massenia is the capital. Pop. over 1,000,000.

Baghistan. See BEHISTUN.

Bagimont's Roll, so called after the Italian Bajimond de Vicci, who was sent by the Pope (1274) to assess the Scottish benefices for the purpose of collecting a tithe for the crusade, remained the basis on which these livings were taxed until the reformation. The roll has been published in *Archæologia*, vol. xvii. (1813).

Bagnacavallo (anc. *Tiberiacum*), old tn., prov. Emilia, Italy, about 11 m. W. of Ravenna, with ancient walls and a fine cathedral. Pop. 15,000.

Bagnara Calabra, tn., prov. Reggio di Calabria, Italy, on the W. coast, 15 m. by rail N.E. of Reggio; founded by Robert Guiscard; suffered from an earthquake in 1783, and again in Dec. 1908, when the town was almost entirely destroyed. Pop. 10,000.

Bagnères ('baths'). (1.) B. DE BIGORRE (Lat. *Aquensis Vicus*), dist. tn., dep. Hautes-Pyrénées, France, 12 m. S. of Tarbes, on l. bk. of the Adour, with hot mineral springs (90°–124° F.); visited annually by some 20,000 persons. Pop. 8,600. See Devier's *La Ville de Bagnières-de-Bigorre* (1901). (2.) B. DE LUCHON (Lat. *Aquæ Onesiæ*), dist. tn., dep. Haute-

Garonne, France, 72 m. S.W. of Toulouse, with sulphur springs (62°–151° F.); is visited by some 36,000 persons annually. Pop. 3,500.

Bagnes (Fr.; Ital. *bagno*, pl. *bagni*), French convict prisons established at Toulon (1748), Brest (1750), Rochefort (1767), etc., on the abolition of the galleys. They were done away with in 1852, the convicts being thenceforward transported to French Guiana and New Caledonia. See Zaccone's *Hist. des Bagnes* (1875); Brissac's *Souvenir de Prison et de Bagne* (1881); also Victor Hugo's *Les Misérables* (1862).

Bagni. (1.) B. DI LUCCA, vil., prov. Lucca, Italy, 11 m. N. of Lucca, with springs impregnated with sulphate of magnesia and carbonate of lime (100°–136° F.). They have been known and visited since the 13th century, and figure in Heine's *Reisebilder*. Pop. 14,000. (2.) B. DI SAN GIULIANO, mineral baths in Italy, 5 m. N.E. of Pisa; famous in antiquity, and still used; temp. 80·5°–104° F. Manufactures textiles and soap. Pop. 21,000.

Bagno. (1.) B. A RIPOLI, residential suburb, with baths, of Florence, Italy. Pop. 16,000. (2.) B. IN ROMAGNA, tn., N. slope Etruscan Apennines, prov. Florence, Italy, with hot springs (105°–110° F.) containing natron. Much frequented. Pop. 10,000.

Bagnolet, N.E. suburb of Paris, France; with gypsum quarries and market gardens. Pop. 12,000.

Bagnone, tn. Massa e Carrara, prov. Italy, 16 m. N.N.E. of Spezia. Pop. (comm.) 7,000.

Bagpipe, a musical reed wind instrument of early but unknown origin. It was known in Britain and Ireland as early as the 12th century, and at present is most used in the Scottish Highlands. The most familiar forms of the instrument are the Scottish or Highland, Irish, and Border or Northumbrian. In each the pipes are in connection with a wind-bag. In the Scottish form the wind is supplied from the lungs of the player, but the others have bellows. The pipe upon which the melody is performed is called the 'chanter,' and is fitted with a double reed. The other pipes, called 'drones,' which sound simultaneously with the chanter, have a single reed, and produce only one note each; but these pipes can be tuned to certain intervals, thus producing a continuous and unvarying accompaniment to the melody. The Highland bagpipe has a compass of nine notes, from G on the second line of the treble stave to A, the ninth above; but the notes do not form any diatonic scale, some of the intervals being less than whole and more than half tones. The Irish bagpipe has a compass of from ten to twelve notes; the Northumbrian has fifteen, including two chromatic intervals. The Scottish and Irish—the latter having longer tubes and softer reeds than the former—have three drones, the two smaller being frequently tuned to the low A of the chanter, and the large pipe to the octave below; but other methods of tuning are also in use. The bagpipe used in the British army is the Highland; but the Northumbrian, which has a fourth drone, is the sweetest-toned and smallest instrument of the three. Pipers, when playing, constantly embroider the notes of the melody with a kind of ornamentation called 'warblers.' Five or seven of these short notes are in frequent use, but as many as eleven may be introduced between two consecutive notes of a melody. Music for the bagpipe is very abundant, and consists of laments, pibrochs, marches, strathspeys, and reels. See Manson's *The Highland Bagpipe* (1901).

Bagratidæ, or BAGRATIDES, a dynasty of Armenian rulers, of whom the first was Ashod I. 'the

Great,' who was recognized as sovereign prince of Armenia by Haroun al-Raschid in 885 A.D. The Bagratides were overthrown by the Seljuks towards the end of the 11th century, though a branch line ruled over Little Armenia until 1375. Another branch ruled in Imeritia, in Georgia, down to 1810.

Bagration, PETER IVANOVITCH, PRINCE (1765–1812), a Russian general, descendant of the Bagratidæ. He entered the army in 1782, became colonel at the siege of Oczacow (1788), and served with Suwaroff in Poland (1794), in Italy (1799), when he captured Brescia, and fought in the disastrous campaign in Switzerland. In the war of 1805 he covered the retreat of Kutusoff's army before Murat, and distinguished himself at Austerlitz in 1805, and at Eylau and Friedland in 1807; took part in the war in Finland (1808) and in Turkey (1809). In 1812 he was commander of the Russian army of the west; was defeated at Mohilev (July 25), and was mortally wounded at Borodino.

Bagshot Beds. The Bagshot Beds are important members of the Eocene of the Thames basin, where they rest upon the London Clay. They are shallow marine and fresh-water deposits, consisting of red, green, and yellow sands, layers of flint pebbles, and occasional thin seams of pipeclay. The Bagshot Beds are divided into three series, of which the Lower is united with the London Clay to form the Lower Eocene, while the Middle and Upper Bagshots constitute the Middle and Upper Eocene of the London area. The Bagshot Beds are not very fossiliferous, but they have yielded shells of such genera as Turritella, Corbula, Nummulites, Cardita and Ostrea, and teeth of sharks (Lamna, Otodus, Carcharodon). See Whittaker's *Geology of London* and *Geol. Survey Memoirs.*

Bagshot Heath, a sandy tract of England, in the cos. Surrey and Berks; once a royal hunting ground; 50 sq. m. in area; 460 ft. above sea-level. In coaching days a haunt of highwaymen.

Bagster, SAMUEL (1772–1851), publisher of Bibles, chiefly polyglot, and New Testaments in Syriac and Hebrew. He also issued the famous *English Hexapla* (1827), besides Bibles, psalters, and lexicons in many languages. His firm still exists, under the title of Samuel Bagster and Sons, Paternoster Row.

Baguet, or BAGUETTE (architectural), a small, round, convex moulding, called a *bead* when plain, and a *chaplet* when carved and enriched.

Bagul. See BAGHAL.

Bahamas, or LUCAYOS, the most N. group of the W. Indies, extending 780 m. between Florida and the E. end of Santo Domingo. They include 670 islands and islets, called cays or keys, and embrace an area of 5,450 sq. m., with a population of 60,000. They are covered with low, rounded hills of wind-blown shell and coral sand. The principal inhabited islands (about twenty) are New Providence, Great Abaco, Harbour I., Eleuthera, Mayaguana, Ragged I., Rum Key, Exuma, Long I., Long Key, and the Biminis, all ports of entry, and the Great Bahama, Crooked I., Acklin I., Cat I., and Watling I., Berry I., Andros I., and Turks and Caicos Is. On New Providence, with 12,500 inhabitants, is Nassau, the capital and only town of importance. During the American civil war it became notable as the headquarters of the blockade-runners. Turks and Caicos Is. were separated politically from the Bahamas in 1848, and made a dependency of Jamaica. Grand Turk is the capital. The climate is agreeable and healthy. In the winter months, from November to May,

the temperature various from 60° to 75°, and in the rest of the year, constituting the warm season, from 75° to 85°. The islands have some reputation as a winter resort. They are historically interesting as the first land sighted by Columbus, the honour being claimed for Cat I., for Watling, Mariguana, Great Turk, and for Samana (Atwood Cay); modern opinion is that Watling was the spot. The islands were permanently occupied by British troops for the first time in 1718, and since then have been under the flag of Great Britain. The soil, though not rich, is suitable for the cultivation of small fruits, vegetables, pineapples, oranges, and cocoanuts. Their only market, the United States, is impeded by tariffs. Sponge fishing is carried on, and shells, pearls, and ambergris are obtained. Fibre (sisal hemp, *Agave rigida*, var. *sisalana*) cultivation is rapidly increasing. The chief centre of industry is Abaco. The annual value of trade is over £500,000, of which one-third are exports. The Bahamas have regular mail connection with New York and Florida. See Stark's *The Bahama Islands* (1898), and *The Bahama Islands*, ed. by G. B. Shattuck (1905).

Bahar. See BIHAR.

Bahawalpur, native state, Punjab, India. Area, 15,000 sq. m. Pop. 720,000. The capital of the state bears the same name, and is 60 m. S. of Mooltan and 2 m. from the l. bank of the Sutlej. It has a silk factory. Pop. 18,000.

Bahia. (1.) State of Brazil, skirting the Atlantic, and stretching inland so as to occupy the middle and N. parts of the São Francisco valley. The state is mountainous. Diamonds are obtained from the mines of Sincora and Lençes. Agriculture (sugar, cotton, coffee, cocoa, tobacco, and rubber) is the chief occupation of the large negro population. Area, 164,640 sq. m. Pop. 2,120,000. (2.) BAHIA, or SÃO SALVADOR DA BAHIA, cap. of above, and the see of a Roman Catholic archbishop, stands partly on the shore and partly on the cliff behind the Bahia de Todos os Santos (All Saints Bay), 800 m. N.N.E. of Rio de Janeiro. It contains some fine buildings, such as the cathedral, the archiepiscopal palace, and the treasury. It is the second seaport of Brazil. Exports: coffee, cocoa, tobacco, sugar, hides, and piassava fibre, etc., to the annual value of £3,700,000. The imports are valued at over £2,000,000 a year. The tonnage of the foreign shipping entering the port is over 1¾ millions. Founded in 1510, it was from 1549 to 1763 the capital of the country. Pop. 230,000.

Bahia Blanca, tn., prov. Buenos Ayres, Argentina, 447 m. by rail S.S.W. of Buenos Ayres; situated 6 m. from its port on the Atlantic, now called Ingeniero White, where the Great Southern and Bahia and N.W. Rys. have constructed moles, now accessible to vessels drawing 28 ft. Wools, skins, and wheat are exported. Pop. (including port) about 70,000.

Bahia Honda ('deep port'), seaport in Vinar del Rio, Cuba, 53 m. W. of Havana. Has sugar and mining industries. Pop. 1,300.

Bahr, Arabic term connoting river or lake—*e.g.* Bahr-el-Abiad (White River).

Bahr, HERMANN (1863), Austrian critic and journalist, born at Linz; one of the leaders during the 'nineties of the revolt against naturalism in German literature; directed with others the 'Free Stage' in Berlin; has written dramas, romances, and works of literary criticism, the best being of the last class—*e.g.* *Renaissance, neue Studien zur Kritik der Moderne* (1897); *Wiener*

Theater (1899); *Bildung* (1900); *Premieren* (1901); *Sanna* (1904); *Josef Kainz* (1905); *Ringelspiel* (1906); and *Grotesken* (1907).

Bahr, JOHANN CHRISTIAN FELIX (1798–1872), German philologist, born at Darmstadt, and educated at Heidelberg, where he became professor of classical philology in 1821. He published *Geschichte der Römischen Litteratur* (2 vols. 1828–32), with three supplements, issued in 1836, 1837, and 1840; also an edition of Herodotus (1830–5).

Bahraich, chief tn., Bahraich dist., Oudh, India, 65 m. N.E. of Lucknow. The shrine of Masaud is visited by Mohammedans and Hindus. Pop. 27,000.

Bahram. The name of five Sasanid kings who reigned between 274 and 439 A.D. See SASANIDS.

Bahramabad, tn., Persia, prov. of and 50 m. W. of Kerman. Produces opium. Pop. about 12,000.

Bahramghat, tn., United Provs. of Agra and Oudh, India, on the r. bk. of the Gogra R., here spanned by a bridge of boats; 39 m. by rail N.E. of Lucknow.

Bahrdt, KARL FRIEDRICH (1741–92), German Protestant theologian, professor of Biblical philology at Leipzig (1766), of philosophy at Erfurt (1768), and of theology at Giessen (1771), all of which he had to relinquish on account of his profligacy and the debased sentiments expressed in his *Translation of the New Testament* (1772–5). On settling (1779) at Halle he was shunned by the university professors, but made the acquaintance of J. H. Everhard, who led him to extreme rationalism. During the last ten years of his life he kept an inn. In his *Letters on the Bible* (1782) he anticipated the mythical theory of Strauss; and his *Letters for Truth-seeking Readers* (10 vols. 1784–6) are pervaded by a low moral tone. See his *Autobiography* (1790–1).

Bahrein Islands, group off Arabian coast, Persian Gulf, placed under British protection in 1867; the largest (Bahrein or Aval I.) is 27 m. long by 10 m. broad, and contains the capital, Manameh (pop. 25,000). Moharek is the next largest island. Pearl-fishing is the chief industry, pearls being exported to the value of over £750,000. The total trade amounts to nearly £3,000,000. A fine breed of white asses is reared. Pop. of group, 100,000. On Bahrein there are a vast number of remarkable sepulchral mounds, 20 to 50 ft. high, extending over the desert for many miles, constituting the most gigantic cemetery in the world, and probably the oldest now existing.

Bahr-el-Abiad, or WHITE NILE. See NILE.

Bahr-el-Azrek, or BLUE NILE. See NILE.

Bahr-el-Ghazal. (1.) A W. tributary of the White Nile, which it joins about 9° 30′ N. This river brings down much of the Nile *sudd*. The river gives its name to a district of the Sudan lying S. of Darfur and Kordofan and W. of the Nile; a territory formerly leased to Congo Free State, but which lease was annulled by Great Britain in 1906. (2.) An extensive but periodic lagoon, arm of Lake Chad, West Africa.

Baiæ, an ancient tn. in Campania, Italy, on a bay 10 m. W. of Naples. It was the favourite watering-place of the Romans under the late republic and empire (see Horace, *Ep.* i. 83). It was at Baiæ that Cæsar, Pompey, and Crassus formed their famous triumvirate (60 B.C.); here also the Emperor Hadrian died (138 A.D.). The modern BAJA.

Baiburt, or BAIBUT, tn., Armenia, Asiatic Turkey, 70 m. N.W. of Erzerum, with manufactures of carpets, arms, cutlery, etc. Pop. 6,000 to 8,000.

Baidyabati, a munic. and mrkt. tn. on the Hugli R., Hugli dist., Bengal, India, 15 m. N.W. of Calcutta, with manufactures of jute and hemp rope. Pop. 17,000.

Baiern, or BAYERN, the German name of BAVARIA.

Baiersbronn, tn., Würtemberg, Germany, in the Black Forest, 30 m. W. of Tubingen. Pop. 6,700.

Baikal Lake, one of the largest fresh-water lakes in the world (400 m. long, with a maximum breadth of over 50 m., and area of 13,500 sq. m.), in S. Siberia, stretching N. from the Sayan Mts. to the watershed of the Lena. The surface lies 1,651 ft. above the ocean, and its depth is most remarkable, sounds of 4,746 ft. and 5,600 ft. having been made. It is frozen for about four and a half months of the year. The Buryats catch large quantities of fish in the lake, especially salmon and gwyniad (*Coregonus*), and seals resembling the *Phoca fœtida* of northern seas. Formerly the lake was the only break in the continuity of the Siberian Railway. A line, however, was carried across the ice during the winter of 1903–4. By Sept. 25, 1904, the Circum-Baikal Ry., running from Baikal round the southern end of the lake to Myssovaya (163 m.), was completed at a cost of six million pounds. See Drizhenko's 'Exploration of Lake Baikal' in *Geog. Journal*, vol. ii. (1898).

Baikie, WILLIAM BALFOUR (1825–64), Scottish explorer, was a native of Orkney, of which country he published a bibliography (1847), contributing also to its zoology in *Historia Naturalis Orcadensis* (1848). He served as surgeon-naturalist with the *Pleiad* expedition (1854) up the Niger R. In his second expedition (1857) the ship was wrecked, and Baikie remained up country for seven years, studying the Hausa and Fulfulde languages (on which he published a monograph, 1861). See his *Narrative of an Exploring Voyage up the Rivers Kwora and Binue* (1856).

Bail. A person on arrest for an offence may generally be released on producing one or more persons who will answer for his appearance at the trial. Such persons are said to go bail for the accused, and they agree to pay to the crown a certain sum in the event of his non-appearance. A person summarily arrested, if not brought before a court within twenty-four hours, must be admitted to bail by the police officer unless there is good reason to the contrary. The King's Bench Division, or a judge in vacation, may also admit to bail for any crime. In Admiralty proceedings, where a ship or cargo is arrested, the owner may have it released on giving bail. In Scotland the law is principally regulated by the Bail (Scotland) Act, 1888, but the Lord Advocate and the High Court of Justiciary have discretionary powers unaffected by it.

Baildon, par. and vil., West Riding of Yorkshire, England, 4 m. N. of Bradford. Has worsted mills, chemical works, etc. Pop. 6,000.

Bailen, tn., prov. Jaën, Spain, 22 m. by rail N. of Jaën; mines and foundries of galena. Famous for its breed of Andalusian horses. Pop. 7,500.

Bailey, the whole of the other buildings and courts of a castle as distinguished from the keep.

Bailey, OLD. See OLD BAILEY.

Bailey, NATHAN (d. 1742), English lexicographer, master of a boarding school at Stepney, London; wrote the *Universal Etymological Eng. Dict.* (1721–7; 30th ed. 1802), and edited the *Dictionarium Britannicum* (1730).

Bailey, PHILIP JAMES (1816–1902), English poet, born at Not-

tingham. His reputation rests wholly upon *Festus*, a poem which created a sensation in 1839 (Fiftieth Anniversary ed. 1889). There is a selection entitled *A Festus Treasury*, edited by Albert Broadbent (1901).

Bailey, SAMUEL (1791–1870), English economic and philosophical writer, was born in Sheffield. After giving up his cutler's business, he twice contested Sheffield unsuccessfully as a philosophical Radical (1832, 1834). His writings are chiefly (1) economic, in one of which—on *Value* (1825)—he criticises Ricardo and others for confusing intrinsic value with exchange value; and (2) philosophical, the most valuable being *Letters on the Philosophy of the Human Mind* (1856–63) and *Theory of Reasoning* (1851). Bailey was a determinist, utilitarian, and nominalist.

Bailey, SOLON IRVING (1854), American astronomer, was born in Lisbon, New Hampshire. Associate professor of astronomy at Harvard, he founded a branch of the Harvard observatory in the southern hemisphere, at Arequipa, in Peru, in 1889, and in 1893 established on the summit of El Misti (19,000 ft.) the highest scientific station in the world. Has written many papers in *Annals of Harvard College Observatory.*

Bailie. (1.) A magistrate of a Scottish burgh, generally elected by the council from the councillors. He has criminal jurisdiction as to police offences, and civil jurisdiction as to debt and possessory questions within the burgh. (2.) Bailie to give sasine, the person who appeared for the superior at the ceremony of giving sasine. (3.) Until 1881 the bailie of Holyrood, or of the abbey, an official appointed by the Duke of Hamilton as hereditary keeper of Holyrood House, Edinburgh, and having jurisdiction as to civil debts contracted within the precincts of the sanctuary. See Green's *Encyc. of the Law of Scotland* (vol. i. 1896).

Bailiffs are of several kinds. (1.) Sheriffs' bailiffs, who are either (*a*) bailiffs of hundreds, summoning juries, collecting fines, etc., in the hundreds; or (*b*) bound bailiffs, whose duty is mainly to serve writs and levy executions. As the sheriff is responsible for their conduct, they are 'bound over' to perform their duties. (2.) County court bailiffs, governed by the County Courts Act, 1888, serve under the high bailiff, and are removable by the judge for misconduct. No distress for rent may be levied except by a person authorized to act as a bailiff for that purpose by a certificate granted by a county court judge. In France there were bailiffs of royal and of private domains. In addition to administering the estates under their charge, they also often presided over the feudal courts of the lordship, and eventually became, owing to their ignorance and pretension, a common butt of the satirical comedy of the day.

Bailiwick, the district over which the jurisdiction of a bailiff or sheriff extends.

Baillairge, CHARLES P. FLORENT (1827), Canadian architect, worked as an engineer before devoting himself to architecture. He has designed numerous buildings for his native city, Quebec, including the Laval University, the Music Hall, and a number of churches; the Monument des Braves de 1760 is also his work. Partly responsible for the design of the Ottawa Parliament buildings, he has also built (1893) the Charles River aqueduct.

Bailleul, tn., 18 m. N.W. of Lille, dep. Nord, France; has manufactures of woollens, linens, lace, etc. Pop. 13,600.

Baillie, LADY GRISELL (1665–1746), Covenanting heroine and song-writer, eldest daughter of Sir Patrick Hume, afterwards first Earl of Marchmont, was born at Redbraes Castle (now Marchmont House), Berwickshire. She is remembered for her pathetic lyric, *Werena my heart licht I wad dee*, and the fragment, *The ewe-buchtin's bonnie*, to which Thomas Pringle added several stanzas. See *Memoirs of George Baillie of Jerviswood and of Lady Grisell Baillie*, by their daughter, Lady Murray of Stanhope (1693–1759).

Baillie, JOANNA (1762–1851), Scottish dramatist and poet, born at Bothwell, Lanarkshire. She went to London in 1784, and in 1790 published anonymously a volume of miscellaneous poems, entitled *Fugitive Verses*. Her first series of *Plays on the Passions* was issued in 1798, followed by a second in 1802, and a third in 1812. These, and *The Family Legend*, produced in Edinburgh in 1810, constitute her chief works as a dramatist. Some of her songs —such as *Woo'd an' married an' a'; Up, quit thy bower;* and *Saw ye Johnnie comin'?*—became popular. She was visited at Hampstead, where she lived from 1806 to her death, by, among other literary celebrities, Sir Walter Scott (third canto of *Marmion*). Her *Collected Works* appeared in 1851, with a prefatory memoir. See Rogers's *Scottish Minstrel* (1870); Mitford's *Recollections of a Literary Life* (1859); Miss Thackeray's *Book of Sibyls* (1883).

Baillie, MATTHEW (1761–1823), physician and anatomist, brother of Joanna Baillie, was born at Shotts, Lanarkshire, and studied medicine in London, under his uncle, William Hunter, the great anatomist, whom he succeeded (1783) as lecturer on anatomy. He was appointed physician to George III. about 1810. His *Morbid Anatomy* (new ed. 1833) was a standard work; and he also wrote *Lectures and Observations on Medicine* (1825). See his Life, prefixed to his works, by James Wardrop (1825).

Baillie, ROBERT (1599–1662), Scottish theologian, born in Glasgow; an Episcopalian strongly opposed to Laud; a Covenanting chaplain, member of Westminster Assembly, professor of divinity (1642) and principal of Glasgow University (1660). Scholar, able controversialist, and author of many books on current religious errors, Baillie will be remembered for his *Letters and Journals* (1637–62; best ed. Bannatyne Club, 1841–2), of great value for a knowledge of the times, and especially of the 1638 and Westminster Assemblies. Baillie did for Scotland what Pepys and Evelyn did for England. See Carlyle's *Miscellanies*, vol. vi. (1872).

Baillie, ROBERT (d. 1684), of Jerviswood, a Scottish patriot, was arrested for complicity in the Rye House plot, condemned, and hanged at the Market Cross of Edinburgh. See Burnet's *Hist. of his own Times* (1723–34).

Baillot, PIERRE MARIE FRANÇOIS DE SALES (1771–1842), French violinist, was born at Passy, near Paris; received his musical training at Paris and at Rome. He is regarded as a founder of the French violin school.

Bailly, JEAN SYLVAIN (1736–93), French astronomer and politician, born in Paris; author of *Histoire de l'Astronomie* (1785; new ed. 1805). On the outbreak of the French revolution he was elected first president of the National Assembly and mayor of Paris (1789). His action in firing upon the mob in the Champ de Mars (July 17, 1791) destroyed his popularity. In July 1793 he was arrested by the Jacobins, condemned, and executed (Nov. 12). See his *Mémoires d'un Témoin*

de la Révolution (1804); *Eloge de Bailly*, by Arago (1836); Nourrisson's *Trois Révolutionnaires: Turgot, Necker, Bailly* (1885).

Bailment is the delivery of goods in trust on a contract, express or implied. The goods may be delivered to be kept gratis for the bailor, to be used gratis or for hire by the bailee, or for the bailee to do something to them gratis or for reward. A gratuitous bailee is liable only for gross negligence. A bailee who receives an article on loan for his own benefit must use the greatest diligence. A fraudulent bailee is guilty of larceny. See Larceny Act, 1861.

Baily, EDWARD HODGES (1788–1867), English sculptor, a native of Bristol, attracted the attention of Flaxman, in whose studio he worked for seven years (1807–14). For his *Eve at the Fountain* (1818) and other works he was elected R.A. in 1821. Baily's work was chiefly on domestic subjects (*e.g. Motherly Love; Group of Children*) and portrait statues—*e.g.* those of Wellington, Nelson (Trafalgar Square), Byron, C. J. Fox, and Lord Mansfield. To him are also due the sculptures on the Marble Arch, London.

Baily, FRANCIS (1774–1844), English astronomer, practised as a stockbroker in London from 1799 to 1825. On his retirement from business he devoted himself to astronomy; discovered Baily's Beads; founded the Astronomical Society (1820); revised the star catalogues of Flamsteed, Lalande, Lacaille, and others; reformed the *Nautical Almanac;* and repeated the 'Cavendish' experiments to determine the earth's density. He wrote a biography of Flamsteed (1835). See Herschel's *Memoirs of F. Baily* (1845); *Dublin Rev.*, vol. xviii. p. 75.

Baily's Beads, discovered by the preceding at the solar eclipse, May 15, 1836; the crescentic line of bright points or beads into which the edge of the sun's disc appears to be broken, at the moment when it is lost at one side of the moon, and at the moment when it emerges at the other.

Bain, ALEXANDER (1818–1903), professor of logic at Aberdeen (1860–80); was educated at Marischal College (M.A. 1840); professor of mathematics and natural philosophy at Glasgow (1845). Chief works: *The Senses and the Intellect* (1855; new ed. 1894); *The Emotions and the Will* (1859; new ed. 1899); *Manual of Eng. Composition and Rhetoric* (1866; new ed. 1887–8); *Logic, Deductive and Inductive* (1870); *Education as a Science* (1879); *Biography of James Mill;* and *Personal Recollections* (1882). The distinguishing features of his psychology were that he eliminated metaphysics, based his analyses upon physiological states and processes, and made subtle use of the mental laws of association, and thus largely determined the direction and methods of modern British psychology. He knew Mill well, and read his *Logic* in manuscript, discussed the whole work in detail with him, and supplied him with many illustrative examples drawn from the experimental sciences. See J. S. Mill's *Dissertations and Discussions* (1874), and Bain's *Autobiography* (1904).

Bainbergs, plate armour for the protection of the legs, introduced during the 13th century; worn over chain-mail.

Baines, EDWARD (1774–1848), English journalist, was a Leeds printer who became proprietor of the *Leeds Mercury* (1801). M.P. for Leeds (1834–41), he advocated Catholic emancipation, parliamentary reform, factory legislation, and abolition of church rates and civil disabilities. Baines published *History of County of York* (1822–3); *History of County Palatine of Lancashire* (1868–70); *History of the Wars of the*

French Revolution (1824); and *History of the Reign of George III.* (1823). See *Life* (1859) by his son.

Bairaktar, or BAIRAKDAR, MUSTAPHA PASHA (1755–1808), grand-vizier of the Ottoman empire, entered the army, and became pasha of Rustchuk. When the Janissaries revolted and put Mustapha IV. on the throne, Bairaktar marched on Constantinople, defeated the Janissaries, overthrew Mustapha, and made Mahmud II. Sultan, he himself becoming grand-vizier. He attempted to disband the Janissaries, but they again rebelled, demanded the restoration of Mustapha, and killed Bairaktar.

Bairam, or BEIRAM, a Mohammedan feast falling immediately after Ramadan, or the month of fasting, and extending over one to three days. The second Bairam, falling seventy days later, commemorates Abraham's sacrifice of Isaac.

Baird, SIR DAVID (1757–1829), British general, entered the army in 1773, and in 1780 fell in India into the hands of Hyder Ali, whose prisoner he remained from 1780–4. He led the storming column against Seringapatam (1799) in the second war with Tippoo, commanded the Indian troops which co-operated with Hutchinson in driving the French from Egypt, and assisted at the capture of Alexandria in 1801. Knighted in 1804, he led the successful expedition against the Dutch at the Cape (1805–6), commanded the first division at the siege of Copenhagen (1807), and the right wing at Corunna (1809), where he was wounded. He was raised to the baronetcy in 1810. See *Life* by Theodore Hook (1832); Sir Robert Wilson's *Campaign in Egypt* (1802); Napier's *Peninsular War*, vol. iii. (1893).

Baird, JAMES (1802–76), Scottish coalowner and ironmaster, M.P. for the Falkirk Burghs (1851–7), devoted himself to educational and religious questions. He founded (1871) the 'Baird Lectures,' to further orthodox teaching; and the 'Baird Trust' of the Church of Scotland, to which he gave (1873) £500,000, in order to promote the spiritual welfare of that country. See *Kings of British Commerce* (1876), and Baird's *Bairds of Auchmedden* (1870).

Baird, SPENCER FULLERTON (1823–87), American naturalist, born at Reading, Pa.; became professor of natural sciences at Dickinson (1845), assistant secretary of the Smithsonian Institute at Washington (1850), secretary (1878), and from 1874 was United States commissioner of fish and fisheries. He did much to further the zoological and archæological exploration of the United States, and laid the foundation of the National Museum (1857) of the Smithsonian Institute. At the same time, he worked along with Audubon, Agassiz, and other zoologists. He wrote *The Birds of America* (1860), with John Cassin; *The Mammals of North America* (1859); *Hist. of American Birds* (1874–84), in conjunction with Dr. Brewer and Professor Ridgway.

Baireuth. See BAYREUTH.

Bairnsdale, tn., Victoria, Australia, 170 m. by rail E. of Melbourne; the centre of a district whose population is about 15,000. Pop. of town 3,000.

Baitul. See BETUL.

Baize, a rough woollen cloth with a nap on one side, used for linings, coverings, and curtains.

Baja, tn., co. Bacs-Bodrog, Hungary, on the r. bk. of the Danube, 37 m. by rail W. of Maria Theresiopel, with an imposing castle, and a large trade in fruit, grain, and figs. Pop. 20,000.

Baja (anc. *Baiæ*), coast tn., Italy, 10 m. W. of Naples. See BAIÆ.

Bajaur, or BAJAOR, dist. (area, 375 sq. m.) under British protec-

tion, N.E. Afghanistan, N. of Kabul R. and W. of the Swat R.

Bajazet or BAYAZID I. (1347–1403), Sultan of the Turks, succeeded his father, Murad I., in 1389, and began his reign by murdering his younger brother Yakub. Bajazet took possession of Bulgaria, Servia, Macedonia, and Thessaly, and his swift subjugation of Asia Minor gave him the name of Ilderim, or 'Lightning.' In 1396 he defeated, at Nikopol, the Hungarians, Poles, and French under King Sigismund of Hungary. The Greek empire was in danger at his hands, when Timur the Mongol attacked his possessions in Asia Minor, and gained a victory over him at Angora in 1402. Bajazet was captured, and travelled in a litter with Timur's camp; which gave rise to the traditional story, used by Marlowe and others, that he was imprisoned in a cage.—BAJAZET II. (1447–1512) succeeded his father, the Sultan Mohammed II., the conqueror of Constantinople, in 1481. A peace-loving monarch, the builder of mosques and bridges, and the patron of learning, he was in 1512 forced by the Janissaries to abdicate in favour of his more martial son Selim. See Gibbon's *Decline and Fall of the Roman Empire* (vol. vii.).

Bajimont. See BAGIMONT'S ROLL.

Bajmok, tn., prov. Bacs-Bodrog, Hungary, 13 m. S.W. of Maria Theresiopel. Pop. 8,000.

Bajocco, or BAIOCCO, a small alloyed silver or copper coin current (1592–1867) in the Papal States, value about ½d.

Bajus, or DE BAY, MICHAEL (1513–89), Roman Catholic theologian, born at Melin in Hainault; studied at Louvain, and, as professor of theology there (1552), took an active part in the Council of Trent. A disciple of Augustine, he was taxed with heresy: eighteen of his propositions were censured by the Sorbonne (1560), and seventy-six condemned by Pius V. (1567). He made a public apology, but did not renounce his opinions, which eventually developed into Jansenism. He became chancellor of his university (1578). His works were published at Cologne (1696). See Linsenmann's *Michael Baius und die Grundlegung des Jansenismus* (1867).

Bajza, JOSEPH (1804–58), Hungarian poet and critic, was director of the national theatre at Pest (1837), and wrote and (partly) translated the *Hist. Library* (1843–45), the *Modern Plutarch* (1845–7), *Universal Hist.* (1847), and published a volume of lyrics in 1835. He also edited Kossuth's paper, *Kossuth Hirlapja* (1848–50).

Bakacs, THOMAS (d. 1521), Hungarian statesman and cardinal, was successively secretary to King Matthias Corvinus, chancellor to Ladislaus II., cardinal primate of Hungary (1500), and papal legate.

Bakarganj, dist., Dacca div., E. Bengal and Assam, India, in the Ganges-Brahmaputra delta. In 1876 part of it was submerged by a tidal wave, with great loss of life. Area, 3,645 sq. m. Pop. 2,300,000.

Bakau. See BACAU.

Bakchiserai. See BAKHCHI-SARAI.

Bakehouse Regulations Acts. See FACTORIES AND WORKSHOPS.

Bakel, a fortified post of W. Africa (fort built 1820), in the French colony of Senegal, on the l. bk. of the Senegal, 260 m. S.E. of St. Louis. Pop. 3,000.

Baker, SIR BENJAMIN (1840–1907), English civil engineer, joint-designer (1882) with Sir John Fowler of the Forth Bridge, and joint engineer of the Nile reservoir. He was also the inventor of the pneumatic shield. He was knighted in 1890, and created K.C.B. in 1902.

Baker, HENRY (1698–1774), English scientist and poet, was born in London. After completing his apprenticeship as a bookseller, he instituted a highly successful method of instructing deaf-mutes. He devoted himself to the study of natural science, some results of which he put in verse (*The Universe*, 1727), and he was latterly associated in journalism with Defoe. He wrote *The Microscope made Easy* (1743) and *Employment for the Microscope* (1753), and in 1744 was given the Copley medal for experiments on the crystallization of salt. He founded the Bakerian lecture of the Royal Society.

Baker, JOHN GILBERT (1834), English botanist, born at Guisbrough, Yorkshire; was first assistant curator of the herbarium at Kew (1866); and keeper (1890–9). He was lecturer on botany at the London Hospital and to the Apothecaries' Society (1882), and has published monographs on ferns (2nd ed. of Hooker's book, 1883), *British Roses* (1869), *Ferns of Brazil* (1870–80), *Flora of Mauritius and Seychelles* (1877), *Flora of the English Lake District* (1885), and *Fern Allies* (1887); has written *On the Geographical Distribution of Ferns* (1868), and edited Watson's *Topographical Botany* (2nd ed. 1883).

Baker, SIR RICHARD (1568–1645), English historian, was educated at Oxford; author of a once popular *Chronicle of the Kings of England* (1643).

Baker, HON. SIR RICHARD CHAFFEY (1842), first president of Federal Senate of Australian Commonwealth (1901–6), was born at Morialta in S. Australia, and was attorney-general (1870), minister of justice and education (1884), and president of Legislative Council (1893–1901). He was knighted in 1895, and has published several books and pamphlets on federation.

Baker, SIR SAMUEL WHITE, (1821–93), English author and explorer, who, after exploring the Blue Nile and tracing the course of the White Nile, in 1864 reached the great fresh-water lake to which he gave the name of Albert Nyanza. On his return to England he was knighted. In 1869–73 Baker commanded an expedition organized by the Khedive of Egypt for the suppression of the slave trade and the annexation of the equatorial regions of the Nile basin. He subsequently (1879) made a complete exploration of Cyprus. Baker was the author of the following works: *The Rifle and the Hound in Ceylon* (1854); *Eight Years' Wanderings in Ceylon* (1855; new ed. 1890); *The Albert Nyanza* (1866); *The Nile Tributaries of Abyssinia* (1867); *Ismailia*, a narrative of the expedition of 1869–73 (1874); *Cyprus as I saw it in 1879* (1879); and *Wild Beasts and their Ways* (1890). In 1895 a *Memoir* of him was published by T. D. Murray and A. Silva White.

Baker, THOMAS (1656–1740), antiquary, fellow of St. John's College, Cambridge, resigned his living in the church (1690) as a nonjuror, and wrote a *History of St. John's College* (ed. Professor Mayor, 1867). See Walpole's *Life of Baker*.

Baker, VALENTINE (1827–87), known also as Baker Pasha, soldier, brother of Sir Samuel White Baker, joined the British army in 1848, and served in the Kaffir war (1852–3), in India, and in the Crimea (1855). He became a major-general in the Turkish army in 1877, and served in the Russo-Turkish war. He organized and commanded (1882–7) the Egyptian gendarmerie for the Khedive, and was disastrously routed at the first battle of El Teb (1884) by the tribesmen of Osman Digna. He wrote *Clouds in the East* (1876), and *War in Bulgaria* (1879).

Baker City, co. seat of Baker co., Oregon, U.S.A., on the Powder R. The industries include gold and silver mining, stock raising, and lumbering. Pop. 7,000.

Bakersfield, city and co. seat of Kern co., California, U.S.A., 100 m. N.W. of Los Angeles. Has oil refineries, carriage works, foundries, fruit and meat packing, and live stock raising. Pop. 5,000.

Bakewell, mrkt. tn., Derbyshire, England, 10 m. E.S.E. of Buxton, with ancient cruciform church containing monuments of the Vernon and Manners families. It has chalybeate springs. Chert is quarried. Chatsworth House (3 m. N.E.), the seat of the Duke of Devonshire, and Haddon Hall (2 m. S.E.), are in the vicinity. Pop. 3,000.

Bakewell, ROBERT (1725–95), English agriculturist, famous for his improvement (from 1755) of farm stock, especially the Leicestershire breed of sheep, the Dishley cattle, and a breed of black horses. See *The Husbandry of Three Celebrated British Farmers* (1811).

Bakhchi-Sarai, tn., Crimea, Russia, once cap. of the khanate of Krim, in valley of Choruk, 20 m. S.W. of Simpheropol; contains the ancient palace (1519) of the Tartar khans. In 1854 it was the headquarters of the Russian army for the relief of Sebastopol. Tobacco is cultivated in the neighbourhood. Pop. 15,000.

Bakhmut, tn., Ekaterinoslav gov., Russia, 125 m. E. of Ekaterinoslav city; produces coal, salt, alabaster, and quicksilver, and manufactures steel rails. Pop. 20,000.

Bakhtegan, or NIRIS, salt lake, 50 m. E. of Shiraz, prov. Farsistan, Persia. Area about 400 sq. m.

Baking. See BREAD, COOKERY, OVEN.

Baking Powder, a powder composed of tartaric acid and bicarbonate of soda, and generally mixed with flour; used as a substitute for yeast in raising bread and cakes. Its action is mechanical, being due to the gas produced by the combination of the two chemicals. See BREAD.

Bakony Wald, a broad, hilly region of Hungary, stretching S.W. from the elbow of the Danube above Budapest, parallel to Lake Balaton, for 50 m., and forming a division between the great *pusztas* (plains) on the E. of the Danube and the plain of the Raab. Alt. 2,000–2,340 ft.

Bakshish, or BACKSHISH (Pers. 'a gift'), a word used throughout the East for a gratuity or 'tip' for services rendered; though it is demanded, often, with threats.

Baku. (1.) Russian gov. of the E. Caucasus, including the plains of the lower Kura and Aras, and the Talish Mts. The chief crops are wheat, millet, maize, and rice; saffron, madder, and cotton are also grown, and silk is produced. The coast fisheries are important, but the main industry is in the neighbourhood of the town. Area, 15,060 sq. m. Pop. 900,000. (2.) Chief tn. of above, at head of a bay (finest natural harbour on the Caspian Sea) on the S. side of the Apsheron peninsula; owes its importance to the petroleum wells in the neighbourhood, of which there are over 3,000, producing over 9,000,000 tons of oil per annum. Natural gas issues from the ground at Atesh-ga ('place of fire'), a very ancient resort of fire-worshippers, and elsewhere S. of Baku. The oil refineries (the Black Town) are 2 m. E. of Baku proper, on the shore of the bay. Baku is connected by rail with Batum (560 m.; also pipe line), Poti, and Petrovsk (273 m.). Steamers ply to Astrakhan for the Volga, to Krasnovodsk, the terminus of the Transcaspian Ry., and to Enzeli in Persia.

Baku was wrested from Persia by the Russians in 1806. Labour riots occurred in January 1905, and again in August–September, during the progress of which several hundreds of oil towers were burned, and an estimated loss of £2,700,000 incurred. Many persons were killed and wounded before order was restored. See Marvin's *The Region of Eternal Fire* (1883); 'Baku Petroleum District,' in *Engineering Mag.* (xv. 1898), and Henry's *Baku: An Eventful History* (1905). Pop. (1860) 13,381; now 180,000.

Bakunin, MICHAEL (1814–76), Russian revolutionist and anarchist, was born in the government of Tver. He studied philosophy at Berlin (1841), thence went to Dresden, and later (1847) to Paris, where he became acquainted with George Sand and the socialist Proudhon. A little later he took an active part in the revolutionary movements at Prague and Dresden, and being arrested in Saxony (1849), was eventually delivered up to the Russian government, which banished him in 1855 to Siberia. Thence he escaped (1860) to Japan, and came by way of America to England (1861). His chief writings are *Dieu et l'Etat* (3rd ed. 1895; Eng. trans. 1894); *Appel aux Slavs* (1888); and *Révolution Sociale et la Dictature Militaire* (1871).

Bala. (1.) Market town, N.E. Merionethshire, Wales, 12 m. S.W. of Corwen, with Calvinistic Methodist college. Gives name in geology to the Bala beds. Pop. 1,500. (2.) Lake (Llyn Tegid), largest in N. Wales, 4 m. long by 1 m. wide, an expansion of the river Dee.

Balaam, a seer or soothsayer whom Balak, king of Moab, called from his home in Pethor, by the Euphrates, to curse Israel, and thereby arrest their apparently irresistible march towards Canaan. The story of his journey, of the angel, visible at first only to his ass, and the beast's remonstrance with its master, is well known. But the most remarkable fact about Balaam, a non-Israelite, is the dignified and truly prophetic oracle which he pronounced regarding Israel, in place of the curse desiderated by Balak. It is very difficult to gain a clear conception of Balaam's character: in Num. 22–24 he does not go beyond Jehovah's word, and it is not quite obvious what his transgression really was; but nearly every other reference to him in Scripture, particularly in the New Testament, speaks of him with opprobrium, and holds him up as a warning example of those who love the hire of unrighteousness—*i.e.*, possibly, prostitute divinely-bestowed talents for worldly reward—and he was slain while fighting on the side of the Midianites against Israel (Num. 31:8, 16; Micah 6:5–8; Rev. 2:14, etc.).

Bala Beds, or CARADOC GROUP, a geological formation, named from Bala in Merionethshire. They form the uppermost subdivision of the Lower Silurian or Ordovician formation. At Bala they are mostly sandstones, grits, and shales, with a fossiliferous limestone, the Bala limestone, and a few thin ash beds. They abound in trilobites, brachiopods, and graptolites. In the N. of Wales volcanic rocks of Bala age are largely developed, and are the cause of much of the picturesque scenery of that region. Snowdon is built up of slate and sandstone, with lava flows and ash beds of the Bala series, and thick intrusive sheets. Rocks of this period occur also in Cornwall, in the Lake District (Coniston limestone), and in the S. of Scotland (Lowther shales). See Harker's *Bala Volcanic Rocks of Wales* (1889); Sir Arch. Geikie's *Ancient Volcanoes of Great Britain* (1897).

Balæna. See WHALE.

Balæniceps ('whale-headed'), or SHOEBILL, a stork with an exceedingly broad and long beak, found on the Upper Nile.

Balænoptera. See RORQUAL.

Balafré, LE ('Scarred'). (1.) A nickname of Francis, Duke of Guise (1519–63), from a sword-cut which he got in the face whilst fighting the English near Boulogne (1545). (2.) A nickname of Ludovic Lesly, uncle of Quentin Durward, in Scott's novel (1823) of that title.

Balaghat ('above the Ghats'), the elevated table-land of Berar, India, which lies between the E. and W. Ghats.

Balaguer, VICTOR (1824–1901), Spanish politician, poet, and historian. He became an active Radical politician and advocate of the rights of Catalonia, fled to France in 1866, and threw himself into the Provençal literary movement. In 1868 he became a leader in the Cortes, and minister of colonies in 1886. He is chiefly known by his Catalan poems (*Poesias Completas*, 1874, and *Obras Poeticas*, 1880), more particularly the collection known as *Trovador de Montserrat* (1850), etc., and tragedies (*Tragedias*, 6th ed. 1891), his *Historia de los Trovadores* (1878–80), and especially his *Historia de Cataluñ*.

Balak-hissar. See BALIKESRI.

Balakirev, MILI ALEXEIEVITCH (1836), Russian musical composer, born at Nijni Novgorod; appeared with great success as a pianist in St. Petersburg in 1855; was conductor of the Russian Musical Society from 1867–70, and, later, director of the imperial orchestra. He has severely criticised Rubinstein and Tchaikovsky. His works are: music to *King Lear*; *Tamara* and *Russia*, both symphonies; *Islamey*, an Oriental fantasia for the piano; a very interesting collection of Russian popular songs (1866); and many overtures with Russian, Spanish, and Czech (Bohemian) themes. He edited a selection of Tausig's pianoforte pieces in 1908.

Balaklava, or BALACLAVA, port and health resort, S.W. coast of Crimea, Russia, in 44° 30′ N. lat., 8 m. S.E. of Sebastopol. Chiefly memorable for the action of Oct. 25, 1854, and the charge of the Russian guns by the Light Brigade (Six Hundred). In 1854–6 it was the headquarters of the British force. See Kinglake's *Invasion of the Crimea*; and Paget's *The Light Cavalry Brigade in the Crimea* (1881). See also CRIMEAN WAR.

Balalaika, a musical instrument very much used in Russia for the accompaniment of popular songs. It is a stringed instrument, with, generally, two strings, and resembles a guitar.

Balance, an instrument for determining the relative weights or masses of bodies, usually by reference to certain standard units (pounds, ounces, grams, etc.). There are many varieties of balance. The ordinary balance consists of a lever of the first kind, called the beam, which is supported on a fulcrum in the middle, and from the extremities of which are hung two scale-pans, one for the weights, the other for the object to be weighed. In order that the beam shall be able to oscillate freely on its support, the fulcrum consists of a steel or agate prism, or 'knife-edge,' with its sharp edge at right angles to the direction of the beam, and resting on a plane of polished steel or agate, thus reducing friction to a minimum. Further, to ensure that the arms of the beam shall keep at absolutely the same length irrespective of their movements, the scale-pans are hung from hooks containing planes, which rest on similar knife-edges at the ends of the beam. Frequently a needle or pointer is

fixed to the centre of the beam in such a way that one end oscillates along the arc of a circle, and comes to rest in the line of direction from the fulcrum to the centre of gravity of the beam, or swings evenly on each side of that line, when the balance is horizontal.

The following are the requirements of a good balance:—(1.) The two arms of the beam must be precisely the same length, otherwise unequal weights in the scale-pans will be necessary to produce equilibrium of the lever. (2.) The balance should be in equilibrium when the scale-pans are empty. (3.) The centre of gravity of the beam, when horizontal, should be in the same vertical line with the knife-edge of the fulcrum, and a short distance underneath the latter, in order to ensure that the beam, when at rest, shall assume a position of stable equilibrium. (4.) The balance should be delicate—*i.e.* should answer to the least alteration of the weights in the scale-pans. This is effected (*a*) by making the arms of the balance long, while their weight is reduced as far as the necessary rigidity will permit; (*b*) and by having the centre of gravity but little below the knife-edge of the fulcrum; while (*c*) due attention must be given to diminishing friction by having the knife-edges of the supports as sharp and the bearings as hard as possible.

A balance to be used in the processes of chemical analyses must possess extraordinary delicacy, even to one ten-thousandth of a gram or one one-thousandth of a grain. In order to prevent the wearing away of the knife-edges of the fulcrum and of the scale-pans as much as possible, the whole beam, and the pans from the beam, are raised off their bearings, when not in use, by means of a screw; and to protect the balance from dust, moisture, air currents, or other disturbance of conditions, it is invariably, even when in use, kept within a glass case, one side of which is movable.

Of the numerous special modifications of the balance only two require separate notice—the Roman balance and the spring balance. The Roman balance, or steelyard, consists of a bar of steel suspended near one of its ends, from which hangs the object to be weighed, while along the longer arm moves a weight used as a counterpoise. As the counterpoise is on the longer arm, a much smaller weight can balance a heavy object, and thus its use obviates the necessity of heavy weights—an advantage which leads to its employment in cases when it is necessary to move the weighing apparatus from place to place, or when the objects to be weighed (carts, wagons, etc.) are very heavy. The spring balance, or Salter's balance, has for its essential part a cylindrical coil of spring wire in a vertical case. From the lower end of the coil depends a hook supporting a scale-pan, and on the front of the case is an index-finger, which moves up and down a slot according to the strain put on the spring by the varying weights in the pan. A graduated scale is placed along the side of the slot, and the index at once shows the weight of any object put in the scale-pan. The spring balance becomes unreliable when frequently used. See Glazebrook and Shaw's *Practical Physics* (1893).

Balance of Power, a political principle implying such a distribution and opposition of forces among the nations forming part of one system that no state or combination of states shall endanger the rights or independence of any other state. It was this that Henry IV. of France and his great minister Sully had in view when, in 1603, they proposed the

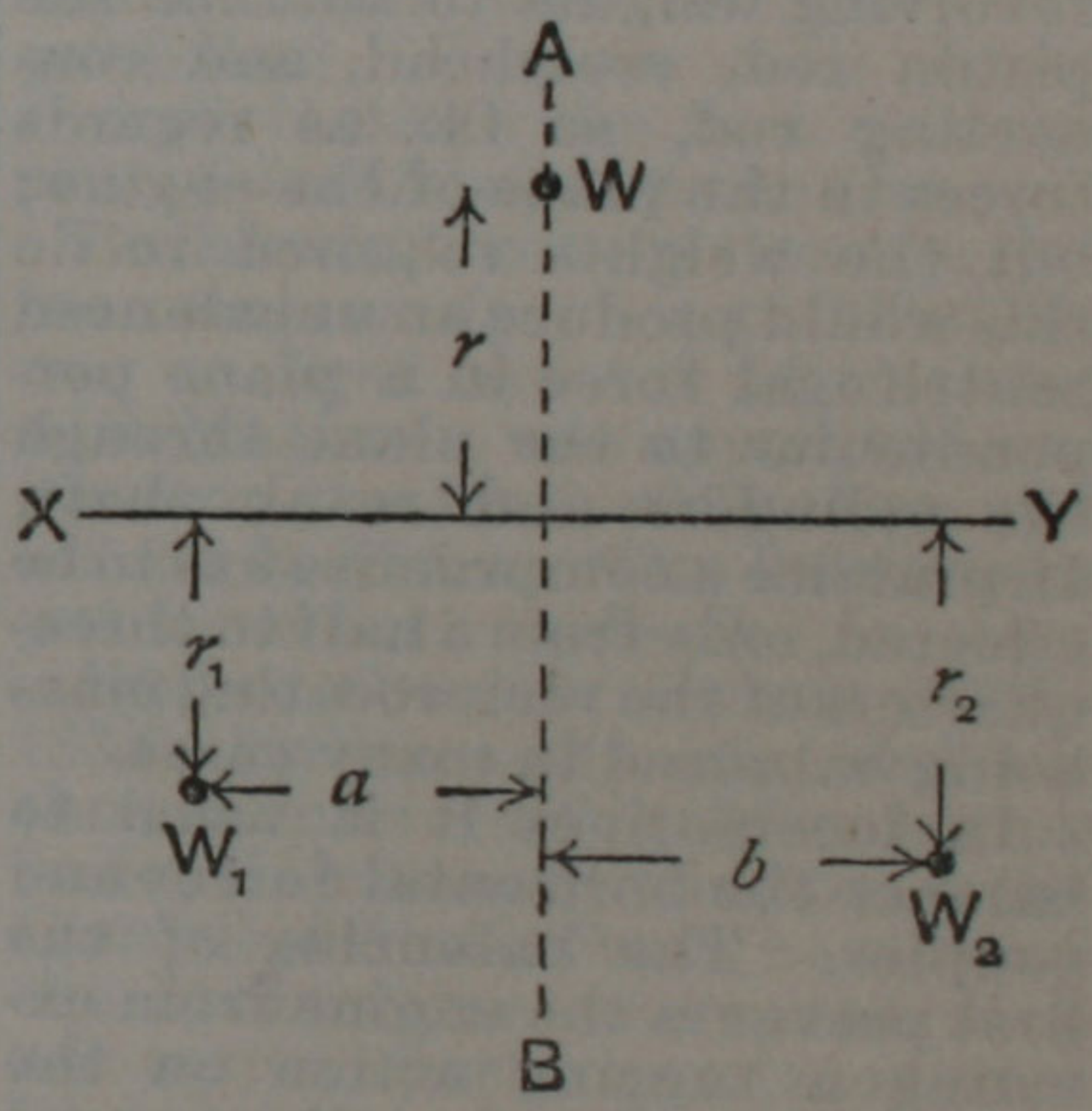
establishment among the European states of a *République très Chrétienne;* it underlay the arrangements of the treaty of Westphalia (1648), which was mainly directed against the growing power of the house of Hapsburg; and, again, it led to the European coalition against the aggressions of Louis XIV. of France, which received their final check in the treaty of Utrecht (1713). For the same reason Napoleon met with the desperate opposition of Europe, led by Britain; and the settlement effected by the peace of Vienna (1815) was based on calculations of the balance of power. To it also was due the coalition of Britain, France, Sardinia, and Turkey against Russia, which resulted in the Crimean war (1854). The influence of the same principle was operative in the Berlin Congress of 1878; and it may be traced in recent international arrangements, in which the power of the Triple Alliance (Germany, Austria, and Italy) has opposed to it that of the Dual Alliance (France and Russia), in the growing movement towards an English-speaking confederacy for the mutual protection of its members against foreign interference, and in the alliance of Britain and Japan for reciprocal support in the Far East. See Dilke's *The Present Position of European Politics* (1887); Hume's *Essays*, ii. 7.

Balance of Trade. See TRADE.

Balance Spring. See HOROLOGY.

Balancing of Machinery. In most machines the inertia of the moving parts originates forces which tend to cause the frame of the machine to vibrate as a whole. Such a machine is said to be unbalanced, and in the case of high-speed machinery it is often necessary to balance these forces wholly or partially by means of suitably disposed weights. A perfectly balanced machine, if hung up and set in motion, would not vibrate as a whole. Machines such as dynamos, turbines, and centrifugal pumps, whose moving parts consist of rotating masses symmetrically situated about the axis of rotation, are naturally in balance, and only require adjusting for errors due to slight lack of symmetry in the different parts; but in machines such as the steam-engine, having unbalanced reciprocating masses, it is impossible to obtain perfect balance as regards all the forces, and in practice a compromise has to be arrived at.

(1.) *Balance of Rotating Masses.*—Suppose it is required to balance a single weight W rotating about



a shaft XY, and at a distance r from it. This cannot be done by a single weight, since in practice it could not be placed opposite to W. Two weights, W_1 and W_2, will be required, in the plane of W and XY, and placed so that (*a*) the centre of gravity of W, W_1, and W_2 is on the axis XY; (*b*) the moments of the centrifugal forces of the three weights, about any axis perpendicular to XY, must balance. The first of these conditions ensures that there shall be no resultant centrifugal force parallel to AB, and is fulfilled if $W_1r_1 + W_2r_2 = Wr$. The second condition

ensures the absence of a centrifugal couple tending to twist the machine about an axis perpendicular to the plane of the paper. Taking moments about AB as a convenient axis (any axis perpendicular to XY will do), the second condition will be fulfilled if $w_1 r_1 a = w_2 r_2 b$. It is obvious that this condition could not be satisfied by a single weight unless it were placed opposite to W.

(2.) *Balancing of Reciprocating Parts.*—It is impossible to balance completely the reciprocating parts of an engine by means of revolving weights. If the connecting rod were infinitely long, then it would be possible by means of revolving weights to balance the piston rod, crosshead, and connecting rod, so far as regards forces in the plane of the engine; but the weights required to do this would produce an unbalanced centrifugal force in a plane perpendicular to the plane through the cylinders and crank shaft. In practice a compromise has to be effected, only from a half to three-quarters of the reciprocating mass being balanced in many cases.

In locomotives it is usual to balance the horizontal forces and couples. The balancing of the first prevents the engine from exerting a tugging action on the train, and balancing the second prevents oscillation; but the effect of the unbalanced vertical forces is to produce a hammer below on the rails, which has to be endured, as being the lesser evil. Some locomotive engineers balance the whole of the horizontal forces in this way, but often, in order to reduce the hammer below on the rails, only three-fourths of the reciprocating masses are balanced. The balance weight is usually cast on the driving wheels.

In inside cylinder engines, the coupling rods may be made to exert a considerable balancing effect by placing them in the proper position. In outside cylinder engines, where one end of the coupling rod is connected with the crank pin, the rod has to be considered as part of the reciprocating masses.

Balanda, tn., Russia, gov. of and 70 m. W. of Saratov; agricultural centre. Pop. 7,000.

Balanga, tn. on the W. side of Manila Bay, 30 m. W. by N. of Manila, Luzon, Philippine Is.; cap. of Bataan prov. Pop. 9,009.

Balanoglossus, a small (1–6″) worm found in sand and mud in the English Channel, the Mediterranean, and various other seas. Though insignificant in appearance, it has acquired much zoological importance from the fact that it is found to possess distinct gill-slits, like those of the lower vertebrates, and, more doubtfully, some other vertebrate characters. It has in consequence been placed in a class by itself —Hemichorda or Enteropneusta —and by some zoologists has been regarded as near the line of vertebrate ancestry. See Willey's *Amphioxus and the Ancestry of Vertebrates* (1894).

Balanophoraceæ, an order of fungus-like leafless plants in the sub-class Apetalæ, found in the equatorial zone, consisting of about forty species, all of them parasitic on the roots of trees.

Balaoan, or BALAOANG, pueblo, prov. of La Union, Luzon, Philippine Is., 21 m. from San Fernando. Pop. 10,000.

Balapur, tn., Akola dist., Berar, India, 12 m. S.W. of Akola. Pop. 10,000.

Balashov, or BALASHEV, tn., Saratov gov., Russia, cap. of a dist., 125 m. W. of Saratov city. Grain trade. Pop. 12,000.

Balasor, dist. at the N.E. angle of the Orissa div., Bengal, India; produces rice, and salt is manufactured by a crude process. Area, 2,068 sq. m. Pop. 1,100,000. The chief town and port, Balasor,

118 m. S.W. of Calcutta, was one of the earliest English settlements in E. India (1642). Pop. 21,000. There is an isolated peak of the same name (6,762 ft.) in the Western Ghats, Malabar dist., Madras.

Balas Ruby, or PRECIOUS SPINEL, a precious stone, consisting of alumina and magnesia, which occurs in small crystals with eight triangular faces (octahedra), and is a little softer than the true ruby. The colour is red of various shades, the deeper being sometimes known as ruby spinel, and the lighter as balas ruby, though blue, violet, yellow, and colourless varieties are known. Burma and Ceylon are the principal sources of supply. See Streeter's *Precious Stones* (1898); Kunz's *Gems and Precious Stones of N. America* (1892).

Balassa-Gyarmat, tn., Hungary, 40 m. N. by E. of Budapest; produces wine. Pop. 8,500.

Balata, a substance resembling gutta-percha, of a dirty reddish-brown colour, with a rather greasy feel, and obtained as an exudation from a tree in Venezuela and Guiana. It is sometimes made a substitute for gutta-percha, but is mainly used in conjunction with it, especially for driving-belts for machinery, composed of strong canvas coated with balata and gutta-percha. See Brannt's *India-rubber, Gutta-percha, and Balata* (1900).

Balaton, LAKE, or PLATTENSEE, a lake in the W. of Hungary, 47 m. long (N.E. to S.W.) and 7 m. to 9 m. broad; alt. 426 ft.; depth, 13 ft. to 36 ft. It receives over thirty streams, the largest being the Zala. Its waters are brackish, and abound with fish. The lake has been thoroughly studied in every aspect — physical, biological, and anthropological—by the Hungarian Geographical Society.

Balausta, an old term for the fruit of the pomegranate.

Balayan, seapt. and bay, Batangas prov., on S.W. coast of Luzon I., Philippine Is. The town is a military station. Pop. 8,500.

Balbi, ADRIANO (1782–1848), Italian geographer, a native of Venice, visited (1820) Portugal, and published *Essai Statistique sur le Royaume de Portugal et d'Algarve* (1822; 3rd ed. 1850), *L'Atlas Ethnographique du Globe* (1826), and an *Abrégé de Géographie* (1832; 8th German ed. 1893), which summarized all the geographical knowledge of his time.

Balbi, GASPARO, a Venetian jewel-dealer of the 16th century; travelled frequently to Aleppo, and once to India, where he remained from 1579 to 1588. He published (*Viaggio nelle Indie Orientali*, 1590) the first description of India beyond the Ganges.

Balbinus, DECIMUS CÆLIUS, Roman emperor (prob. A.D. 238–239), was an aged senator who, along with Maximus, was appointed emperor on the death of Gordian and his son in Africa. The Prætorians put them both to death.

Balbo, CESARE, COUNT (1789–1853), Italian statesman and author, born at Turin. After acting under Napoleon as auditor of the Council of State, Paris, he entered the Piedmontese army, and took an active part, as a moderate liberal, in the establishment of a monarchy under the house of Savoy, his chief opponent being the republican Mazzini. He published *Storia d'Italia* (1830), *Vita di Dante* (1839); but his reputation as an author rests on his *Speranze d'Italia* (1843; 5th ed. 1855), in which he advocated the unity of Italy. See *Life* by Ricotti (1856).

Balboa, VASCO NUNEZ DE (1475–1517), Spanish discoverer, born at Xeres in Estremadura; accompanied Rodrigo de Bastidas in his voyage of discovery to the western seas (1501); discovered the Pacific Ocean (1513), and took possession of it in the name of