

The Carmichael Prize is in the award of the President and Council of the Royal College of Surgeons in Ireland. It is of the value of 120*l.*, and is given for the best essay dealing with the state of the medical profession in Great Britain and Ireland.

The British Medical Association has instituted two Research Scholarships, awarded annually but capable of being continued for three years, each of the yearly value of 150*l.* These are for the encouragement of research in anatomy, physiology, pathology, bacteriology, State Medicine, clinical medicine, and clinical surgery. They are awarded by the Council of the Association on the recommendation of the Scientific Grants Committee.

The Association has also established an Ernest Hart Memorial Scholarship of the annual value of 200*l.*, the holder of which is required to devote himself to the study of some subject in the department of State Medicine. Forms of application for these scholarships may be obtained from the General Secretary of the Association.

The Grocers' Company have instituted three Medical Research Scholarships, open to all British subjects, of the annual value of 250*l.* They are intended as an encouragement to the making of exact researches into the causes and prevention of important diseases.

At Cambridge there are at least two valuable studentships in science, each of the annual value of 200*l.* and tenable for three years. One is the Balfour Studentship for original research in biology, and especially in animal morphology; and the other the John Lucas Walker Studentship for original research in pathology. At Trinity College the Coutts Trotter Studentship is open in physiology and experimental physics.

In connection with the Jenner Institute of Preventive Medicine a studentship of the value of 150*l.* has been offered. It is open to all British, including Colonial, subjects; it is tenable for one year and is renewable for a second year. It has been instituted for the purpose of research in pathological chemistry.

The Salters' Company Research Fellowship, of the annual value of 100*l.*, is for the promotion of research in pharmacology. It is awarded by the Company on the nomination of the treasurer of St. Thomas's Hospital and a Committee of Selection. It may be held for a term of three years, and the research must be prosecuted in the laboratories of St. Thomas's Hospital.

In connection with University College, Liverpool, are the Alexandra Fellowship in pathology, which was instituted in 1899 for a period of five years, and is of the annual value of 100*l.*; and the Colonial Fellowship in pathology and bacteriology, for which there is a preference for members of Colonial universities and medical schools.

The Walker Prize of the Royal College of Surgeons is awarded every five years for the best work in advancing the knowledge of the pathology and therapeutics of cancer. It is of the value of 100*l.* It is open to foreigners as well as British subjects, and it is not intended that essays should be written specially for the competition.

The John Tomes Prize is awarded triennially by the Royal College of Surgeons for original work on dental surgery, pathology, anatomy, physiology, or mechanics. The next award is for the period ending December 31, 1902.

The Cameron Prize, which is of the value of about 100*l.*, is given annually by the University of Edinburgh to the member of the medical profession who shall be adjudged to have made the most valuable addition to medical therapeutics during the year preceding.

The Marshall Hall Prize is given every five years by the Royal Medical and Chirurgical Society for physiological and pathological researches relating to the nervous system.

The Alvarenga Prize of the College of Physicians of Philadelphia, of the value of 36*l.*, is awarded annually for the best essay on any subject in medicine not already published. The essays, bearing a motto but no name, are to be sent to the secretary on or before May 1 of each year, and the award is made about July 14 following. A second is given by the Académie de Médecine in Paris, and a third by the Hufeland Society in Berlin, a fourth in Belgium, and a fifth by the Misericordia Hospital of Lisbon.

The Riberi Prize, which is of the value of 800*l.*, is offered by the Royal Medical Academy of Turin for original work in anatomy, physiology, pathology, or pharmacology. Research on the history of medicine since the Renaissance may also be submitted. The account of the research must be written in Latin,

French, or Italian, and is to be sent to the secretary of the Academy. The prize is awarded for work done during the previous five years, and the last award was made in 1897.

The Bressa Prize of the Royal Academy of Science, Turin, is of the value of about 400*l.*, and is given for the most important scientific work produced during a given term of years. The last award was made in 1899.

The Vallauri Prize, of the value of 1,200*l.*, is in the gift of the Royal Academy of Sciences of Turin, and will be awarded to the scientific investigator, Italian or foreign, who within the period of four years from January 1, 1899, to December 31, 1902, shall be considered to have published the most noteworthy work on any of the physical sciences, taking that term in its widest sense.

One of the Nobel Prizes is awarded by the Carolinian Institute in Stockholm to the person who has been adjudged to have made the most important discovery in physiology or medicine during the preceding year. Recently two prizes, each of the value of about 11,000*l.* sterling, have been awarded by the Nobel Institute, one to Prof. Finsen, the founder of the Medical Light Institute at Copenhagen, and the other to Prof. Pawlow, of St. Petersburg, for his researches in regard to nutrition.

About thirty open prizes are offered each year by the Académie de Médecine of Paris, of which the most valuable is the François-Joseph Audiffred Prize. This is of the value of 1,000*l.*, and is offered to any person, without distinction of nationality or profession, who in the opinion of the Académie de Médecine is rightly adjudged to have discovered a preventive or cure of tuberculosis. The following are also among the more important offered for the year ending with the end of February, 1902; the sum specified in each case does not necessarily go to one candidate, but may be divided. The Academy Prize, awarded annually, worth about 40*l.*, is this year for a research on the rôle of toxins in pathology; the Baillarger Prize, of about 80*l.* (biennial), is for the best work on the treatment of mental diseases and the organisation of asylums; and the Charles Boullard Prize, also biennial, of 50*l.*, is for a similar subject. The Barbier Prize, of 80*l.* (biennial), is for the discovery of a cure for such "incurable" maladies as hydrophobia, cancer, epilepsy, typhoid and cholera. The Mathieu Bourceret Prize, of 50*l.* (annual), is for work on the circulation of the blood. The Campbell Dupieris Prize (biennial), of the value of 96*l.*, is for the best work on anaesthesia or the diseases of the urinary passages. The Chevillon Prize (annual), of 65*l.*, is for the best work on the treatment of cancer. The Desportes Prize, of 55*l.* (annual), will be awarded for the best work on practical medical therapeutics. The Herpin (of Metz) Prize (quadrennial), of 50*l.*, is offered for a research on the abortive treatment of tetanus. The Theodore Herpin (of Geneva) Prize, of 125*l.* (annual), is for a research on epilepsy and nervous diseases. The Laborie Prize, of 210*l.* (annual), is given for the greatest advancement in surgical science during the year. The Lefèvre Prize (triennial), of 75*l.*, is for a research on melancholia. The Meynot Prize (annual), of 108*l.*, is for the best work on ear disease; and the Saintour Prize (biennial), of 166*l.*, for the best work on any subject in medicine.

CHEMISTRY AT THE BRITISH ASSOCIATION.

IN spite of the fact that a number of papers of general interest were contributed to Section B at the Glasgow meeting, the attendance was not so good as at the Bradford meeting last year. After the reading of the presidential address, a paper was read on duty-free alcohol by Dr. W. T. Lawrence, in which it was advocated that the Government should permit the use of non-methylated alcohol which had not paid duty for scientific purposes. In the course of the ensuing discussion, Dr. T. E. Thorpe drew attention to some of the difficulties with which the Excise Department would have to cope if such a course were permitted, and Prof. A. Michael, of Boston, stated that the United States Government allowed the use of non-methylated duty-free alcohol for scientific purposes and did not seem to meet with administrative difficulties. Dr. A. G. Green presented a comprehensive statistical report on the coal-tar industry, in which the progress made in this industry in Germany during recent years was strongly contrasted with its decadence in this country. The report of the Committee on preparing a new series of wave-length tables of the spectra of the elements was presented. Prof. Adrian Brown contributed a paper on enzymic

action, in which he quoted the experimental results of an investigation of the action of invertase on cane sugar; these results confirm the conclusion of previous workers that the action of inversion does not follow the simple law of mass action, but the author does not regard the action as independent of mass influence. He considers that the influence of mass in inversion changes is restricted by some other and hitherto unrecognised influence, and this he believes he has found in the time factor of molecular change. In reply to remarks by Prof. Reynolds Green, the author stated that his results were not necessarily in discord with those of Croft Hill. A paper was read by Prof. E. A. Letts and Mr. R. F. Blake, on the chemical and biological changes occurring during the treatment of sewage by the so-called bacteria beds. A large portion of the unoxidised nitrogen present in sewage disappears during the passage of the sewage through the so-called bacteria beds, and the authors consider that this may be due either to escape of the nitrogen in the gaseous state as free nitrogen or possibly as oxides or to the passage of the nitrogen into the tissues of animals or vegetables; both of these causes of loss may operate at the same time. An examination of sewage matter before and after passage through the beds showed that in nearly all cases the amount of dissolved nitrogen present in the sewage was greater after treatment than before, although, of course, if free nitrogen were evolved, only a minute fraction of it would remain dissolved in the sewage effluent. With respect to the possible biological explanation of the loss, it is pointed out that the sewage beds at Belfast and other places swarm with minute insects (*Podura aquatica*), and that species of worms are also present; these in feeding on the sewage undoubtedly cause a loss of nitrogen. A paper was then read by Dr. S. Rideal on humus and the so-called irreducible residue in bacterial treatment of sewage, in which the results were detailed of a number of analyses of the humus-like substance or so-called irreducible residue produced in bacterial sewage beds. It is shown that in this material the ratio of carbon to nitrogen and the percentage of nitrogen in the organic matter present are very nearly the same as in humus mould; the conclusion is drawn that if sewage has undergone proper bacterial fermentation the small quantity of peaty deposit formed is of the nature of humus and is practically inoffensive. In a paper on sulphuric acid as a typhoid disinfectant, Dr. S. Rideal advocated the use of sulphuric acid, either as such or in a more portable form as sodium bisulphate, for destroying the *Bacillus typhosus* in potable waters or in drainage from isolation hospitals. Mr. W. Ackroyd gave a paper on the inverse ratio of chlorine to rainfall, in which it was shown that when the observation periods are shortened to daily estimations of the chlorine, minimal amounts of rainfall are marked by maximum contents of chlorine, and *vice versa*. In a second paper, Mr. Ackroyd dealt with the distribution of chlorine in Yorkshire. Mr. G. T. Beilby, in a paper on the minute structure of metals, showed that the microscopic examination of metallic surfaces has revealed that metals occur in two forms, *viz.*, as minute scales or "spicules" (*a*) and as a transparent glass-like substance (*b*). The spicules do not vary much in size in the different metals and have a diameter of $1/300$ to $1/400$ of a millimetre; the form *a* passes into the form *b* when the metal is pressed or hammered, and all polished metallic surfaces are covered with a thin layer of this transparent form as with a lacquer or enamel. Prof. G. G. Henderson and Mr. G. T. Beilby read a paper on the action of ammonia on metals at high temperatures; on exposing platinum, copper, gold, silver, iron, nickel and cobalt to ammonia gas at 600° to 900° disintegration of the metal occurs, whilst a large proportion of the ammonia is decomposed into its elements. After the treatment the metal shows a spongy or cellular structure, as if it had been rapidly cooled whilst in a state of effervescence; copper and iron rods of a quarter of an inch diameter are penetrated to the centre by the ammonia gas within half an hour, and copper exposed to the action of ammonia gas for seven days at 800° falls to a fine powder. Dr. W. C. Anderson and Mr. G. Lean gave a paper on aluminium-tin alloys, in which they show that these alloys evolve hydrogen freely when placed in water; the microscopic examination of the water-corroded plates of alloy indicates that contact action between the excess of tin and the aluminium-tin compound is responsible for the spontaneous oxidation. Prof. Willy Marckwald, of Berlin, gave a very interesting demonstration and description of the properties of radium; he had surmised, from the work of P. and S. Curie, that the barium salt extracted

from pitchblende contains the radium salt as an isomorphous constituent, and that the process used by these workers for separating a strongly radio-active salt from the barium compound is probably similar to that in use for isolating the constituents of an isomorphous mixture. He therefore fractionally crystallised the barium chloride prepared from pitchblende from water, and found that pure barium chloride first separates and then a material, probably the eutectic mixture, which is very rich in the radio-active component. The most strongly radio-active fractions have the power of immediately discharging a charged gold leaf electroscope when at the distance of half a metre from the latter and when preserved under colourless glass soon turn it a deep brown colour. The radio-active substance is strongly luminescent in a dark room, and on interposing the hand between the preparation and a barium platino-cyanide screen, the bones in the fingers are seen sharply delineated on the screen. Prof. Marckwald also exhibited several preparations of so-called "phototropic" substances, compounds which change colour on exposure to sunlight and recover their original tint on preservation in a dark place; he mentioned that the rapidity of change in either direction is considerably influenced by the temperature. Prof. A. Michael, of Boston, read papers on the genesis of matter and on the process of substitution; he also contributed a paper on the three stereoisomeric cinnamic acids, in which he claimed to have proved that these three isomerides actually exist, that is, that one more isomeride exists than can be accounted for by the van 't Hoff hypothesis as interpreted by Wislicenus. Prof. G. G. Henderson and Mr. Corstorphine read a paper on the condensation of benzil with dibenzylketone; in this condensation a tetraphenylcyclopentenone is produced, and on heating it with red phosphorus and hydriodic acid a mixture of tetraphenylcyclopentene and tetraphenylcyclopentane is formed. Dr. Hodgkinson and Mr. L. Limpach contributed a paper on some relations between physical constants and constitution in benzenoid amines, and Dr. G. Young gave a paper on the existence of certain semicarbazides in more than one modification. Prof. W. H. Perkin, jun., gave a brief outline of his work on the synthetic formation of bridged rings. Prof. Joji Sakurai, of Tokio, in a paper on some points in chemical education, observed that in spite of the rapid progress made in chemistry during the past fifteen years, chemical education seemed still to be carried out in an inefficient and unsatisfactory manner. He pleaded for the more extensive use of physical chemistry as an educational agent, but wished to replace the ordinary name of this branch of the subject by the more rational one of general chemistry. Mr. W. Thomson contributed a paper on the detection and estimation of arsenic in beer and articles of food; after noting that arsenic is introduced into barley during the process of malting owing to the employment of anthracite coal or coke containing arsenic, he suggested that all beers in 50 c.c. of which arsenic could be detected by any test whatever should be condemned. In a report entitled "The Equilibrium Law as Applied to Salt Separation and to the Formation of Oceanic Salt Deposits," Dr. E. F. Armstrong gave an excellent *résumé* of the work of van 't Hoff and his pupils on the investigation of the conditions attending the formation of the German deposits of magnesium salts; the report was illustrated by the aid of a number of models. Dr. J. Gibson, in a paper on the electrolytic conductivity of halogen acid solutions, detailed the results of experiments which showed that halogen acid solutions of concentrations corresponding to a change of curvature of the electrolytic conductivity curve have altogether peculiar properties. Other papers were read by Mr. P. J. Hartog, on the flame coloration and spectrum of the nickel compounds, by Dr. Farmer, on the methods of determining the hydrolytic dissociation of salts, and by Dr. T. S. Patterson, on the influence of solvents on the rotation of optically active compounds.

ENGINEERING AT THE BRITISH ASSOCIATION.

SECTION G suffered badly at Glasgow, both in attendance and in the quality of the papers presented to it, from the Engineering Congress which was held in the University buildings during the preceding week; many regular members of the Section were absent, and several valuable papers which would under ordinary circumstances have come to the Section were read instead at one or other of the Congress sectional meetings. On the opening day, after the presidential address,