

Music of the Ancients appeared in 1749, and his *Oratio Harveiana* in 1760. Shortly after this he was appointed by the duke of Richmond physician-general to the royal regiment of artillery and corps of engineers, an appointment that gave him constant access to the laboratory of Woolwich, and it was by his advice that a professorship of chemistry was added to the establishment of the college. In his latter years he withdrew altogether into private life. The circle of his friends included some of the most distinguished literary men of the age. His intimacy with Burke had commenced at school, and soon ripened into the warmest friendship. He was also warmly attached to Dr Johnson, to whom he offered an annuity of £100 during the remainder of his life to enable him to visit the Continent for the recovery of his health; and when this offer was declined, he pressed him to reside in his house, as more suited to his health than that in which he then lived. He attended the great moralist on his deathbed. The same generous disposition was manifested in his conduct to Burke, to whom he presented £1000, a sum he had intended to leave him by will. Dr Brocklesby died suddenly 11th December 1797. He left his entire fortune, with the exception of a few legacies, to his two nephews, Dr Thomas Young and Mr Beeby.

BRODERIP, WILLIAM JOHN, a distinguished writer on natural history, was born in Bristol, probably in 1787. He was educated at the school conducted by the Rev. Samuel Seyer, and proceeded to Oriel College, Oxford, where he began the study of law. He was called to the bar in 1817, and took part for several years in editing the law reports. In 1822 he was appointed by Sir Robert Peel one of the metropolitan police magistrates, a post which he occupied for thirty-four years. All his leisure time was devoted to the favourite study of his earlier days—natural history. He was a member of most of the scientific societies, contributed numerous papers to their Transactions, and did much to further the study of zoology in England. He acted for many years as vice-president of the Zoological Society. The zoological articles in the *Penny Cyclopædia* were written by him; and made him widely known as an original investigator and able expositor. A series of articles contributed to *Fraser's Magazine* were reprinted in 1848 as *Zoological Recreations*, and were followed in 1852 by *Leaves from the Note-Book of a Naturalist*. Broderip died on the 27th February 1859.

BRODIE, SIR BENJAMIN COLLINS, Bart., a distinguished physiologist and surgeon, was born in 1783 at Winterslow, county of Wilts, and died at Broome Park, 21st October 1862, in the 79th year of his age. His paternal grandfather, connected with the family of Brodie of Brodie, was born in Banffshire about the year 1710, and came as an adventurer to London, where he acquired considerable wealth as an army clothier. One of his sons, the father of the subject of this notice, was educated at the Charter House, and afterwards at Worcester College, Oxford, where he took holy orders. Here he probably acquired the friendship of the first Lord Holland, with whom he afterwards lived at Holland House. The second Lord Holland having purchased the estate of Winterslow, Mr Brodie rented a cottage near the same place. The second Lord Holland died in 1774, and directed in his will that Mr Brodie should have offered to him the presentation of the first of three livings which he had in his gift when a vacancy occurred. This event took place in consequence of the death of the incumbent of Winterslow, and Mr Brodie became rector of the parish. In 1775 he married one of the daughters of Mr Collins of Milford, a banker of Salisbury. They had six children,—four sons and two daughters,—and the subject of this sketch was their fourth child.

He received his early education from his father, who

appears to have been a man of energy, ability, and method, and at an early age he had acquired a considerable knowledge of the classics. When the time for choosing a profession arrived, his father intimated to him that he was intended for that of medicine, and accordingly, in the autumn of 1801, he began to attend the anatomical lectures of the celebrated Abernethy in London. As his family was connected by marriage with several of the leading members of the profession, such as Dr Denman (the father of the first Lord Denman), Dr Baillie, and Sir Richard Croft, the young student enjoyed many advantages of distinguished professional society, but it does not appear that at this period of his life he had any predilection for medical studies or any aptitude for surgical work. The great eminence as an operator to which he afterwards attained was gained, as he himself said, by persistent application and perseverance.

He devoted great attention to the clinical study of disease, and began to make an elaborate series of notes of cases which came under his observation. This habit he continued throughout life, and thus gradually amassed that enormous amount of practical experience which afterwards gave his advice as a consulting surgeon such weight.

Like most young adventurers in the fields of science of that day, he early began to teach. He gave many courses of lectures upon anatomy, not only as it bore on surgical practice, but as a science having important physiological and teleological relations. In 1808 he became assistant-surgeon to St George's Hospital, and he continued on the staff of that institution for over thirty years. This gave him the opportunity of teaching clinically, and he soon acquired a reputation as an able and fluent extempore speaker. In 1810 he was elected a fellow of the Royal Society, and in the following year communicated a series of papers "On the Influence of the Brain on the Action of the Heart, and on the Generation of Animal Heat." In 1812 he also communicated a paper "On the Mode in which Death is produced by certain Poisons." These papers were founded upon a series of careful physiological experiments, having for their object to determine, first, the relation of the nervous system to the circulatory and nutritive systems in higher animals, and, second, to ascertain, if possible, how poisons produce death. The most important fact ascertained by the first series of experiments was that the stoppage of the heart's action at the moment of death does not depend on the removal of the influence of the brain, but on the arrest of respiration. He also pointed out some important facts which could only be accounted for by supposing that the nervous system has an influence on the production and diffusion of animal heat, an idea not then generally accepted. For these researches he received the Copley medal of the Royal Society in 1811. In 1813 he delivered the Croonian lecture, "On the Effect of the Nerves on the Heart and on the Involuntary Muscles," and in 1814 he contributed another paper "On the Influence of the Nerves of the Eighth Pair on the Secretions of the Stomach." In 1816 he performed many experiments on animals, to ascertain the influence of bile on the food during its passage through the bowels. These papers comprehend what Brodie accomplished in physiology. They are all characterized by lucidity, conciseness, sound judgment, and a modest interpretation of results. They are valuable at the present time not so much for the facts they contain, most of which are now incorporated in the general mass of scientific knowledge, but as admirable illustrations of the application of the experimental method of research to physiological questions.

At this period of his career Brodie rapidly glided into a large and lucrative practice, and more especially he quickly gave evidence of superior powers as an operator, having

knowledge, coolness, and readiness of resource. From time to time he wrote upon surgical questions, contributing numerous papers to the *Transactions of the Royal Medical and Chirurgical Society*, and to the medical journals. Probably his most important work is that entitled *Pathological and Surgical Observations on the Diseases of the Joints*, in which he attempts to trace the commencements of disease in the different tissues which form a joint, and to give an exact value to the symptom of pain as evidence of organic disease. The thoughts suggested by this volume led to the adoption by surgeons of measures of a conservative nature in the treatment of diseases of the joints, by which the number of amputations has been reduced, and many limbs and lives have been saved. He also wrote on diseases of the urinary organs, and on local nervous affections of a surgical character. Brodie was a man of restless activity; to use his own words, he felt "his happiness to be in a life of exertion." When released from professional cares he had recourse to literary and scientific pursuits, and especially to the study of psychological questions. He was fond of reading, collecting facts, and speculating on all matters connected with mental phenomena; and in 1851 he published anonymously a work entitled *Psychological Inquiries—the First Part*. A second edition of this work appeared in 1855, a third in 1856, a fourth in 1862, and in the same year the *Second Part* was also published. This work enjoyed well-merited popularity, as it was written in clear untechnical language, and revealed the speculations of the writer concerning the mind of man. When the name of the author became known, the greatest interest was excited in the work, although it contains nothing new to professed psychologists. He wrote also occasionally for the quarterly reviews.

Brodie received many honours during his career. He was the medical adviser of three successive sovereigns, and in 1834 he was elevated to the rank of a baronet. It is generally believed that he might have been created a peer had he desired the honour. He became a corresponding member of the French Institute in 1844, D.C.L. of Oxford in 1855, and president of the Royal Society in 1858; and he was the first president of the Medical Council under the Act for the Education and Registration of the Medical Profession.

A complete edition of his works, with an autobiography, in three volumes, appeared in 1865, collected and arranged by Charles Hawkins, fellow of the Royal College of Surgeons of England; and a generous and discriminative biographical sketch, by Professor Henry W. Acland of Oxford, appeared in the obituary notices in the *Proceedings of the Royal Society* for 1863. (J. G. M.)

BRODY, a town of Austria, in the circle of Zloczow, in Galicia, near the Russian frontier. It contains three large synagogues, a Jewish hospital, and a Jewish college, and from its prevailing Jewish character has been called the German Jerusalem. There are also one Roman Catholic and three Greek churches and an industrial school. Its castle is the residence of the Counts Potocki. It is the seat of an extensive trade carried on with Russia and Turkey, and has two large annual fairs, the principal articles of sale being wool, cotton, silk, and peltry. In 1869 the population, of which about two-thirds are Jews, amounted to 18,890. Brody was founded in 1679 under the name of Lubicz, and was raised to the rank of a free commercial city in 1779.

BROGLIE, ACHILLE LÉONCE VICTOR CHARLES, DUC DE, peer of France, was born in Paris 28th November 1785, and died 25th January 1870. The family from which this eminent statesman descended was of Piedmontese origin, but it won its honour in the service of France. The first Marshal de Broglie (1639-1727) served with distinction under Louis XIV.; his son, known as the

Chevalier de Broglie (1671-1745), was raised to the highest grade in the French peerage for his gallant military service at Guastalla and at Prague in 1742, but he refused the rank of marshal of France, which was offered to him by the regent, on the ground that his father, who was still alive, deserved it more than he did. The next in descent was the second marshal (1718-1804), who commanded the French armies in the Seven Years' War, for which he was created a prince of the empire, and though subsequently disgraced and exiled by the intrigues of the Condés, he was recalled in 1789 by Louis XVI. to the office of commander-in-chief. To stem the tide of the Revolution was impossible. The marshal speedily fell from power, emigrated to Germany, refused the solicitation of Napoleon to return to France, and died at Münster in 1804.

The son of this veteran followed an opposite course and met with a more untimely end. He adopted the liberal opinions of the time. He followed Lafayette and Rochambeau to America. He sat in the Constituent Assembly, constantly voting on the Liberal side. He served as chief of the staff to the Republican army on the Rhine; but, like many other champions of the Revolution, he was denounced, arrested, dragged to Paris, and executed on the 27th June 1794. The parting injunction he left to his son, Victor de Broglie, the subject of this notice, then a boy nine years old, was ever to remain faithful to the cause of liberty, even though it were ungrateful and unjust. His father murdered, his mother imprisoned, his property confiscated and plundered, the young de Broglie first appears in life in wooden shoes and a red cap of liberty, begging an assignat from the younger Robespierre. Yet he adhered to the cause for which his father had died; he maintained through life the principles of 1789. He seemed to have forgotten his own rank, until he was reminded of it at the Restoration by a writ of summons to the Chamber of Peers, and in early life he served, not unwillingly, as one of the officers of the council of state of the emperor Napoleon I.

In 1815, before he had completed his 30th year, the Duc de Broglie was summoned by Louis XVIII to the Chamber of Peers. He combined, in a manner rare in France, the qualities we are wont to respect in the most eminent members of the British aristocracy,—high rank, independent fortune, unblemished integrity, unflinching patriotism, and a sincere and consistent attachment to liberal opinions. The first incident in his parliamentary life was the trial of Marshal Ney, and on this occasion he had the courage to speak and vote alone for the acquittal of the prisoner, on the ground that he was not guilty of deliberate treason; no other peer of France supported his protest on that occasion. During the Restoration he continued to take an active part in the defence of liberal opinions and measures. He refused to take office in the cabinet of M. de Serre. He opposed the reactionary policy of the court. He supported the short-lived administration of M. de Martignac, and he acted with the party known as the *doctrinaires*, of which M. Royer-Collard was the founder, and M. Guizot the ablest representative. Meanwhile, in 1816, he had married the daughter of Madame de Stael, a union of unbroken domestic happiness; and he had pledged himself to that sacred cause of Negro emancipation, in which he was the worthy rival and ally of Clarkson, Buxton, Wilberforce, and Brougham. The revolution of July 1830 imposed fresh duties on the Duc de Broglie. Though reluctant to take office from his cold, retiring, and unambitious temperament, he consented to hold the ministry of public worship in the first cabinet of Louis Philippe's reign, and in 1832, after the death of Casimir Périer, he was prevailed upon to take the more important department of foreign affairs. In this function he

strengthened the alliance of France with England; he negotiated the Quadruple alliance; he contributed to the settlement of the Belgian and Greek questions; and he laboured with success to preserve the peace of Europe. He was out of office from March 1834 to March 1835, but he returned to power at the latter date, and this time as the head of the cabinet. He was riding by the side of the king when Fieschi's "infernal machine" was fired on the royal cortege, and a bullet passed through the collar of his coat. In 1836 the Government was beaten on the question of the reduction of the five per cents., and M. de Broglie retired permanently from official life. The king, it must be said, had never found in him a congenial minister. His manner was dry and somewhat harsh, his character unbending, and for the remainder of the reign of Louis Philippe, M. de Broglie, though not in opposition, was the censor rather than the servant of the crown. With M. Guizot, though not in office, he preserved through life the relations of the closest personal friendship and political union. The overthrow of the constitutional monarchy in 1848 was a heavy blow to this parliamentary veteran, for he felt that the form and system of government to which he was most attached were at an end for ever. He consented, however, from patriotic motives to sit in the republican assemblies of 1848, and as a member of the section known as the "Burgueses" he laboured to counteract some of the evils of universal suffrage, and to avert the catastrophe which he saw to be impending over France. He shared with his colleagues the indignity of the *coup d'état* of December 2, 1851, and remained for the remainder of his life one of the bitterest enemies of the imperial régime, although he has been heard to remark with that caustic wit for which he was famous, that the empire was "the government which the poorer classes in France desired and the rich deserved." The last twenty years of his life were devoted chiefly to philosophical and literary pursuits. Having been brought up by his step-father, M. d'Argenson, in the sceptical opinions of the time, he gradually arrived, by study and reflection, at a full and sincere belief in the truth of the Christian religion. "I shall die," said he, a "penitent Christian and an impenitent Liberal." His literary works, though few of them have been published, were rewarded by a seat in the French Academy, and he was also a member of another branch of the French Institute, the Academy of Moral and Political Science. In the labours of those learned bodies he took an active and assiduous part; and on his death, which took place at the advanced age of 85, just before the lamentable events of 1870, he was followed to the grave by representatives of all that is most illustrious in the political and literary society of France, revered as one of the wisest and most upright men of his age. He was succeeded in the honours of his house by Albert de Broglie, his eldest son, also distinguished by his literary works, and who has since 1871 played no inconsiderable part in the political affairs of his country as a leading member of the National Assembly, and for sometime head of the cabinet of Marshal Macmahon. (H. R.)

BROKER, a word derived variously from the French *broier*, to grind, and *brocarder*, to cavil or higgie, and the Saxon *broc*, misfortune.

A broker is an agent or intermediate person appointed for transacting special business on account of another, but differing somewhat from an ordinary factor in functions and responsibility. Of this class there are various descriptions, exercising employment without the smallest analogy, though all are brought under the general name of brokers: of these the principal are—exchange brokers, whose province is to ascertain the rates and relation of exchange between countries; stock-brokers, who negotiate transac-

tions in the public funds; insurance brokers, who effect insurances on lives or property; and pawnbrokers, who advance money on goods, on the condition of being allowed to sell the goods if the sum advanced is not repaid with interest within a limited time. See **AGENT** and **INSURANCE**.

Separating pawnbrokers, and those dealers in old wares who are called brokers, as both distinct from the class to whom the term in its broader acceptation applies, the broker is an agent for both parties, the buyer and the seller; and for the general principles of jurisprudence applicable to his position, reference may be made to the article **AGENT**. It is a marked peculiarity, however, of the broker as an agent, that his quality of agency is not only palpable in the face of the transactions, but he is agent for both parties. The function of the broker is indeed a very simple one, and easily separates itself from the usual intricacies of the law of sale and of agency. It is his proper function to find buyers and sellers, and to bring them together that they may transact with each other. Hence the rise of such a class in any department of business is an indication of its great increase. In small towns, and in narrow and peculiar departments of business, the buyers and the sellers know each other, and need not be at the expense of employing a third party. But where both bodies are numerous, and the individual members of each find enough to occupy their attention in the production of their commodity, or its purchase and distribution, there is economy in the establishment of a distinct class who bring the buyer and the seller together. The broker usually gives what are called bought and sold notes to his clients, and some nice questions have arisen as to the effect of these when they do not correspond with each other or with the entry in the broker's books. The amount of broker's commission is in some few cases fixed by statute,—e.g., under 10 Anne c. 19, § 120, a fine of £20 is imposed on brokers charging more than 2s. 9d. per cent. for buying or selling tallies, exchequer tickets, bank bills, &c. Generally it is settled by agreement with the principals or by the custom of trade. The brokers for the purchase and sale of goods within the city of London are a body with peculiar privileges, and acting under special licensing regulations, some of which date back to the reign of Henry VIII. The London Brokers' Relief Act (1870) has considerably altered their position, but they must still be admitted by the court of mayor and aldermen, and the penalty of £100 for acting as a broker without qualification may still be imposed. A list of London brokers is kept by the mayor and aldermen; and if a broker has been convicted of felony or fraud, or certified by a superior judge to have been guilty of fraud, he may be absolutely or for a time disqualified. There has been some doubt as to the class of persons falling under these regulations; ship-brokers and auctioneers, it would appear, do not.

BROMBERG, a town of Prussia, capital of a government in the province of Posen, is situated 70 miles north of the city of that name on the River Brahe, which is there crossed by a fine new railway bridge. Its public buildings comprise two Roman Catholic churches, a Protestant church, and a Jewish synagogue, a gymnasium, a seminary, a workhouse and penitentiary, a hospital, and a military storehouse. It has large mills, manufactures linen and woollen stuffs, leather, tobacco, Prussian blue, sugar, chicory, vinegar, beer, brandy, and oil, and carries on an active transit trade. The Bromberg Canal, constructed in 1773-4 by command of Frederick II., at a cost of 700,000 dollars, connects the Brahe with the Netz, and thus establishes communication between the Vistula, the Oder, and the Elbe. Bromberg is mentioned as early as 1252. From 1327 to 1343 it was in the hands of the Teutonic Order.

Destroyed in war it was restored by Casimir of Poland in 1346, and down to the close of the 16th century it continued to be a flourishing commercial city. It afterwards suffered so much from war and pestilence that about 1772, when the Prussians took possession, it contained only from five to six hundred inhabitants. By the treaty of Tilsit it was transferred to the duchy of Warsaw; in 1813 it was occupied by the Russians, and in 1815 it was restored to Prussia. Population in 1871, 27,740.

BROME, ALEXANDER, a minor English poet, was born in 1620, and died in 1666. He was an attorney in the lord mayor's court, and was the author of many of the songs and epigrams that were published in favour of the Royalists and against the Rump. These, together with his epistles and epigrams, translated from different authors, were all printed in one volume, octavo, after the Restoration. He published a translation of Horace by himself and others, and was the author of a comedy entitled *The Cunning Lovers*. He also edited two volumes of Richard Brome's plays.

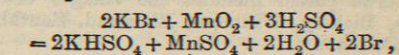
BROME, RICHARD, a dramatic writer in the reign of Charles I., and a contemporary of Dekker, Ford, Shirley, and others. He was originally a servant of Ben Jonson; but he soon acquired a high literary reputation, and was addressed in some lines by his quondam master on account of his comedy entitled *The Northern Lass*. Brome's genius lay entirely in comedy. His plots are original and well managed, and his characters, which for the most part are strongly marked, were drawn from his own experience. He has left fifteen comedies. See Ward's *English Dramatic Literature*, 1875, vol. ii., for a good notice of Brome.

BROMINE, one of the halogen group of non-metallic chemical elements, which comprises three other members,—chlorine, iodine, and fluorine. The whole group has many properties in common, the most marked being their behaviour towards hydrogen, uniting with it atom for atom, forming gaseous condensable acid compounds, which are all produced by similar reactions, and which yield in combination with metals crystals of uniform structure. Bromine was discovered in 1826 by Balard, who extracted it from the water of the Mediterranean during his researches in connection with the sea-water. At ordinary temperatures it is a deep brownish-red liquid, emitting a strong disagreeable odour (whence its name, from *βρῶμος*, a stink), having a specific gravity of 2.96, freezing into a red-brown crystalline mass at -24.5° C., and boiling at 63° C. Its combining equivalent or atomic weight is 80. Bromine is an element of great chemical activity, and of the highest interest in scientific chemistry on account of its combinations, and especially on account of the products of its substitution for hydrogen in organic compounds.

Although very widely disseminated, since it is found in ocean water, bromine is nowhere an abundant element. It is a constituent of some silver ores from Mexico and South America; it is very generally found in strong saline springs, as well as associated with deposits of salt; and it is present in many marine places. The waters of the Atlantic, according to Von Bibra, contain 24 grains per gallon; while Herepath's analysis gives Dead Sea water a strength of 121.5 grains per gallon. It is only from the waters of certain saline springs in America that bromine is prepared as a direct product. At several places in western Pennsylvania and West Virginia the manufacture is carried on extensively, 125,000 lb having been extracted in 1870. In Europe bromine is only obtained as a secondary product of the preparation of potash and other alkaline salts, its chief source being the mother-liquors of the kelp manufacture, brine springs, and especially the Stassfurth saline deposits, near Magdeburg, Prussia. The produce at Stassfurth in

1873 amounted to about 10,000 lb; and it is estimated that the yield of English and French works was, taken together, about the same.

On the commercial scale bromine is prepared at Stassfurth from the liquids which have been exhausted of all their crystallizable soda and potash salts, and from which also a deposit of chloride of magnesium has been obtained. This final mother-liquor is found to contain from 0.3 to 0.5 per cent. of bromine, in the form of bromide of potassium. To separate the bromine the liquor is introduced into a sand-stone apparatus similar to that used for the evolution of chlorine from common salt,—the process and reaction being similar in both cases. In this it is mixed with black oxide of manganese and sulphuric acid in definite proportions, and heated by a current of steam. The red vapour of bromine is given off and led by a pipe into a condensing worm of earthenware, and received into a series of three Woulfe's bottles, the first of which contains water, and the others alkaline ley and iron filings. The reaction which takes place is thus represented—



—sulphates of potash and manganese, water, and free bromine being produced from bromide of potassium, manganese dioxide, and sulphuric acid. Pure bromine vapour distils over at first, but as the distillation proceeds chlorine is gradually evolved, and from this the bromine may be freed by shaking up with a solution of bromide of potassium, which yields up its bromine to combine with chlorine. On account of its peculiarly irritating action on the organs of respiration, very great precautions have to be taken to protect workmen from the fumes of bromine, and it is indispensable that those engaged in the industry should abstain from all alcoholic liquors.

The chief industrial application of bromine and its compounds is in medicine, for which it is used in the form of bromide of potassium, bromide of ammonium, and bromide of sodium, besides in various combinations with alkaloids and organic substances. It is, however, most largely employed as bromide of potassium, a salt prepared on the large scale by the decomposition of potassium carbonate by the bromide of iron. It is also prepared by passing the vapour of bromine into a solution of caustic potash, when a mixture of bromide and bromate of potassium is produced. The mixed salts are reduced to a uniform bromide by burning with coal dust. Bromide of silver is employed to some extent in photography, and, according to the experiments of Vogel, it possesses a peculiar sensitiveness for the red, green, and yellow colours, which are not acted on by other photographic agents. During the American Civil War (1861-5) bromine came into use as a disinfectant in military hospitals, a purpose to which it was also applied in the Franco-German War in 1870-1. For such purposes it was found to possess several advantages over chlorine, which, however, has the recommendation of cheapness and abundance. It has long been hoped that bromine might be substituted for iodine in the preparation of the several coal-tar colours, but hitherto the attempts in that direction have not been successful. Eosine, a tetrabromated potassium salt, is the only dye into which bromine at present enters. The use of bromine has been suggested by Dr Rudolf Wagner in several metallurgical operations, in which he anticipates it might be of great service. He proposes, in place of the present wasteful method of reducing mercury from cinnabar, to digest the ore in an aqueous solution of bromine, whereby a bromide of mercury would be formed. He also suggests that bromine might be advantageously applied to the extraction of gold from poor auriferous ore, in a manner analogous to Plattner's chlorination process. Further, it is recom-