OBITUARY NOTICES.

JAMES ALOYSIUS AUDLEY.

1858—1938.

J. A. AUDLEY was born in Liverpool on October 1st, 1858, but before he was two years old his parents removed to Hanley, Stoke-on-Trent, and, except for a short period, the whole of his life was spent in the Potteries, where he died on July 15th, 1938.

Audley was educated privately and also attended classes at the Burslem Schools of Science and Art, being awarded a silver medal for Inorganic Chemistry by the Science and Art Department in 1875, and the bronze medal for the honours course in the same subject six years later. He obtained a scholarship which enabled him to proceed to the Normal School of Science, South Kensington, where, incidentally, he studied under Huxley.

In due course he qualified for his Associateship and also took the London B.Sc. degree; he was elected a Fellow of the Chemical Society in 1886. Local associations and contacts directed Audley to the study of ceramics and in 1887 the City and Guilds of London Institute awarded him a bronze medal for the Honours grade examination in Pottery and Porcelain, and also a full technological certificate.

In his earlier years Audley was in the employ of the Shelton Iron, Steel and Coal Co., after which he held teaching appointments at Shrewsbury and Hanley, and eventually became work's chemist to a local firm of sanitary earthenware manufacturers. From here he went to the New Hall Pottery Co., Hanley, of which he was a director at the time of his death. Audley's scientific activities were mainly in the field of ceramics and more than forty entries appear under his name in the *Transactions of The Ceramic Society*; he was also the author of " Silica and the Silicates " in S. Rideal's Industrial Chemistry series.

Nevertheless, his tastes were markedly catholic—antiques of all descriptions, archæology and local history, books, botany and chess were all within his purview, and in the course of a long life he amassed an extensive collection of literary and other miscellanea. For fifty-three years he was a member of the North Staffordshire Field Club and at its meetings, which he regularly attended, Audley was constantly able to " point a moral and adorn a tale " from his store of curious and out-of-way knowledge.

It was Audley's boast and a constant source of pleasantry between him and his friends that he had never worn an overcoat, indeed, it is highly probable that this indifference to the weather was the most immediate cause of his death. Audley's outstanding characteristics were loyalty and generosity; he was a member of many local bodies, all of which learned to realise that his unwavering support would be forthcoming through good times or ill without any thought of personal gain or advantage. Though never overburdened with material assets at any time of his life, whenever an appeal for some deserving cause or person was brought to his notice, Audley would be among the first to contribute, and the gift was always enhanced by the readiness with which it was offered.

He married Miss Lavinia Heath, who predeceased him some fifteen years ago.

H. V. THOMPSON.

MATTHEW JAMES CANNON.

1868—1938.

CANNON was educated in London and received his early training in analytical chemistry in the laboratories of H. S. Carpenter, F.I.C., F.C.S., of Holborn Viaduct. He studied bacteriology at King's College under Prof. Crookshank and Dr. Hewlett and was keenly interested in micro-photography.

He was employed for about 15 years as assistant chemist and resident manager in the chemical department of Messrs. Beaufoy of South Lambeth.

After leaving them, Cannon set up as a consultant analyst at Clapham and became intimately connected with the brewing industry and gained both medals offered by the

Brewers' Company. He wrote a series of important articles, which were published by the Institute of Brewing, dealing with the analysis of brewing materials, and the relationship between analytical and practical results obtained in the brewery.

With the growth of his brewing connections, Cannon started a laboratory in the City, where, in addition to his work on brewing, he became interested in the study of fruit juices and their uses in the mineral water trade. This interest eventually led him to setting up a laboratory in Hammersmith, where he became consultant to some of the leading mineral water manufacturers in the country.

For the past 36 years, Cannon acted as official analyst to the judges in the beer and mineral water competitions at the Brewers' Exhibition.

He leaves a widow and one son. A. STERN.

CHARLES CLAUDE CARPENTER.

1858—1938.

CHEMISTRY, and the public who benefit from the application of chemistry, owe a great deal to those leaders of industry who have understood the part that chemical science can play in improving the lot of humanity. Among the names of such men of vision there will always remain that of Charles Carpenter, who, from his early days, recognised the importance of science, and particularly chemical science, in the processes of gas manufacture and utilisation.

After an education which laid the foundation of his understanding of physical and chemical science, he entered the service of the Phoenix Gas Company as a pupil to the engineer in charge of that Company's West Greenwich Works. At the early age of twenty-six he was appointed Engineer of the Vauxhall Works of what had by that time become the South Metropolitan Gas Company. Before he was thirty, he was a recognised authority on the heating of retort settings, applying the Siemens system of producer gas firing to this end. When in 1899 he was appointed Chief Engineer of the Company, he became interested in the distribution side of the Company's activities. Finding the burner which was then in use for determining the illuminating power of coal gas to be, in his estimation, unsatisfactory, he set himself to evolve one of greater precision. This burner was later accepted by the Gas Referees as the standard test burner under the name of the "Metropolitan No. 2 Argand." The innovation was typical of all his work. He was particularly keen to recognise deficiencies in any system, appliance or piece of plant, and to his mind a deficiency implied that ideal performance had not been reached. Having recognised such a deficiency, his ingenious brain would not rest until the desired improvement had been made and it is truly remarkable to recall the wide range of problems covering the whole field of the extensive activities of a large gas undertaking to which his ingenuity was applied.

In the particular field of chemical processes, he devoted attention to the removal of naphthalene and to the purification of coal gas from organic sulphur compounds. He recognised long before other leaders of the gas industry the necessity for supplying to the public, appliances which could be relied upon to give uniform service without adjustment by the consumer, and he initiated the policy by which the South Metropolitan Gas Company supplied only appliances adjusted to rigid standards. As a corollary it was necessary to ensure that the gas was equally standard in quality and, under his direction, this task too was accomplished. In view of his outstanding attainments and his wide grasp of the requirements of the gas industry, it was not surprising that on the death of Sir George Livesey in 1908, he was elected by the Board of Directors to be a Director and Chairman of the Company, a post which he held with the altered title of President until ill health compelled his retirement in 1937.

During the Great War he laid his services at the disposal of Lord Moulton, the Director General of Explosive Supplies, and was engaged in devising ways and means of producing certain chemicals essential to modern warfare. In 1920 he was made a Commander of the

Order of the British Empire. It was doubtless the difficulties which he encountered during this period in obtaining chemicals without an adequate chemical industry that led him with others to recognise the great importance of forming some central body representative of the chemical manufacturers of the country. As the outcome of considerable effort the Association of British Chemical Manufacturers came into being, Charles Carpenter being its first Chairman. When in 1917 the Advisory Council for Scientific and Industrial Research decided to establish a Fuel Research Board, Dr. Carpenter was able to give material assistance in arranging for a site and facilities to be placed at the Board's disposal. As a member of the Coal Conservation Committee appointed by the Ministry of Reconstruction in 1918, he showed his belief in the importance of applying scientific methods to the problems of fuel treatment and utilisation. His work in this connection has found its own permanent memorial in the therm method of selling gas.

This is not the place to speak of Charles Carpenter's great qualities as an administrator; suffice it to say that as a disciple of Sir George Livesey he developed the work commenced by his predecessor in establishing a new and happier relationship between employer and employee, and by the South Metropolitan Gas Company's Act of 1920 placed Copartnership upon a statutory basis.

Carpenter joined the Incorporated Institute of Gas Engineers in 1890, and was a member of the first Council. He became Vice-President in 1894 and President a year later. In 1925 he was awarded by the Institution the distinction of its Birmingham Medal. He was elected a member of the Southern Association of Gas Engineers in 1886, and was President of that body seven years later. In 1912, the centenary year of statutorily authorised and controlled gas supply, the degree of Doctor of Science was conferred upon him by the University of Leeds. From 1915 to 1917 he was President of the Society of Chemical Industry and was awarded its medal in 1923. In 1920 he succeeded Dr. R. Messel as representative of the Society of Chemical Industry on the Governing Body of the Imperial College of Science and Technology. Carpenter was elected a Fellow of the Chemical Society in 1917 and became a Life Member. E. V. EVANS.

EDWARD CHARLES EDGAR.

1881—1938.

EDGAR was born in London. He received his schooling in the Isle of Man and later entered the University of Manchester with a Hulme Scholarship at the age of seventeen. He graduated in 1901 with First Class Honours in Chemistry and was awarded a University Scholarship. During the two succeeding years he held a University Fellowship and then became Dalton Scholar in 1904. After successive appointments as junior demonstrator and senior demonstrator, he became a senior lecturer in 1913. In the meantime he had obtained the D.Sc. degree.

In 1916 Edgar was granted leave of absence from the University to take up the post of Superintending Chemist at H.M. Factory, Litherland. In November of the same year he became a Senior Inspector for the Department of Explosive Supplies, Ministry of Munitions.

Between 1918 and 1922 his appointments included a post with British Dyes, Chief Research Assistant to the Director of Research, British Launderers' Association, and Head of the Contracts Branch, D.E.S., at Alston and Burstal. In 1923 he became Head of the Chemistry Department at the Regent Street Polytechnic. Finally, in 1926 he was appointed to the Principalship of Rutherford Technical College, Newcastle-upon-Tyne, a post which he held until his death.

The bare enumeration of the posts which Edgar held gives striking evidence of his versatility. Almost immediately after graduation he started an investigation with Prof. H. B. Dixon on the atomic weight of chlorine. Hydrogen which had been weighed absorbed in palladium was burnt in chlorine generated by the electolysis of fused silver chloride and weighed in the liquid state. The vessel in which liquid chlorine was weighed was closed by a tap of which the barrel tapered upwards to enable it to withstand the

internal pressure. The hydrogen chloride formed was condensed and weighed in a nickel-steel bomb, and the residual gases analysed. This ingenious method, recalling the classical researches of Morley on hydrogen and oxygen, allowed of the employment of very large quantities of material, and consequently of the attainment of a standard of accuracy rarely achieved in the more conventional methods of atomic weight determination, where large-scale operations are impracticable (*Phil. Trans.*, 1905, **205**, 169). A year or so later Edgar extended this investigation by carrying out the converse operation of burning chlorine in hydrogen. For this purpose he used a specially designed vessel of vitreous silica, which at that time was rather a novelty (*ibid.*, 1908, **209**, 1). The values obtained in the two series were in close agreement, 35·463 and 35·462, so this important chemical constant was established with a high degree of probability. During a period overlapping the latter part of this research the writer had been working on the same problem with Prof. R. Whytlaw-Gray in London, and although the method used was entirely different, the value obtained, 35·460, confirmed those obtained in Manchester (J., 1909, **95**, 1633).

The next subject to attract Edgar's attention was the behaviour of hydrogen in contact with palladium, an investigation in which he was associated with A. Holt and J. B. Firth. The authors recognised that the process was two-fold, part of the gas forming a condensed layer on the surface of the metal, and part diffusing into the interior. When the pressure of the gas was diminished, the surface layer was removed readily, whereas the gas in the interior was much more firmly held. The conditions necessary for " activating " palladium were also examined and defined (*Z. physikal. Chem.*, 1913, **82**, 513). In 1911 Edgar undertook, in collaboration with the writer, a redetermination of the combining volumes of hydrogen and oxygen, the investigation occupying four years (*Phil. Trans.*, 1916, **216**, 393).

During the six years of our association in Manchester I was closely in touch with Edgar both in research and in routine work and found abundant evidence of his sterling worth. With a deep, but quite impersonal, conviction of the dignity of a University lectureship he combined a strong sympathy for the under-dog. The former quality made him something of a martinet with classes of students, but the latter rendered him easy of approach and a patient helper in any difficulty. He was at that period, I think, a little conservative in his ideas on the teaching of chemistry, but almost an iconoclast on every other subject. His social interests and activities were wide : he was a member of the Fabian Society and a zealous advocate of the political and educational claims of the other sex, and a close, personal friend of Dr. Weizmann. Music was a delight to him and he himself was a capable pianist. A keen cricketer in his younger days, he maintained his interest in the game and was a mine of information on the performances of the county teams and the careers of famous players.

In the early years of the war he became an enthusiastic member of the University O.T.C., where his value as an officer was enhanced by a knowledge of military history which would have qualified him for a post in a Faculty of Arts.

The varied experience gained in his many fields of activity bore fruit in the organising and administrative ability which marked his tenure of the Principalship of Rutherford College. During his twelve years of office the number of students increased from 1000 to 2500 and the courses, which had been mainly engineering, were extended in many directions. He remodelled the organisation on departmental lines, and developed the corporate life of the college by such measures as the founding of the Students' Association. Outside the College, also, he had a wide reputation in educational circles, and was regarded as one of the most active members of the Northern Counties Technical Examinations Council. In Newcastle, as in Manchester, he commanded the admiration and respect of colleagues and students alike, and the illness which overshadowed the last years of his life, though impairing his activity, in no way diminished his influence, which remained paramount until the end. He leaves a widow, but no children. F. P. Burt.

(For details of the last phase of Edgar's career I am indebted to Mr. T. Walling, Director of Education, Newcastle-upon-Tyne.)

ARTHUR JOSIAH HOFFMEISTER GAUGE.

1880—1938.

ARTHUR JOSIAH HOFFMEISTER GAUGE, the son of Josiah Gauge of Biggleswade, was born on July 31st, 1880. His mother's ancestors settled in England about the middle of the eighteenth century. Gauge was educated at Tottenham, and studied chemistry and physics at the Birkbeck Institute, and also at the Royal College of Science from 1902 to 1904. In 1911 he was appointed to the staff of the Government Laboratory, and was a Superintending Chemist at the time of his death on August 4th, 1938.

During his career at the Government Laboratory Gauge was engaged in investigations of certain industrial hazards, such as those arising from phosphorus, metallic powders, dusts and lead compounds, and in researches of a more general character, for example, on solubilities, diphenylene and mannitoboric acid. Some of this work was published in the *Transactions* for 1911 and 1913. Interest in mannitoboric acid and similar substances remained with Gauge till quite recently. He was engaged in an attempt to prepare boric acid derivatives of sorbitol, and one of his last investigations included a re-examination and confirmation of the properties of mannitoboric acid.

For some years Gauge was employed in the examination of water supplies and effluents and he took a leading part in work on the disposal of effluents from flax-retting factories and in the investigation of the possible toxicity of washings from tarred roads near fishing streams, and in many similar problems. Some of this work was published in the *Journal* of the Society of Chemical Industry (Vol. **51**, p. 117) and in a monograph issued by the Stationery Office in 1930 for the Joint Committee on Damage to Fisheries (p. 123 *et seq.*). On matters concerning water, water pollution and effluents, Gauge's experience and sound judgment were of the utmost value officially, and it is scarcely too much to state that in some ways his knowledge of these matters was unrivalled.

During recent years Gauge devoted himself to problems in connexion with brewing and brewing products and their bearing on Revenue problems. He took up this branch of applied chemistry with the enthusiasm that characterised all his undertakings, and again he acquired a knowledge of his subject of so wide a scope as to make his views authoritative.

Gauge was a man of generous instincts, a firm friend and a most loyal colleague, ever willing to render assistance where it was needed. In all his work, he was ready to help, and freely acknowledged the assistance of his collaborators. J. J. FOX.

ALFRED JOHN GREENAWAY.

1852—1938.

JOHN GREENAWAY, for so he was known to many Fellows of the Chemical Society, died after a long illness on August 25th, 1938. He was born at Islington on July 12th, 1852, the youngest of four children and only son of John Greenaway (1816—1890), well known as a wood engraver and draughtsman, a contributor to the early volumes of "The Illustrated London News," "Punch," and other leading magazines and books of the day. It was directly from him that the great artist, Kate Greenaway (1846—1901), the best and closest friend her brother ever possessed, derived her artistic inspiration.

After his early education at a local private school, Greenaway was apprenticed to his father; but, later, by his own wish he was allowed to study chemistry and entered the Royal College of Chemistry in Oxford Street. He was appointed demonstrator under Sir Edward Frankland when the College was transferred to South Kensington. As far as can be discovered, Greenaway was the last of those who knew personally the beginning of the Royal College of Science. Among his pupils during that period (1872—1881) were the late Professors W. H. and A. G. Perkin, with whom he maintained life-long and intimate friendships. Greenaway was elected Fellow of the Society in 1874 and became an original Fellow of the Institute of Chemistry in 1877. He became an abstractor for the Society—

the publication of "Abstracts of Chemical Papers published in British and Foreign Journals" commenced in 1871—at the invitation of Henry Watts, then Editor of the Journal, and, in 1885, he became Sub-Editor in charge of the Abstracts, succeeding Charles E. Groves. On the death of Dr. J. C. Cain in 1921, Greenaway became Editor of the Journal and Dr. Clarence Smith (the present Editor) became Sub-Editor.

During the early years of his work for the Chemical Society Greenaway lived with his sister, Kate, in the house at Frognal, Hampstead, which had been built for her. After her death he went to live at The Orchard, Chertsey, which was owned by Miss Ethel Boyce, a well-known musician and an intimate friend of his sister. At The Orchard, with its lovely garden on the banks of a quiet back-water of the Thames, Greenaway loved to entertain his many friends, among them chemists, artists, and musicians. Professor Hilda Johnstone in writing to "The Times" has created the atmosphere in which John Greenaway will long be remembered. "His guests . . . will remember how closely Kate's pictures covered the walls of his sitting-room in such pleasant harmony one with another that the observer found it natural to accept their host's strictures upon the modern preference for isolating a work of art in a sea of uninhabited background. On his shelves were copies of Ruskin's works which the author had had specially bound for presentation to Kate. The whole atmosphere recalled those Victorian poets, artists, and thinkers who first raised an altar to beauty amid the materialism of their age."

Greenaway always regretted that it had been financially impossible for him to complete his chemical training in Germany, as was then the custom. He foresaw himself condemned to routine and irksome teaching with little opportunity for original investigation and possible advancement, and was impelled to break away from it. For some time after giving up his teaching work he was private assistant to the late Dr. F. W. Pavy, Physician to Guy's Hospital. This was a unique position for a chemist in those days. In 1877, Greenaway published (J., **31**, 251) a short paper with the late R. J. Friswell on thallous platinocyanide. In 1881, he translated with the late Professor W. R. E. Hodgkinson Wislicenus's "Short Text-book of Organic Chemistry," and in 1891 he edited the translation of the fifth edition of Mendeléeff's "Principles of Chemistry."

Greenaway was thoroughly happy in his work for the Society. He never spared himself and he rejoiced in carrying out his duties conscientiously. His work brought him many friends among colleagues and authors. He only held the editorship until December, 1923. His work during the War (1914—1918) was particularly heavy, for Dr. Cain, who was engaged on work of national importance, was seriously ill during part of the time and, consequently, Greenaway was primarily responsible for most of the editorial work during that period. He was also deeply affected by Dr. Cain's death and in 1923, after a serious breakdown, had to give up work. The Council unanimously adopted the following resolution at its meeting on December 20th, 1923:—

> "The Council accepts with profound regret the resignation of Mr. John Greenaway as Editor, and desires to place on record its high appreciation of the eminent services he has rendered to the Society and to the science of chemistry in general for the period during which he has been connected with the Society's publications.
>
> The Council sincerely trusts that his health may be completely restored and that he may be spared many years to enjoy the happiness and leisure to which his unselfish work in the interests of our science so richly entitles him."

The Council nominated Greenaway for the Vice-Presidency of the Society and he was elected to this office for three years in 1924.

For some time Greenaway remained ill and depressed, unhappy because of his enforced inactivity. Gradually he became resigned and began to recover some of his former vitality. I remember vividly in the summer of 1924 entering his room unannounced and seeing him happily playing the piano. After a few minutes he turned round and, seeing me, exclaimed, "Gibson, I believe I shall be able to play Schumann again; I shall be all right now." Soon afterwards he was able to go away for his usual September holiday to Abersoch in Caernarvonshire, a place he had visited for over thirty years and in which he had numerous friends.

John Greenaway
1931

[*To face p.* 208.

Greenaway's interest in Chemical Society affairs continued to the end: it was only failing eyesight and lameness that prevented his attending the ordinary scientific and annual meetings. He resumed his interest in editorial work and became adviser on Nomenclature to the Bureau of British Chemical Abstracts and after some time a Chemical Society's representative on the Bureau. He also represented the Society on the Commissions on Nomenclature of Organic and Inorganic Chemistry of the Union internationale de Chimie and attended with the writer meetings of the Commissions in Paris, where he was always welcomed by our foreign colleagues. He edited with the writer a volume of Faraday Lectures in 1928 and he wrote a charming, personal account of his friend, Professor W. H. Perkin, who died in 1929.

In 1934, Greenaway went to live at Mill Hill. In his own small house he was very happy; but in the summer of 1937 failing strength became obvious and he had to give up his customary long walks. In October he had a fall, which may have been due to developing spinal trouble. He became rapidly worse and had to take to his bed. During this long illness, when he waited eagerly for the end, he remained alert and generally cheerful. The end came peacefully and suddenly. His ashes are interred at Hampstead, where his sister, Kate, is buried.

For the Chemical Society, John Greenaway did outstanding and self-sacrificing work and to him the Society will always be greatly indebted. He will long be remembered for his personal charm and modesty by many whom he taught to appreciate, as he did so intensely, beautiful things.

CHARLES S. GIBSON.

ALAN HAYTHORNTHWAITE.

1893—1938.

ALAN HAYTHORNTHWAITE was born at Battersea in London on December 23rd, 1893. He was educated at the City of London School and studied chemistry at the Royal College of Science, obtaining the B.Sc. (Lond.) degree in 1914. He served with the Army from September, 1914, until November, 1915, when he was invalided out. In 1917 he joined the firm of Messrs. May and Baker, Ltd., whose works were then at Battersea and Wandsworth and in whose service he remained until his untimely death as a result of a motor accident on September 7th, 1938. He was at first an assistant chemist and was mainly engaged in the manufacture of neoarsphenamine. In 1924 he was made chemist in charge of the production of this and other important drugs manufactured by the firm. In the meantime he had found opportunity to carry out some research work on organic compounds of arsenic, as a result of which he gained the Ph.D. (Lond.) degree. He was also by this time a Fellow of the Institute of Chemistry. When in 1935 the subsidiary firm of Pharmaceutical Specialities (May and Baker), Ltd., was formed, he became chief chemist of that company.

Haythornthwaite brought a keen sense of responsibility to every aspect of his work and his technical skill enabled him to surmount the many difficulties with which he was asked to deal. He was of a somewhat reserved disposition, but was ever ready to help those with whom his work brought him into contact and his even temperament and kindly nature endeared him to all his colleagues. He was in his earlier years a tennis player of considerable ability, but in recent years had sought his recreation in golf. He leaves a widow and one son.

A. J. EWINS.

GEORGE NEVILL HUNTLY.

1866—1938.

GEORGE NEVILL HUNTLY, who died on August 2nd last, was for many years a well-known figure at gatherings of chemists in London and his contributions to discussions were marked by knowledge and clearness of thought.

He studied at the Royal College of Science and gained the Associateship with Honours in Chemistry. He was also a Bachelor of Science of London, became a Fellow of the Society in 1893, and obtained the Fellowship of the Institute of Chemistry in the following year.

A very skilful analyst, he possessed in a marked degree the ability of applying theoretical knowledge to the many analytical problems and technical matters on which he was consulted, for, after a few years spent in teaching chemistry, he elected to practice it, although he occasionally lectured in place of his friend A. M. Kellas during that great mountaineer's Himalayan expeditions. In his youth Huntly was very active, and he once told me that it was only in actual climbing that Kellas could beat him on their Alpine holidays.

His passion for accuracy and thoroughness was tempered by an unusual appreciation of the limits of precision of the methods available, but it probably prevented his making as great a financial success as a less gifted but more commercially minded man might have done. I believe much of his best work was done for professional brethren who called him in to grapple with problems beyond them.

Huntly was a gas examiner to the London County Council and many other bodies. It was in this capacity that I made his acquaintance. Our relations, at first merely official, soon became cordial and on his frequent visits to the Council's old laboratory at Craven Street and later at the County Hall we discussed many matters, mainly concerning thermometry and the calorimetry of fuel. He had an exceptional knowledge of the mercurial thermometer, its merits and limitations and much of his spare time was spent in calibration of thermometers. An early worker with the bomb calorimeter as an instrument for the valuation of commercial fuels, he did much to make known its use and the degree of accuracy to be obtained with it, besides the limitation imposed on precision by the difficulties of sampling large bulks of coal. He did much useful work on committees of various bodies dealing with problems of combustion and fuel examination.

Huntly was, perhaps, not an easy man to know, but I found him, as I believe many others did, a generous friend, willing to tell one all he knew of a subject and to lend rare books and cherished apparatus. He was a hard worker, although his health seemed far from good and some years ago he injured his spine in a manner that appeared likely to lead to permanent invalidism. His sincere devotion to chemistry was altogether admirable.

J. H. COSTE.

ARTHUR HUTCHINSON.

July 6th, 1866—December 12th, 1937.

ARTHUR HUTCHINSON, formerly Master of Pembroke College and Professor of Mineralogy in the University of Cambridge, was one whose life was spent—as teacher, investigator, and administrator—almost wholly in the service of the University : he held many offices, all of them with distinction, and won universal respect.

His father, George Hutchinson, a London merchant, died young, and Arthur was brought up by his mother, who devoted her life to securing a good education for him.

From Clifton College, where W. A. Shenstone was Science Master, he won an entrance scholarship in Natural Science at Christ's College, Cambridge, and having come up to the University in October, 1884, he was placed in the first class in both parts of the Natural Sciences Tripos, taking Part I in 1886 and Part II (in chemistry and mineralogy) in 1888.

After graduation he started chemical research with Pattison Muir in the laboratory of Gonville and Caius College, studying the action of potassium cyanide on bismuth nitrate. His crystallographic bent was at once revealed, for the chief result of the investigation was the discovery of a new form of bismuth trioxide crystallising in regular tetrahedra (J., 1889, **55**, 143).

Having completed this research, he went to Würzburg to work under Emil Fischer. Fischer, at that time at the height of his investigations on the sugars, had just found that the amides of the hexonic acids, in contrast to the lactones, were not reducible to sugars (*Ber.*, 1890, **23**, 930). This was the more surprising since Guareschi had found that

benzamide could readily be reduced to benzyl alcohol (*Ber.*, 1873, **6**, 1462). Hutchinson was accordingly given the problem of investigating the reducibility of different types of amides.

He found that amides in which the $CO{\cdot}NH_2$ group was directly attached to an aromatic nucleus were reduced to the corresponding alcohol when treated with sodium amalgam in weakly acid solution, but aliphatic or fatty-aromatic amides could not be thus transformed. In alkaline solution the reduction took a different course. In some cases (*e.g.*, anisamide) a substituted benzil was formed by a process analogous to the reduction of acetone to pinacol, and in others (benzamide, *o*-toluamide) the amide of a dihydro-acid of undetermined constitution resulted (J., 1890, **57**, 957; *Ber.*, 1891, **24**, 173). For a thesis embodying this work he was awarded the degree of Ph.D. of the University of Würzburg, *summa cum laude*.

At the beginning of 1891 he was back again in Cambridge, living with his mother, who had taken a house there. He resumed his work at the Caius laboratory and was made a member of the staff (assistant college lecturer), demonstrating to practical classes and giving a course of lectures on general and inorganic chemistry extending through the academical year.

Pattison Muir was then engaged (with Forster Morley) in preparing a new edition of Watts' "Dictionary of Chemistry" and, while revising the article on lead, had encountered a statement by Jacquelin that a solution of red lead in glacial acetic acid deposited crystals of the composition $PbO_2,3Ac_2O$. This seemed to him improbable and he directed Hutchinson's attention to it. Hutchinson became interested in the compound and, inviting the collaboration of William Pollard, an enthusiastic undergraduate who afterwards became the well-known member of the Geological Survey, began an investigation which absorbed most of his spare time for many months. He and Pollard worked out a convenient method of preparing the substance, and by analyses, molecular weight determinations, and a study of its reactions showed that it was a compound of quadrivalent lead, the tetra-acetate $Pb(CH_3{\cdot}CO_2)_4$ (J., 1893, **63**, 1136; 1896, **69**, 212).

They thus provided chemists with a valuable reagent, for Dimroth in Hutchinson's former University of Würzburg found that it was an effective oxidising agent for organic compounds (*Ber.*, 1920, **53**, 484), and Criegee in the same laboratory showed that it reacted in a characteristic manner with various classes of compounds, notably the 1 : 2-glycols (*Ber.*, 1931, **64**, 260).

Hutchinson continued to work in the Caius laboratory for four years, and during this period two events occurred which were of primary importance in shaping his life. The first of these was his election, in October, 1892, to a fellowship at Pembroke College where the distinguished mathematician and man of science, Sir George Stokes, was then senior fellow. The College was still chiefly devoted to the older studies, but they realised that the time had come when some provision should be made for science teaching, and of the many young scientists of promise then available in the University they chose Hutchinson, who was commended to them by his attractive personal qualities as well as by his ability. Besides directing the studies of science men, he took an active share in the life of the college and soon became recognised as a valuable member of the staff. In due course he was made assistant tutor, and for many years he held the office of praelector with the duty of presenting members of the college for degrees in the Senate House. He had liberal sympathies and his opinions came to be valued in the college as representing a point of view which, in a predominantly conservative society, might otherwise have been lacking.

The second of these events was one that formed a turning point in his scientific career. It occurred towards the end of 1894, when the demonstratorship of mineralogy became vacant through the resignation of R. H. Solly, and Hutchinson was invited by the professor (W. J. Lewis) to take the post. He accepted the invitation and in due course left the Caius laboratory for the Mineralogical Museum, going to Munich during the ensuing long vacation (1895) to study crystallography under Groth. He held this demonstratorship for nearly 30 years.

The teaching staff of the department of mineralogy consisted solely of the professor

and demonstrator. Hutchinson consequently bore a considerably greater burden of routine teaching and daily drudgery than was usual for one of his standing and attainments. However, his power of clear exposition and his gift of humour made him an unusually effective teacher, and the greater part of the instruction in crystallography and mineralogy soon passed into his hands. By the attractive style of his lectures, and the free use of large-scale models (mostly of his own design and construction) he made the subject interesting even to the less intelligent of his hearers.

He devoted a great deal of time and thought to finding simple and effective ways of presenting the principles of crystallography to elementary classes, employing graphical methods where possible, and the stereographic protractor which he devised (*Min. Mag.*, 1908, **15**, 93) proved of much value in facilitating the teaching of crystal drawing to students with no previous knowledge of spherical geometry. He afterwards showed how it could be adapted for rapidly indexing the spots of a Laue *X*-ray photograph (*Min. Mag.*, 1926, **21**, 10). His crystallographic slide rule also was useful, particularly for checking calculations. He was interested in the design of crystallographic apparatus, showing considerable ingenuity in this connexion, and the Hutchinson universal goniometer (*Min. Mag.*, 1911, **16**, 100), marked by its simple and practical construction, proved very serviceable for instructional purposes.

His first mineralogical paper (*Min. Mag.*, 1900, **12**, 274) described a new mineral which he discovered while re-cataloguing the Carne collection of Cornish minerals purchased for the University in 1899. On a specimen of axinite in this collection from Roscommon Cliff, St. Just, there was a small single crystal of another mineral listed as selenite. Hutchinson perceived that it was not selenite, determined its crystal form, and by analyses carried out on a minute fragment established its composition, $CaO,SnO_2,3SiO_2,2H_2O$. He named it stokesite, in honour of Sir George Stokes, and this small crystal is the only example of the mineral that has yet been discovered. It also represents the only known crystalline compound which contains both stannic oxide and silica as essential constituents.

Among other minerals investigated by him were lengenbachite from the Binnenthal, whose composition he determined (*Min. Mag.*, 1907, **14**, 204), and cornetite, a basic cupric phosphate from N. Rhodesia, of whose optical characters and composition he gave (with A. M. Macgregor) a complete account (*Min. Mag.*, 1921, **19**, 225). Hutchinsonite, a rare thallium mineral from the Binnenthal, was named in his honour by its discoverer, R. H. Solly.

The investigation in which his originality was perhaps best evidenced was one on the diathermancy of antimonite (*Min. Mag.*, 1903, **13**, 342). He found that this substance was sufficiently transparent to radiations of long wave-length to enable its behaviour between crossed nicols to be examined by means of a thermo-couple and he thus succeeded in giving a definite proof that it had orthorhombic symmetry, a fact on which some doubt had been cast by certain observations of Drude (*Ann. Phys. Chem. Wiedemann*, 1888, **34**, 489). He then found (*Min. Mag.*, 1907, **14**, 199) that it transmitted enough light between the wave-lengths 750 and 850 to enable measurements of its refractive indices to be made visually in this region. In this way, using suitably cut prisms of very acute angle, he determined the refractive indices for the A and Z lines in the principal directions in the crystal.

During the years 1915—1918 he was engaged in research in connexion with the war, chiefly on gas masks for the navy, and in 1918 he was made O.B.E. After the demobilisation, the great influx of men whose education had been interrupted by military service threw a heavy strain on every department of the University. Hutchinson had an exceptionally heavy burden to bear, since in addition to his teaching and college work he had onerous administrative duties, the Secretaryship of the General Board of Studies having been entrusted to him. He was also President of the Mineralogical Society from 1921 to 1924, and in 1922 he was elected a Fellow of the Royal Society. In the same year he was made university lecturer in crystallography.

At this time he was greatly overworked, and in 1924 he had a serious breakdown. However, he made a very complete recovery and after the death of Professor Lewis in 1926 he was appointed as the natural successor to the chair of mineralogy. The closing years

of Lewis's professorship had seen the beginning of the new era in crystallography which followed the discovery of *X*-ray diffraction, and one of the first steps taken by Hutchinson after his succession to the chair was to bring about the institution of a university lectureship in structural crystallography to promote research in the field which the new method had opened. To this lectureship Mr. J. D. Bernal was appointed in 1927 and a laboratory of crystal physics was equipped.

Hutchinson retired from the professorship under the age limit in 1931. On his retirement he was presented with his portrait, and the large and representative gathering of colleagues and former students who assembled to do him honour formed a striking testimony to the services he had rendered in promoting the study of mineralogy in the university.

Two years after his appointment as Professor, the Mastership of Pembroke became vacant through the death of W. S. Hadley, and the college then showed the high esteem in which Hutchinson had come to be held by them by electing him their Master. He still retained his professorship, so for the next three years he was at the same time head of a house and head of a scientific department of the university. His tenure of the mastership came in a time of unusual stress, for it fell to his lot to preside over the college during one of the saddest periods in its history. Within the short space of four or five years no less than five members of the society were lost through death, some of them still comparatively young, and all of them holding important offices in the college. These successive losses from the staff threw a heavy burden on the rest, especially on the master, and early in 1935 Hutchinson's health again broke down. Once more, however, he made an astonishing recovery, and at the beginning of the next academical year he was able to undertake, in addition to his duties as master, those of treasurer with the management of the college estates.

His wise leadership had done much to bring the college safely through this difficult time, and at the unanimous request of his colleagues he retained the mastership for a year beyond the normal period. He retired from office in September, 1937.

His kindliness and charm of manner, and his quiet humour, made him a delightful companion and won him a large circle of friends. Endowed with a strong sense of fairness and well-balanced judgment, he was an admirable chairman, and in consequence he was chosen to preside over many administrative bodies of the university. His chief characteristics were perhaps his deeply ingrained integrity and his disinterestedness.

He married in 1901 Evaline, daughter of Mr. Alexander Shipley of Datchet and sister of his friend Sir Arthur Shipley, the zoologist, afterwards Master of Christ's. He found in her a great support in all his duties and in his liberal sympathies. They had two sons and one daughter.*

W. H. Mills.

PATRICK HENRY KIRKALDY.

1871—1938.

Kirkaldy was a Londoner, born in Stoke Newington, and received his early education at the Brewers' Company's School and at George Green's School, Poplar, of which his father, John Givens Kirkaldy, was a governor. On leaving school he went into the office of the New Oriental Bank, Threadneedle Street. He might have become a banker—many years later he was a Treasurer—but after three years in the City he entered King's College, London, as a student in 1891, studying chemistry with a view to an industrial career in the family business of paint and anti-fouling composition manufacture. After his three years course, however, the direction of his career was again altered, for in 1894 he was awarded the Daniell Scholarship for original work and was appointed demonstrator in the chemical department at King's; thereafter for 25 years he remained on the teaching staff of the College, becoming Assistant Professor in 1909. The King's of those days was not the King's of these and there were difficulties to contend with, now happily surmounted; amidst these Kirkaldy laboured for the welfare of his students, both in and

* The writer is indebted to Dr. Wm. Pollard and Prof. E. H. Minns for information and assistance.

out of lecture and laboratory hours. Amongst the memories of the simple but jolly "smokers" of those times there are those of Kirkaldy's own contributions by voice and violin.

Then came the war and Kirkaldy's contribution lay in supervision of the work allotted to King's in the evaluation of coal tar for national purposes.

In 1919 Kirkaldy retired from his Professorship at King's and was elected a Fellow of the College.

From then on for some 17 years he directed his chemical interests largely to the Institute of Chemistry, but during that period he was also almost continuously an Examiner to the Pharmaceutical Society. He had always been interested in the Institute and his services to it are legion.

An Associate by examination in 1893, he was elected a Fellow in 1897 and served on the Council first in 1916. In 1924 he became Honorary Treasurer and held that office until 1936; not only as Treasurer but also in the many associated positions which often fall to the lot of a Treasurer, Kirkaldy well served the Institute. He was first Chairman of the London and South Eastern Section, was Chairman of the Finance and House Committee and of the Benevolent Fund Committee; for many years he presided over the delicate deliberations of the Nominations, Examinations and Institutions Committee; he was always to be seen at the lectures and functions at the Institute. He is known to Fellows of the Chemical Society as one of the representatives of the Institute in the long drawn out discussions and negotiations the objective of which was union, co-operation and association of the chemistry bodies in this country; the outcome of these was eventually the formation of the Chemical Council, on which Council he represented the Institute in 1935 and 1936.

In 1936, to the distress of all who were acquainted with him, failing health compelled his retirement from all public activities. He died on September 14th, 1938, at Cricklewood in his 68th year, leaving a widow but no family. He will be remembered with affection by many generations of King's students and by those of the teaching staff of that period who survive him: in a wider circle particularly by those for whom and with whom he worked at the Institute.

He was elected a Fellow of the Chemical Society in 1895. E. HINKS.

WILLIAM HENRY MERRETT.

1871—1938.

PROFESSOR W. H. MERRETT, formerly assistant-professor of metallurgy at the Royal School of Mines, died on October 29th last, after a brief illness. Shortly before his retirement in 1937 he had a severe stroke, which left him in indifferent health. A further seizure some fifteen months later unhappily proved fatal.

William Henry Merrett was born in 1871 and was educated at St. Olave's School, London. He entered the Royal School of Mines as a student in 1891 with a Royal Exhibition from the Board of Education, and three years later was awarded a first class associateship in Metallurgy. After graduation he proceeded to the Royal Mint as assistant to the late Sir William Roberts-Austen, who was chemist and assayer to the Mint, and also professor of metallurgy at the School of Mines. During the seven years spent at the Mint Merrett carried out researches on metals and alloys, and was responsible for much of the experimental work embodied in the fifth and sixth reports to the Alloys Research Committee of the Institution of Mechanical Engineers. In connection with this work Merrett constructed the first apparatus employed to investigate the cooling of steel by a "differential" method, and he acquired great skill in the photographing of steel structures, contributing in no small measure to the foundation of the science of metallography as it is understood to-day. Merrett's beautiful photomicrographs of those days bear witness to the meticulous care with which all his work was carried out, often with extemporised appliances.

Merrett also carried out all the experimental work for a War Office and Admiralty Committee on Explosives and Ordnance. Much of this work was of a confidential nature,

dealing with the heat treatment of gun steels, the effects of various alloying metals upon the properties of gun steels, and the erosion of gun tubes by explosive charges. He also carried out confidential investigations on service explosives.

In 1901 Merrett was appointed to the staff of the Royal School of Mines, being the last to bear the title of " Instructor in Assaying," a title dating back to the foundation of the School. Some ten years later he became assistant professor of metallurgy, a position which he held until his retirement in 1937.

From his early youth Merrett interested himself keenly in military matters, joining the 3rd Middlesex Artillery in 1888. Some years later he transferred to the Electrical Engineers Volunteers, gaining valuable experience in searchlight units many years before the advent of aircraft. He rose to the rank of Major in the London Electrical Engineers (as the corps became known under the Territorial scheme), and was mobilised for active service in July, 1914. During the War he served in charge of various coast defences and anti-aircraft units, and subsequently as instructor to the Ordnance College. He retired from military service in 1926 with the Territorial Decoration and Long Service Medal.

Merrett was a Fellow of the Institute of Chemistry, a governor of the Camborne Mining School, a member of council of the Institution of Mining and Metallurgy, and a member of many scientific societies.

Merrett was a successful and popular teacher, being able to draw upon his wide experience for illustrations to his lectures. The welfare of his students, past and present, was uppermost in his mind, and he loved them as they loved him.

As a man he was kindness itself, in spite of, or maybe because of, his military leanings; generous in the extreme, courteous, good-tempered—in a friendship extending over thirty-four years the writer cannot recall any instance of Merrett losing his temper—and wholly reliable. Mines' men, and friends the world over will hold in grateful memory a lovable gentleman.

B. DRINKWATER.

SIR ROBERT MOND.

1867—1938.

BY the death of Sir Robert Ludwig Mond, which occurred in Paris on October 22nd, not only chemical science but science generally loses one who can ill be missed and whose work and actions will be remembered for many generations to come. He was born at Farnworth, near Widnes, Lancashire, on September 9th, 1867, and was the elder son of the late Dr. Ludwig Mond, F.R.S. His younger brother, Alfred Moritz Mond (Baron Melchett), was an active politician and occupied several posts in the Government of his day.

Robert Mond was educated at Cheltenham College, at St. Peter's College, Cambridge, at the Zurich Polytechnicum, and at Edinburgh and Glasgow Universities. He was Hon. LL.D. of Liverpool and Toronto Universities, F.S.A., F.R.S. Edinburgh, and a member of numerous other societies, some of which, for example The Faraday Society, elected him to the Presidential Chair. He was elected F.R.S. this year.

Among his activities in the domain of chemistry, he rendered his father able assistance in the discovery and purification of nickel carbonyl, and in the investigation of other compounds of similar type. His work in this field was of the highest importance in placing the carbonyl process for the separation of nickel on a commercial basis, thus providing the means for preparing nickel on the large scale. The value of this discovery, great as it was, has been enhanced during recent years by the fact that chromium plating can best be effected on a surface of nickel. Robert Mond was in no sense a specialist, but utilised his power of vision to survey not only the various fields of science in which he was interested but also a great many subjects outside this particular sphere. His earlier days at Winnington provided means by which he could show the particular type of mind he possessed and his capacity for overcoming difficulties as they confronted him in his work. For he was a patient man and rarely failed to solve a problem, the solution of which seemed to him desirable, either by personal investigation or with the help of

colleagues whom he would inspire with his own enthusiasm. One of his chief attributes was the gift of choosing the right man for the right work, and many men in high industrial positions to-day stand witness to this power of selection. Nevertheless, as time progressed he ceased to find opportunity to work at the bench and became gradually the administrator, in which capacity his earlier practical experience, combined with his shrewd knowledge of men, enabled him to become a leader and to occupy posts among the great industrialists of his day. It is possible that the wide knowledge and wide power of command he held were mainly inherited, and that in these respects he followed in the footsteps of his father.

After his investigations at Winnington he joined the Board of Brunner, Mond and Company, and later that of the Mond Nickel Company, of which he became Chairman.

So far as his chemical activities are concerned, Robert Mond must be regarded as the initiator and supporter of research. His munificent donations to those sections of science in which he was interested and to science generally were made with an exercise of judgment and beneficence which were dictated by his great sense of generosity and kindness of heart. There are many men living to-day who have had an evil period of misfortune alleviated at the opportune moment, and sometimes entirely removed, through the help he provided, secretly and without desire for thanks. Having given a substantial sum to France for the acquirement of a Maison de la Chimie, he regarded it as only just that a similar sum should be given to the acquirement of a " Chemistry House " here in England. In fact, wherever money was wanted for a scheme of which he approved it was readily and willingly given. His gifts to general charities outside those he gave to science were numerous and generous. He founded, and supported very generously, the Hospital for Infants in Vincent Square as a memorial to his first wife, whose tragic death took place in Egypt in 1905.

His connexion with the Davy-Faraday Research Laboratory has been described by the Treasurer, Sir Robert Robertson, in the following words :

" By the same deed of trust (1896) of Ludwig Mond in which he conveyed the Davy-Faraday Research Laboratory and its endowment to the Royal Institution, Robert Ludwig Mond was named Honorary Secretary for the Laboratory Committee for life. When in London he came occasionally to the meetings of the Committee and read the minutes. To the equipment and furnishing of the Davy-Faraday Laboratory, he gave much thought and travelled over the Continent and in America studying arrangements of laboratories and purchasing apparatus for his father's foundation. Although forty years have passed since the laboratory was fitted up according to his designs, the arrangements of benches and of electrical distribution are still in use. At the celebration of the centenary of Faraday's discovery of electricity from moving magnetism (1931), he represented the Faraday Society and gave £5000 towards the reconstruction of the theatre. His interest in the Davy-Faraday Laboratory continued unabated, and recently he gave £2000 to its funds. He also caused to be collected and printed a list of workers in the laboratory from 1896 to 1932 with their publications. The Royal Institution has lost a good friend."

Mond was also responsible with others for the establishment and upkeep of the Norman Lockyer Observatory at Sidmouth, and he contributed largely to its maintenance.

He was a cosmopolitan well known in all the capitals of Europe, and his activities in France were almost as considerable as those in his own country. Both Monsieur Auguste Béhal and Monsieur Louis Hauzeur spoke at the funeral orations, of which the following are extracts :

M. Auguste Béhal—

" Membre du Conseil d'Administration de la Maison de la Chimie, il suivit de près sa naissance et son developpement. Mais non content de pouvoir se compter parmi ses fondateurs, aussi bien par son action personnelle que par sa contribution à son édification Sir Robert s'intéressa à son activité, à sa bonne marche, s'inquiétant des moindres détails matériels, en même temps que de ses projects d'avenir.

" Il sentit bientôt qu'il fallait assurer la continuité de l'œuvre entreprise, et il fonda la *Société des Amis de la Maison de la Chimie.* ' Car,' a-t-il dit un jour, ' il reste beaucoup

[*Photo by Elliott and Fry.*

SIR ROBERT MOND.

[*To face p.* 216.

à accomplir et il faudra du temps pour que le programme tracé soit entièrement exécuté. Chaque génération se doit d'apporter sa pierre à l'édifice collectif; les générations montantes et celles qui leur succèderont auront à cœur de marquer de leur empreinte l'œuvre que nous laissons et que nous confions à leur sollicitude.'

" En créant cette nouvelle Société, Sir Robert a voulu aider moralement et matériellement la Maison de la Chimie, et parfaire le fonctionnement de ses services. Il considérait, en effet, qu'il faut lui donner le moyen de recevoir tous les livres, tous les périodiques, tous les brevets mondiaux touchant à la chimie, et qu'il y a lieu de diffuser la documentation et de vulgariser parmi le grand public les nouvelles découvertes.

" Mais il a voulu d'autre part, que la Maison de la Chimie devint un foyer international où puissent se rencontrer les industriels et les chimistes des divers pays.

" Comprenant l'importance de plus en plus grande de la coopération internationale, Sir Robert voulait, en créant la Société des Amis de la Maison de la Chimie, faire naître un centre de rapprochement où se retrouveraient tous ceux qui portent intérêt à la chimie, sans tenir compte de leurs pays respectifs.

" La Maison de la Chimie à laquelle il consacra, pendant ses dernières années, la presque totalité de son activité, et la Société des Amis de la Maison de la Chimie, perdent en Sir Robert un Ami, un animateur eclairé, un grand protecteur. Sa perte est déjà ressentie profondement dans notre Maison et son souvenir toujours vivace animera constamment notre action."

M. Louis Hauzeur—

" Chimiste et industriel, Sir Robert Mond ne s'intéressait pas moins à l'aspect commercial et social des vastes industries qu'il dirigeait. Qu'il me soit permis de rappeler ici qu'il fut, en Angleterre, un ardent champion de l'adoption de la journée de huit heures et du congé hebdomadaire payé. Sa philanthropie se manifestait en toute occasion. Il créa un hôpital destiné à étudier les meilleures conditions de la nutrition des enfants, ce qui l'amena à s'occuper d'élevage, pour avoir du lait pur.

" Ses goûts l'avaient porté vers l'égyptologie. Dans ce domaine il découvrit le secret du fameux bleu égyptien, employé si abondamment dans les poteries anciennes.

" Tous les aspects de la chimie l'intéressaient. Et l'une de ses joies les plus profondes était de guider et d'encourager les jeunes chercheurs qui venaient prendre conseil auprès de lui, dans ses laboratoires de Combe Banks, ou il s'était transporté après la mort de son père en 1910.

" L'histoire des origines les plus lointaines de la chimie avait retenu son attention. Il avait fondé tout récemment une revue très vivante, consacrée à l'alchimie.

" Sir Robert Mond était un fervent ami de la France, dont on peut dire qu'il avait fait sa seconde patrie. Et l'un des plus précieux témoignages qu'il en ait donnés, c'est le rôle éminent qu'il joua dans les destinées de notre Société. Nul mieux que lui n'avait compris tout ce qu'une pareille charge comporte, tout ce qui peut en rayonner de vraiment humain. Il ne négligea rien qui put mettre les chimistes et les industriels en contact les uns avec les autres, soit à l'occasion de nos congrès, soit dans les réunions sociales qu'il organisa toujours avec munificence."

The fellowship of the Royal Society conferred on Robert Mond this year gave him probably the greatest pleasure of all the honours he received. He had received the honour of knighthood in 1932 and had been promoted Commandeur de la Légion d'Honneur from that of Officer. He held the Honorary Degrees of LL.D. of Liverpool and Toronto, and therefore possessed the State and Academic Distinctions in this country he so fully deserved. But the crowning recognition, that of recognition by his fellow scientists, was still lacking, and so long as this was absent all else mattered little. It is pleasing to know that he lived to receive this recognition and that he was a proud man when he heard of his election.

Another field in which Robert Mond showed a wide interest was that of Egyptology, and his name will be remembered not only as one who possessed the keenest interest in the subject but also as the benefactor who contributed largely to its needs. The able manner in which this work was carried out is indicated by the publication of three volumes

entitled " The Bucheum," by Robert Mond and Oliver Myres, and by two volumes issued last year entitled " The Cemeteries of Armant." His activities in this connexion are well told by Professor Percy E. Newberry in *Nature* of November 12th, 1938.

In connexion with Mond's work for Palestine Exploration, Professor John L. Myres in a letter to the writer, says : " I first made Mond's acquaintance in Liverpool and owed much in my own work to his extraordinary originality and quick grasp of a situation and a remedy. He always left one with a stimulating sense of responsibility for ' doing something about it.' " Professor Myres sent the following account which he had prepared for the *Palestine Quarterly*, and which he has allowed the writer to use : " When Palestine became a Mandated Territory, and was assigned to Great Britain, the care of ancient monuments devolved on the new administration. At the same time the duty of regulating and facilitating the archæological researches of all countries alike had to be undertaken. It was obviously necessary in these circumstances to provide an advanced base for British scholars, who had done much for the archæology of Palestine in earlier years; and also to create a trained staff for the new Department of Antiquities. The more cautious wished to raise an endowment before beginning to organize or to explore on the spot. But Sir Robert Mond thought otherwise, and it was through his personal efforts, backed by generous benefactions and guarantees, that the British Academy and the Palestine Exploration Fund were induced to join in establishing a ' British School of Archæology in Jerusalem ' on the lines already found valuable for many years in Athens and in Rome. The University of Liverpool lent the services of Professor John Garstang as Director, and on him the Government of Palestine conferred in addition the Directorship of the Department of Antiquities, which was thus enabled to come into action at once, within the premises acquired for the School, and with an inspectorate consisting, in the main, of the School's staff and students; the Colonial Office contributed a subsidy of £500 a year to be administered by the School's Council. Thus the administration was given indispensable help in carrying out its duty to archæology under the terms of the Mandate, and British archæologists were put, in respect of local establishments and other important considerations, on the same footing as those of other nations. In all this work, Sir Robert Mond was the guiding spirit, both in London and in Jerusalem, as well as the chief financial supporter. When the School and the Department were eventually separated, and the Government of Palestine financed as well as administered its own organisation, he remained Honorary Treasurer of the School, and was responsible in great measure for its existence. Especially was this the case after the withdrawal of the Colonial Office grant, which rendered it necessary for him to continue the close relationship which existed between the Palestine Exploration Fund at home and the London Office of the School, to which it had always extended its hospitality.

" Among Sir R. Mond's latest benefactions, his gifts to the valuable library in order to bring it up to date are well worthy of record. Periodicals and books of reference which are useless unless up to date, were supplemented by him on his own initiative and without outside help.

" It was to Sir Robert Mond also that the School owed its ability to support the researches of Miss Dorothy Garrod and her colleagues in the cave deposits of Mount Carmel, which have yielded exceptionally valuable evidence of the antiquity of man in the Near East and of the climatic and faunal circumstances of his early occupancy of Palestine. This was a field of exploration which appealed both to his scientific as well as to his historical interests, and involved the kind of team-work which he loved to encourage.

" It was the academic and instructional aspect of the British School in Jerusalem which interested him. When he excavated on his own account, or in conjunction with others, in Palestine, it was always an independent enterprise, for which he made himself responsible. The School's excavations were intended to be made for the training of its own students, and were to be exercises in field technique. He never concealed his opinion that the maintenance of the necessary establishments for such advanced studies and field training was a contribution both to the advancement of learning and to such efficient administration as might reasonably be expected of a civilised country. His own generous contributions to this end he regarded as a patriotic duty. Ultimately, the strength of

public opinion made this obvious and led to Government action, which is illustrated by what actually happened in regard to the antiquities of Palestine. The School, by his death, loses not only a munificent founder, and wise councillor, but one whose place it will be very difficult to fill."

In his youth Robert Mond was an assistant to Lord Kelvin, and he has been heard to express his deep sense of admiration for this great man. He was twice married, his first wife, Helen Edith Levis, dying in Egypt and leaving him two daughters. He married again in 1922, his second wife being Marie Louise Le Manach of Belle Isle en Terre in Brittany, who survives him. He was cremated in Paris, and his ashes interred at Belle Isle en Terre. A kindly host, he was ever ready to welcome his friends either at his London house or at his flat in Paris. He leaves many relatives and friends who mourn his loss.

J. F. THORPE.

ARDESHIR NASERVANJI PESTON-JAMAS.

1883—1937.

ARDESHIR NASERVANJI PESTON-JAMAS, whose death took place at Bombay on November 19th, 1937, was born at Surat on July 8th, 1883, and educated at the Government High School and the Gujarat College, Ahmedabad; Wilson College, Bombay; and the Techno-chemical Laboratory of the late Professor T. K. Gajjar, Bombay. He graduated B.A. of Bombay University in 1906, B.Sc. in 1907, and M.A. in 1908.

Peston-Jamas's knowledge of geology and chemistry largely determined his professional career. Within a dozen years of his graduation he had held a number of appointments, among them being the posts of Geologist, Eastern Syndicate, Ltd., London, Assistant Manager of the Gorumahisani Iron Mines, Manager of the Singbhum Copper Co., and State Geologist of the Nawanagar State.

He was commissioned at different times by important industrial interests to investigate coal, iron, limestone, manganese, mica, bauxite and chromite deposits in India, and he reported on the mineral resources of the Dhrangadhra State. In later years he carried on business under his own name as geologist and prospector.

Peston-Jamas was of a kindly and generous disposition, an excellent companion and a good friend.

He was elected a Fellow in 1912.

A. R. NORMAND.

BERTRAM PRENTICE.

1867—1938.

BERTRAM PRENTICE, who died at Disley, Cheshire, in April, 1938, was born in Edinburgh in September, 1867. He received his earlier education at George Watson's College, Edinburgh, and having chosen chemistry for his future career, he continued his studies at the Heriot-Watt College and at the University of Edinburgh. He obtained his B.Sc. degree in 1893 and his Doctorate in 1894. He was awarded the Baxter Scholarship of Edinburgh University and during its tenure studied chemistry in Germany—first at Halle under Volhard and later in Munich under Baeyer. He carried out research under the latter, and for his doctorate put forward a thesis on " Some derivatives of dimethylacrylic acid," being awarded the degree of Ph.D. " summa cum laude."

Prentice's teaching career began at the Heriot-Watt College, Edinburgh, where he was demonstrator and lecturer under W. H. Perkin, jun. In August, 1896, he was appointed Head of the Chemistry Department at the Royal Technical College, Salford (then the Royal Technical Institute), which had just been built. He remained here until his retirement in September, 1932. During the period 1909—1932 Prentice was Principal of the College.

An enthusiastic chemist, he published a number of original papers, and it was a matter

of keen regret to him that the pressure of his teaching and administrative duties limited his activities in research.

He was very prominent in educational affairs, locally and nationally. For many years he was Treasurer of the Association of Principals in Technical Institutions and later was President of the Association. He was also on the panel of the Burnham Committee.

As a teacher, he was remembered with great respect and affection by many generations of students. This was well shown by the gathering of ex-students at his retirement and by the many letters of greeting sent to that meeting by ex-students from all over the world. His former students would learn of his death with sorrow. E. CLARK.

KOTARO SHIMOMURA.

1861—1937.

BORN at Kumamoto in 1861, the eldest son of a poor Samurai family, just before the downfall of the Tokugawa and the restoration of the Mikado's power, Shimomura trod a thorny path during his youth. When about twelve years old, he attended the Kumamoto Yogakko, a school established by the Daimyo of Higo, where an American, Captain L. L. Janes, was engaged to instruct the sons of Samurais in the science and arts of the West. Young Kotaro imbibed confused ideas about science and Christianity: the latter was branded in those days as devil's magic. Lessons in physics, chemistry, and astronomy were so wonderful to the intelligent boy that they became more or less mixed in his mind with the miraculous elements in Christianity. This led to his going to Kyoto in 1876 to study theology at the Doshisha Institute, then the sole mission school, founded by Dr. Niijima. From theology he was drawn to metaphysics, which for a time absorbed all his interest. However, becoming disgusted with the emptiness of the latter, he resorted to scientific reading. Misfortune then befell the family and the sudden death of his father laid on Shimomura the responsibility of supporting his mother and six young sisters. Notwithstanding these obstacles, he managed to go to America in 1885, when he was twenty-five years old, and entered the Worcester Polytechnic Institute, where he took a course of chemistry and graduated with the degree of B.S. with honours. Then he went to Johns Hopkins University, where he studied organic chemistry under Prof. Ira Remsen.

Meanwhile Mr. J. N. Harris, a millionaire of New London, had decided to found a school of science in Japan, and he asked Shimomura to start one on his endowment of $100,000. Shimomura returned to Japan in 1889 and devoted himself to the organisation of the Harris School of Science in the Doshisha Institute. He became the Director and Professor of Chemistry, but unfortunately differences arose between him and the Trustees of the Doshisha with regard to the execution of the endowment deed, which culminated in his resignation after five years' service.

Shimomura was now facing a crisis in his life, for he had never thought of any other career than teaching as his profession. After careful consideration, he decided to enter the industrial world. By-product coking, an industry entirely neglected in Japan and America in those days, and only very little practised in England, was his choice. He went abroad in 1896 to investigate the subject and after consulting many savants and technologists came at last in contact with the Solvay Co. in Brussels, who received him cordially and gave him ample opportunity of studying their by-product coke-ovens, known as the Semet–Solvay system, and their working. On returning to Japan, he built and started in 1898, for the newly founded Osaka Seimi Works Co., a battery of 16 Semet–Solvay coke-ovens—the first by-product coke-ovens built in Japan. This type of oven proved so successful that it was adopted by the Imperial Steel Works (150 ovens) and other companies. Coal-tar in those days had very little value in Japan. On acquiring a long-term contract with the Imperial Steel Works for their tar, Shimomura, in conjunction with the Osaka Gas Co., formed the Toyo Wood Preserving Co., the first successful enterprise in Japan for creosoting railway sleepers and telegraph poles.

When the Great War broke out, Shimomura undertook research work on synthetic dyes. One night, when he was engaged in experimental work in his private laboratory,

a violent explosion occurred, which left him totally blind for many years: he never fully recovered his eyesight.

The Japan Dyestuff Manufacturing Co., subsidised by the Government, was founded in 1915 and Shimomura was asked to design the plant and start the work. On completion of the first stage of the programme he retired from active work and served the company as an adviser.

Busily engaged though he was in many directions, Shimomura always retained a great interest in the welfare of the Osaka Seimi Works Co., which had been established at his instigation, and the last act he did for this company, after nearly thirty years' flourishing existence, was its amalgamation, in 1925, with the Osaka Gas Co., with benefit to both companies.

Shimomura was much interested in improving the quality of coke, and as early as 1908 he took out a patent for the manufacture of hard coke from highly volatile native coals (which usually give so-called fingery coke) blended with a semi-coke containing 15—20% of volatile matter (termed "X-coal") obtained by carbonising highly volatile coals at about 500°. A similar process was later developed independently in the Sarre district by St. Claire Deville. Blending with semi-coke has since become so popularised that it is now practised in several places both in Japan and abroad.

The degrees of Dr.Ing. from the Japanese Government (1915) and D.Eng. (Hon.) from the Worcester Polytechnic Institute (1933) were conferred on Shimomura, and he was awarded by His Imperial Majesty a Blue Ribbon Medal (1924) for his services to chemical industry.

Shimomura was quiet and deep-thinking in character, and disliked all social functions, spending most of his spare time in reading, writing, and experimenting in spite of his impaired eyesight. In his advanced age, he was specially absorbed in religious science, philosophy, and poetry, and, apart from many scientific papers, he published two books on religion and the immortality of the soul. He was true in his friendships, and among his English friends the names of Watson Smith, Arthur Dickinson, Prof. Smithells, Prof. Cohen, and Sir Ferguson Bell may be mentioned.

He is survived by his wife, two sons, both chemists, and a daughter.

AKIRA SHIMOMURA.

FREDERICK WOODLAND TOMS.

1856—1938.

FREDERICK WOODLAND TOMS, who died at his home in Jersey on July 20th at the age of 82, had been a Fellow of the Society since 1877. He was the son of Frederick Toms of the editorial staff and, for the latter part of his life, editor-in-chief of *The Field*.

Toms was educated at the City of London School, where he happened to be a contemporary of the present writer, and where a common devotion to the chemical instruction of Henry Durham and Isaac Scarf (still remembered by a few surviving chemical "Old Citizens") led to an intimate friendship which, despite later geographical separation, proved to be of lifelong duration.

On leaving school in 1875 Toms became a pupil assistant of the late R. V. Tuson, Professor of Chemistry at the Royal Veterinary College, where he remained for two years, after which he went for three years to the Royal College of Science, studying chemistry under Professor (later Sir) Edward Frankland, to whom during much of this time he acted as personal assistant chiefly, but not wholly, in matters relating to water analysis. He then went, on Frankland's recommendation, to Dr. (later Sir) William Perkin, in whose organic research laboratory at Sudbury he served for two years.

Following this he went to Guy's Hospital as senior assistant in the physiological research laboratory of the late Dr. F. W. Pavy, F.R.S., where he remained until the year 1884, when he was appointed as the first resident Official Analyst to the States of Jersey. The duties of this appointment he carried out for 47 years, retiring in 1931 in favour of his assistant, Mr. C. P. Money, who still holds office.

The Jersey appointment afforded room for considerable activity in connection with the administration of the law relating to adulteration of food, in which, however, Toms for a number of years found himself seriously hampered by the futility of the local application of the milk standards or limits elsewhere in force (or in use), having regard to the natural richness of the milk of Jersey cattle which constitute the only breed on the Island. Ultimately, he was successful in obtaining the official adoption of a local standard more effective for the prevention of adulteration.

Food and drug analysis, however, formed but one phase of his work. His father's connection with agricultural journalism, together with his own early experience at the Veterinary College, had naturally led him to take an interest in such branches of science as bore upon agricultural practice, and he had already contributed to *The Field* a series of articles on the chemistry of ensilage at the time when its novel introduction into farm practice was engaging attention at home and abroad. He now found under the auspices of the Jersey Royal Agricultural Society ample scope for investigation relating to soils and fertilisers under the intensive system of farming and market gardening prevailing in the Island; and of this he was not slow to avail himself. The consumption of artificial fertilisers in Jersey was then, as it still is, large in relation to the area of ground under cultivation, and Toms found that at that time local knowledge of the origin, composition, and properties of fertilisers was often vague and their use empirical and often illogical, while the prices paid for them were sometimes in anything but reasonable adjustment to their relative intrinsic or productive value. He initiated field experiments on the manuring of the staple crops of the Island, mainly potatoes and tomatoes, in various districts, and the lessons derived from them were promulgated with a clearness and simplicity of exposition which soon led to a confident demand for his advice, as well as to insistence on proper guarantees of composition by the vendors of fertilisers and on the checking of these by analysis. Later such guarantees became legally compulsory, as in this country.

His attention as States Analyst was also demanded in relation to water supplies, gas, building materials, and articles coming under fiscal supervision and in other miscellaneous directions.

His experiences in Jersey were mainly recorded in his long series of official annual reports and consequently his direct contributions to scientific journals were but few. Among them was one by himself and C. P. Money on the " Separation of Lead Tetra-ethyl from Solution in Petroleum Spirit " (*Analyst*, 1928, **53**, 328), based upon observations made by Frankland and Lawrence (J., 1879, **35**, 244) at the time when he, Toms, was a research student in Frankland's laboratory. The reagent used for the separation of the lead tetra-ethyl was sulphur dioxide and the lead assessment was made by conversion of the reaction product into lead sulphate by " wet combustion."

As an instance of his earlier versatility it may be mentioned that as long ago as 1878 he carried out for *The Field* an investigation into the comparative composition of various explosives used for sporting purposes, finding that the excessive violence of certain brands of wood powder which had been productive of trouble was due to faulty proportion between two varieties of nitrocellulose used in their composition. A summary of this investigation appeared among the " Abstracts " (J., 1878, **34**, 923).

Toms was elected an Associate of the Institute of Chemistry at the time of its formation in 1878, becoming a Fellow in 1883, and he was an original member of the Society of Chemical Industry, and a member of the Society of Public Analysts in 1884 at the time of his Jersey appointment.

He was married in 1887 to Emily, daughter of the late Frazer Hopwood, of the Orange Free State, and step-daughter of the late George Snell, of Jersey, who survives him with two sons, one of whom, Frazer Toms, has recently retired from the post of Deputy Inspector-General of Police in the Punjab, and the other, Humphrey Toms, is in medical practice in England.

The life of Toms was one of enthusiastic and unflagging devotion to duty, and his friendship was precious to those who were fortunate enough to enjoy it.

BERNARD DYER.

U TIN.

1898—1938.

U TIN was born in Henzada, Lower Burma, on August 8th, 1898. He received his early education at the Government High School, Henzada, and in 1916 joined the Burma Government Medical School, Rangoon. Here he had a distinguished career and obtained his diploma in 1920. He then joined the staff of the school as a demonstrator. In 1922 he joined the Civil Medical Department of Burma as a sub-assistant surgeon and served in various stations in the Shan States and on the Chinese border.

In 1926 he was appointed Assistant Chemical Examiner and Assistant to the Police Surgeon, Rangoon, under Lt.-Col. T. F. Owens, I.M.S., Chemical Examiner to the Government of Burma. He was a brilliant, hardworking, reliable assistant. In 1930 he went to England for three years and worked at Guy's Hospital, London, and in 1933 he obtained the M.R.C.S. (Eng.) and L.R.C.P. (Lond.) diplomas. In the same year he returned to Burma to his former appointment. His ability and devotion to duty were most marked; he worked in his laboratory until the afternoon of the day of his death. His loss is keenly felt in the laboratory where he served.

U Tin married in 1928, Ma Saw, the daughter of a Lower Burma landowner, and left one daughter and one son.

U Tin was the Secretary of the Provincial Medical Services Association and the present sound position of the Association is largely due to his guidance and care.

D. H. PEACOCK.

HERMANN THEODORE VULTÉ.

1858—1937.

HERMANN THEODORE VULTÉ died at his home in New Jersey on December 10th, 1937, in his 80th year. Vulté was born in New York City on July 21st, 1858. He received his scientific training in the schools of Columbia University, first earning the Ph.B. degree in the School of Mines in 1881, and later the Ph.D. degree in the Graduate School in 1885. He was elected a fellow of the Chemical Society on November 19th, 1895.

In 1879 Vulté married Eugenia Wilhelmina Charlotte Fielitz. They made their home in New Rochelle. To them were born five sons. In 1930, several years after the death of his first wife, he married Martha Chellis and moved to New Jersey, where they spent the remaining years of his life in quiet retirement.

Vulté lived during his active years in the City of New Rochelle, where he served the civic interests of his community through his advice to and service in the Health and Sanitation Departments. Except for two years, 1881—1883, while he was Superintendent of Columbia Chemical Works, Brooklyn, New York, Vulté was a student or instructor in one or more of the schools of Columbia University from 1877 to his retirement in 1928. Chronologically, Student 1877—81; Fellow and Graduate Student 1883—85; Assistant Instructor in Chemistry, School of Mines, 1885—92; Tutor in Chemistry, Columbia University 1892—97; Instructor in Chemistry, College of Physicians and Surgeons 1897—1904; Instructor in Chemistry, Barnard College 1892—1900. Since 1899 he was associated with Teachers College, Columbia University, as Lecturer in Domestic Science and Art 1899—1900; Lecturer in Domestic Science 1900—04; Adjunct Professor of Domestic Science 1904—09; of Household Chemistry 1909—10; Assistant Professor of Household Arts 1901—23; and Associate Professor of Household Chemistry 1924—28, at which time he retired from active service.

It was in the field of Household Chemistry and Arts that Vulté made his most valuable contributions to teaching and in his recorded contributions to literature. His best known publications are the following textbooks—" Laboratory Notes in Household Chemistry for the use of Students in Domestic Science "; co-author with S. B. Vanderbilt of a text " Household Chemistry for the Use of Students in Household Arts," and with G. A. Goodell

of one titled "Food Industries; Textbook on the Production and Manufacture of Staple Foods for Use in High Schools and Colleges." He also contributed to periodicals in the field of Household Chemistry.

Vulté was known to his co-workers and friends as a most genial and helpful companion. His breadth of information and willingness to share it will never be forgotten by those who enjoyed this companionship. He will be remembered by all who knew him as one who was always ready to give a helping hand, and one who could meet adversity with a smile. He retained his wholesome outlook on life and his devotion to his work to the end.

CLIFFORD D. CARPENTER.