

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.

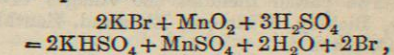
BROME, RICHARD, a dramatic writer in the reign of Charles I., and a contemporary of Dekker, Ford, Shirley, and others. He was originally a servant of Ben Jonson; but he soon acquired a high literary reputation, and was addressed in some lines by his quondam master on account of his comedy entitled *The 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-

mended for the refining of gold by the formation of a bromide; and it is thought that bromine vapour might be used with advantage for toughening brittle gold.

BROMLEY, a market-town of England, in the county of Kent, 10 miles S.E. of London. It is situated on high ground to the north of the river Ravensbourne, and since the opening of the railway has become a favourite residence for men of business from London. It has a town-hall—built in 1864, an old market-house, a literary institution, and a college, originally founded in 1666 by Bishop Warner for the residence and support of clergymen's widows. The church is a fine Gothic building, containing some handsome monuments; and in the vicinity is a palace, erected in 1777 in room of an older structure, for the bishops of Rochester, to whom the manor has belonged since the time of Ethelbert. In the gardens attached is a mineral spring known as St Blaze's Well, which was in great repute before the Reformation. The population of the parish, which in 1861 was only 5505, amounted at the census of 1871 to 10,674. The parish includes the villages of Plaistow, Sundridge, Bickley, Widmore, Elmstead, Southboro' and Bromley Common.

BROMSGROVE, a market-town of England, in the county of Worcester, 13 miles S. by W. of Birmingham, with a station on the Birmingham and Worcester Railway, at the distance of a mile and a half. The church of St John is a fine old building, restored in 1858, with a tower and spire 189 feet in height. The free grammar school, founded by Edward VI., has been recently enlarged; and a literary institute and a school of art have been established. The principal manufactures of the town are nails, buttons, needles, and coarse linen stuffs; and there are also waggon-works and malt-kilns. The population of the Improvement District in 1871 was 6967.

BRONCHITIS, inflammation of the mucous membrane of the bronchial tubes. Well known as one of the most common diseases of the climate of Great Britain, bronchitis exists in either an *acute* or a *chronic* form.

Acute bronchitis, like other inflammatory affections of the chest, generally arises as the result of exposure to cold, particularly if accompanied with damp, or of sudden change from a heated to a cool atmosphere. The symptoms vary according to the severity of the attack, and more especially according to the extent to which the inflammatory action spreads in the bronchial tubes. The disease usually manifests itself at first in the form of a catarrh, or common cold; but the accompanying feverishness and general constitutional disturbance proclaim the attack to be something more severe, and symptoms denoting the onset of bronchitis soon present themselves. A short, painful, dry cough, accompanied with rapid and wheezing respiration, a feeling of rawness and pain in the throat and behind the breast bone, and of oppression or tightness throughout the chest, mark the early stages of the disease. In some cases, from the first, symptoms of the form of asthma known as the *bronchitic* are superadded, and greatly aggravate the patient's suffering. See ASTHMA.

After a few days expectoration begins to come with the cough, at first scanty and viscid or frothy, but soon becoming copious and of purulent character. In general, after free expectoration has been established the more urgent and painful symptoms abate; and while the cough may persist for a length of time, often extending to three or four weeks, in the majority of instances convalescence advances, and the patient is ultimately restored to health, although there is not unfrequently left a tendency to a recurrence of the disease on exposure to its exciting causes.

When the ear or the stethoscope is applied to the chest of a person suffering from such an attack as that now described, there are heard in the earlier stages snoring or cooing

sounds, mixed up with others of wheezing or fine whistling quality, accompanying respiration. These are denominated dry sounds, and they are occasionally so abundant and distinct as to convey their vibrations to the hand applied to the chest, as well as to be audible to a bystander at some distance. As the disease progresses these sounds become to a large extent replaced by others of crackling or bubbling character, which are termed moist sounds or râles. Both these kinds of abnormal sounds are readily explained by a reference to the pathological condition of the parts. One of the first effects of inflammation upon the bronchial mucous membrane is to cause some degree of swelling, which, together with the presence of a tough secretion closely adhering to it, tends to diminish the calibre of the tubes. The respired air as it passes over this surface gives rise to the dry or sonorous breath sounds, the coarser being generated in the large, and the finer or wheezing sounds in the small divisions of the bronchi. Before long, however, the discharge from the bronchial mucous membrane becomes more abundant and less glutinous, and accumulates in the tubes till dislodged by coughing. The respired air, as it passes through this fluid, causes the moist râles above described. In most instances both moist and dry sounds are heard abundantly in the same case, since different portions of the bronchial tubes are affected at different times in the course of the disease.

Such are briefly the main characteristics presented by an ordinary attack of acute bronchitis running a favourable course.

The case is, however, very different when the inflammation spreads into, or when it primarily affects the minute ramifications of the bronchial tubes which are in immediate relation to the air-cells of the lungs, giving rise to that form of the disease known as *capillary bronchitis*. When this takes place all the symptoms already detailed become greatly intensified, and the patient's life is placed in imminent peril in consequence of the interruption to the entrance of air into the lungs, and thus to the due aeration of the blood. The feverishness and restlessness increase, the cough becomes incessant, the respiration extremely rapid and laboured, the nostrils dilating with each effort, and evidence of impending suffocation appears. The surface of the body is pale or dusky, the lips are livid, while breathing becomes increasingly difficult, and is attended with suffocative paroxysms which render the recumbent posture impossible. Unless speedy relief is obtained by successful efforts to clear the chest by coughing and expectoration, the patient's strength gives way, somnolence and delirium set in, and death ensues. All this may be brought about in the space of a few days, and such cases, particularly among the very young, sometimes prove fatal within forty-eight hours.

During life, in addition to the auscultatory signs present in ordinary bronchitis, there generally exist in this form of the disease abundant fine moist râles at the bases of both lungs; and the appearance of these organs after death shows the minute bronchi and many of the air-cells to be filled with matter similar to that which had been expectorated, and which has thus acted as a mechanical hindrance to the entrance of the respired air and caused death by asphyxia.

Acute bronchitis must at all times be looked upon as a severe and even serious ailment, but there are certain circumstances under which its occurrence is a matter of special anxiety to the physician. It is pre-eminently dangerous at the extremes of life, and mortality statistics show it to be one of the most fatal of the diseases of those periods. This is to be explained not only by the well recognized fact that all acute diseases tell with great severity on the feeble frames alike of infants and aged people, but more

particularly by the tendency which bronchitis undoubtedly has in attacking them to assume the capillary form, and when it does so to prove quickly fatal. The importance, therefore, of early attention to the slightest evidence of bronchitis among the very young or the aged can scarcely be overrated.

Bronchitis is also apt to be very severe when it occurs in persons who are addicted to intemperance. Again, in those who suffer from any disease affecting directly or indirectly the respiratory functions, such as consumption or heart disease, the supervention of an attack of acute bronchitis is an alarming complication, increasing, as it necessarily does, the embarrassment of breathing. The same remark is applicable to those numerous instances of its occurrence in children who are or have been suffering from such diseases as have always associated with them a certain degree of bronchial irritation, such as measles and hooping-cough.

One other source of danger of a special character in bronchitis remains to be mentioned, viz., collapse of the lung. Occasionally a branch of a bronchial tube becomes plugged up with secretion, so that the area of the lung to which this branch conducts ceases to be inflated on inspiration. The small quantity of air imprisoned in the portion of lung gradually escapes, but no fresh air enters, and the part collapses and becomes of solid consistence. Increased difficulty of breathing is the result, and where a large portion of lung is affected by the plugging up of a large bronchus, a fatal result may rapidly follow, the danger being specially great in the case of children. Fortunately, the obstruction may sometimes be removed by vigorous coughing, and relief is then obtained.

With respect to the treatment of acute bronchitis, in those mild cases which are more of the nature of a simple catarrh, little else will be found necessary than confinement in a warm room, or in bed, for a few days, and the use of light diet, together with warm diluent drinks. Additional measures are, however, called for when the disease is more markedly developed. Medicines to allay fever and promote perspiration, such as the well-known Mindererus spirit, combined with antimonial or ipecacuan wine, are highly serviceable in the earlier stages. Later on, with the view of soothing the pain of the cough, and favouring expectoration, mixtures containing squill or tolu, with the addition of some opiate, such as the ordinary paregorics, may be advantageously employed. The use of opium, however, in any form should not be resorted to in the case of young children without medical advice, since its action on them is much more potent and less under control than it is in adults. Not a few of the so-called "soothing mixtures," have been found to contain opium in quantity sufficient to prove dangerous when administered to children; and, indeed, it is to be feared that fatal results not unfrequently follow their incautious use in this way.

From the outset of the attack the employment of warm applications to the chest in the form of fomentations or poultices affords great relief. Few remedial measures are of greater value than the frequent inhalation of steam. This is accomplished readily enough in the case of adults by the use of an inhaler or simply by breathing over an open-mouthed vessel containing boiling water. In children in whom this plan cannot be carried out in the same manner, there is in general no difficulty in surrounding them with an atmosphere of steam by placing around them vessels containing hot water, the vapour from which envelopes them. The relief to the cough and breathing, and the aid to expectoration afforded by this simple plan, are often surprising, and the cases are rare where it cannot be borne.

Should the cough persist for a length of time, and the disease threaten to become chronic, counter-irritant applica-

tions to the chest in front and behind, in the form of stimulating liniments, or even of blisters, will be rendered necessary.

When the bronchitis is of the capillary form, the great object is to maintain the patient's strength, and to endeavour to secure the expulsion of the morbid secretion from the fine bronchi. In addition to the remedies already alluded to, stimulants are called for from the first; and should the cough be ineffectual in relieving the bronchial tubes, the administration of an emetic dose of sulphate of zinc or squill may produce a good effect.

During the whole course of any attack of bronchitis, attention must be paid to the due nourishment of the patient; and during the subsequent convalescence, which, particularly in elderly persons, is apt to be slow, tonics and stimulants may have to be prescribed.

Chronic bronchitis may arise as the result of repeated attacks of the acute form, or it may exist altogether independently. It occurs more frequently among persons advanced in life than among the young, although no age is exempt from it.

The usual history of this form of bronchitis is that of a cough recurring during the colder seasons of the year, and in its earlier stages, departing entirely in summer, so that it is frequently called "winter cough." In many persons subject to it, however, attacks are apt to be excited at any time by very slight causes, such as changes in the weather; and in advanced cases of the disease the cough is seldom altogether absent.

The symptoms and auscultatory signs of chronic bronchitis are on the whole similar to those pertaining to the acute form, except that the febrile disturbance and pain are much less marked. The cough is usually more troublesome in the morning than during the day. There is usually free and copious expectoration, and occasionally this is so abundant as to constitute what is termed *bronchorrhœa*.

Chronic bronchitis leads to alterations of structure in the affected bronchial tubes, their mucous membrane becoming thickened or even ulcerated, while occasionally permanent dilatation of the bronchi takes place, often accompanied with profuse fetid expectoration. In long standing cases of chronic bronchitis, the nutrition of the lungs becomes impaired, and dilatation of the air-tubes (*emphysema*) and other complications result, giving rise to more or less constant breathlessness. Chronic bronchitis is liable in some instances, particularly when accompanied with loss of flesh and strength, to be mistaken for consumption; but the physician who carefully regards the history of the case and observes the physical signs and symptoms, will in general be able to distinguish the one disease from the other.

Chronic bronchitis may arise secondarily to some other ailment. This is especially the case in Bright's disease of the kidneys, and in heart disease, of both of which maladies it often proves a serious complication.

Chronic bronchitis does not often prove directly fatal, nor is it necessarily inconsistent with long life. Its chief danger lies in the tendency to intercurrent acute attacks, particularly in the aged; and in this manner it very frequently causes death.

The treatment to be adopted in chronic bronchitis depends upon the severity of the case, the age of the patient, and the presence or absence of complications. Attention to the general health is a matter of prime importance in all cases of the disease, more particularly among persons whose avocations entail exposure, and tonics with cod-liver oil will be found highly advantageous. The use of a respirator in very cold or damp weather is a valuable means of protection. In those aggravated forms of chronic bronchitis, where the slightest exposure to cold air brings on fresh attacks, it may become necessary, where circum-