# OBITUARY NOTICES.

## WALTER ERNEST ADENEY.

1857—1935.

WALTER ERNEST ADENEY died at Kingstown, Co. Dublin, on the 16th June, at the age of seventy-eight. He was educated at the City of London School and went to Ireland as a Royal Exhibitioner in 1877 to study at the Royal College of Science, Dublin. At the conclusion of his associateship course in applied chemistry he joined with the late Sir W. N. Hartley in spectroscopic research work of outstanding merit.

When only thirty years of age Adeney was elected Curator and Examiner in Chemistry by the Senate of the Royal University of Ireland. He entered into this work with characteristic zeal, and in co-operation with the professors of the Universities of Dublin, Belfast, Cork, and Galway did everything to secure the successful working of a system of federal practical examinations. Many graduates of the University still recall with gratitude the kindly spirit and sympathy shown to them by Adeney during the stress of examination periods. In recognition of his services to the Royal University and of his scientific work the Senate conferred upon him the degree of Doctor of Science (Honoris Causa) in 1897.

During his tenure of office at the University, Adeney devoted much attention to analytical problems concerned with the constitution of distilled spirits and natural waters. His expert knowledge in this connection was recognised by his appointment to Royal Commissions on whisky and on sewage disposal.

On the dissolution of the Royal University in 1909 his office therewith was abolished and he then established a private laboratory and devoted himself to further research upon the biochemical and physical principles underlying the self-purification of contaminated waters. His meritable work in this difficult and important branch of science gained for him a status of international repute. In 1911 he was invited by the New York Harbour Commission to advise them on sewage problems in connection with New York Harbour. In 1921 his advice was sought by the Municipality of Bombay with respect to the state of Bombay Harbour, and in 1927 he was consulted by the Mersey Docks and Harbour Board on problems arising in the Mersey river. In the same year he was invited by the London County Council to report on the state of the Thames and to advise the Public Health Department.

From 1917 to 1921 Adeney held the post of Professor of Chemistry in the Royal College of Science, Dublin. During this short period he established a school of research into fundamental problems in the self-purification of polluted waters. In collaboration with the late H. G. Becker he carried out a classical investigation on the absolute rate of aeration of water. The results of this research have furnished a scientific basis of attack for problems on sewage disposal and the purification of gases in industrial chemistry. Adeney's life work in the study of polluted waters has been embodied in book form, " The Principles and Practice of the Dilution Method of Sewage Disposal," published by the Cambridge University Press. In recognition of his contributions to the advancement of science, Adeney was awarded the Boyle Medal by the Royal Dublin Society in 1931.

Although Adeney's chief activity lay in the pursuit of chemical research, he found time to help in the work of numerous public bodies. For many years a member of the Science Committee and of the Council of the Royal Dublin Society, he was elected Honorary Secretary to the Society in 1921, which post he resigned in 1933 owing to failing health. During his tenure of office Adeney applied himself whole-heartedly to the work of the Society. Only his colleagues on the committees could appreciate the magnitude of his unostentatious work in furthering the objects of the Society. His kindly and tolerant disposition exercised an influence in smoothing difficulties which could not be achieved by a lesser man. In recognition of his valuable services to the Society for 53 years, the Council presented him with a framed address and appointed him a Governor in 1933.

A Fellow of the Institute of Chemistry, he served as a member of Council and also as Vice-President. He was also Chairman of the Irish Free State Section for 14 years. He was elected a Fellow of the Chemical Society on March 17th, 1881.

In 1888 Adeney married Rebecca, daughter of the late Dr. W. E. Steele, who is still living. He also leaves one daughter, Mrs. Ernest Watson of Greystones, Co. Wicklow.

A. G. G. LEONARD.

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## KENNETH FRANKLAND ARMSTRONG.

1909—1935.

ON January 3rd, Kenneth Armstrong and John Howard reached the Hoch Joch, near Vent in the Ötzthal, on ski; in returning, an avalanche overwhelmed Howard, and Armstrong fell in the course of search for his friend. The loss of these two brilliant young chemists must surely be one of the most poignant tragedies on record in these columns.

Armstrong attended Oundle School from 1922 to 1926, and then proceeded to Magdalen College, Oxford, obtaining a Natural Science Scholarship. Apart from a period of study in Geneva his career followed the normal course of an Undergraduate in the Honour School of Chemistry. He graduated as B.A. in 1930, B.Sc. in 1931 (First Class Honours in Chemistry) and became known as a highly promising and original student.

He took every opportunity of broadening the basis of experience, visiting South Africa with the British Association in 1929 and the International Conference at Madrid in 1934; he also travelled in Austria and Germany on vacation. He was awarded a Henry Fund Fellowship in 1931 and elected to spend two years at Harvard in J. B. Conant's laboratory. As the result of the work carried out there, two important papers on the chemistry of chlorophyll were published and a number of valuable general articles were also forthcoming on related topics.

Travel was well to the front in America and he made good use of all the opportunities afforded by his sojourn abroad. Armstrong had many interests and these are further exemplified by his membership of the Inner Temple, by his studies of graphic art, continental architecture and entomology. He had a good collection of butterflies, especially the high alpine varieties, and he projected microchemical investigations of their constituents. He was a fluent speaker equally in demand for the festive and the more serious occasions.

On his return from Harvard, Armstrong was awarded a Harmsworth Senior Scholarship of Merton College and he worked in the Dyson Perrins Laboratory at Oxford, initiating a series of promising investigations on aucubine, quebrachol, the colouring matters of certain insects, including the cinnabar moth, and on purely synthetic problems.

His literary activities were manifold and the most important example is the collaboration with his father in writing "The Glycosides" (1931) and "The Carbohydrates" (1934), in the series of "Monographs on Biochemistry." His main chemical interests were bound up with the questions connected with the formation of complex compounds in plants, and in this field he had many novel ideas. He was also a student of protein chemistry and hoped to attack the subject experimentally.

But the flower of his versatile genius had not fully opened and no bare recital of achievement is sufficient. Those who knew him intimately and shared his confidence in scientific affairs were stimulated by his enthusiasm, his curiosity, and his alertness, whilst they admired his originality, his fund of knowledge, and his breadth of outlook.

It appeared certain that Armstrong would play a leading part in advancing our science and that he would worthily uphold the high tradition of his family. Strikingly handsome, and modest in bearing, he was universally beloved for his personal qualities, for those that lay beneath the surface as well as for his unfailing kindliness and courtesy.

R. ROBINSON.

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## HERBERT BRERETON BAKER.

1862—1935.

HERBERT BRERETON BAKER, President of the Society from 1926 to 1928, died on 27th April last, in his 73rd year. The second son of a Lancashire clergyman, Baker was educated first at Blackburn and later at Manchester Grammar School, which he and a brother were enabled to join by the self-sacrificing efforts of their parents: as can well be understood, the slender financial resources of the vicarage were severely taxed by the education of four children and the claims of needy parishioners, mainly cotton workers.

Beginning on the classical side at Manchester, Baker later turned over to science, and so came under the influence of Francis Jones, described by his pupil as the "best of all teachers." A Brackenbury school award and a scholarship secured at Balliol enabled him to proceed to Oxford, where he ultimately took a first class in natural science. He was then appointed demonstrator at Balliol and private assistant to H. B. Dixon—an association which awakened in the younger man a notable enthusiasm for research and in fact determined the field of investigation which he later made particularly his own—the influence of moisture on chemical change.

In 1884 Baker was appointed chemistry master at Dulwich College and for nearly twenty years he was engaged in school teaching. Much energy was devoted to the development of a science side on the Manchester Grammar School lines, but in spite of this and the heavy demand of normal school routine, Baker managed to prosecute research continuously, and he published during the Dulwich period some of the work by which his name is specially known. It is a notable fact that he was elected a Fellow of the Royal Society in 1902, while still a schoolmaster.

From Dulwich Baker was appointed to the headmastership of Alleyn's School, but after a short time in this post he was elected to the Lee's readership at Christ Church, Oxford, in succession to Vernon Harcourt, his old friend and instructor. To an enthusiastic investigator like Baker, the opportunities of the readership were naturally more congenial than those attaching to a headmastership, and he quickly showed himself active at Oxford not only in the initiation of research but also in the organisation of chemistry teaching—at that time apparently in a somewhat chaotic state. The new Lee's reader himself became responsible for the inorganic chemistry lectures in the University and inaugurated an extensively illustrated experimental course which proved extremely popular.

It was during his tenure of the Lee's readership, in 1905, that Baker married Muriel, the daughter of H. J. Powell, partner in the Whitefriars Glass Works. Mrs. Baker had herself been trained as a chemist and collaborated with her husband in various investigations.

In 1912 Baker succeeded Sir Edward Thorpe as Director of the Chemistry Department of the Imperial College of Science and Technology, a position which he occupied until his retirement in 1932. His arrival at South Kensington was soon followed by the establishment of a special Department for Chemical Technology and by the institution of full professorships in Organic and Physical Chemistry.

During the War Baker put himself and his laboratory freely at the disposal of the fighting services and his advice was much in request. After the first gas attack by the Germans in April, 1915, Baker was asked by Sir Alfred Keogh to proceed to France along with Dr. J. S. Haldane to determine the nature of the poison gas employed. This was quickly found to be chlorine, and respirators charged with a mixture of sodium carbonate and sodium thiosulphate were provided as rapidly as possible for the protection of the troops against this gas. Such respirators, however, gave no protection against phosgene, the use of which by the Germans was anticipated, and Baker set to work to discover a suitable absorbent for this compound. After many failures, sodium phenate was found to be effective, and the manufacture of the phenate helmet in quantity was achieved before the Germans launched their first phosgene attack. Baker's war services in these and other directions were recognised by the award of the C.B.E. in 1917.

The war ended, Baker's energies were once more directed to the administration of a

large department overflowing with students and to the research work in which his interest was mainly centred. His distinction as an investigator, already marked in 1912 by the Chemical Society's award of the Longstaff Medal, was further recognised by his selection as Davy Medallist of the Royal Society in 1923. He served on the Councils both of the Royal Society and of the Chemical Society, and became President of the latter body in 1926. Baker took a considerable share also in the activities of the University of London and served for a number of years on the Senate and its Committees.

Apart from some experiments on the union of nitrogen and hydrogen, described before the British Association in 1883, Baker's earliest research work, carried out at Balliol College and published in the Journal for 1885, lay in the field now specially associated with his name—the study of the influence of moisture on chemical change. H. B. Dixon's observation that a mixture of dry carbon monoxide and oxygen does not explode on the passage of a spark led to an investigation of the question whether moisture is in all cases necessary for the combustion of elementary substances. Phosphorus and carbon were selected for the first experiments, and the purified material in each case was sealed up with oxygen in hard-glass tubes, containing also plugs of phosphorus pentoxide. After eight days or more the behaviour of these tubes when heated was compared with that of similar tubes in which, however, the oxygen was saturated with aqueous vapour. In the dry tubes, there was either retardation or even complete absence of oxidation—indeed, when the tubes containing carbon were heated to redness combustion started immediately in the moist tube with rapid consumption of all the oxygen, whereas in the same conditions in the dry tube there was no visible reaction and much of the oxygen remained uncombined. It was in connexion with the reading of this paper at the Chemical Society that Armstrong's view of chemical action as " reversed electrolysis " was put forward.

These experiments were elaborated and extended during Baker's early years at Dulwich. Both the oxides of carbon were shown to be produced in the slow combustion of purified charcoal in dried oxygen, the monoxide being formed first, with subsequent conversion, if circumstances were favourable, into the dioxide. Experimental proof was obtained that sulphur, boron, amorphous and ordinary phosphorus did not burn in dried oxygen, and that ordinary phosphorus exhibits no luminosity at any pressure; on the other hand, selenium, tellurium, arsenic, and antimony burned whether the oxygen was moist or dry.

From the study of combustion in dried oxygen it was but a step to the examination of the effect of moisture on the rate of chemical reactions generally, and a notable paper describing Baker's observations in this field appeared in the Journal for 1894. It was shown that pure dried lime was without action on either sulphur trioxide or ammonium chloride when the two potential reactants, after being in presence of phosphorus pentoxide for some time, were brought together in a tube previously baked out in a current of dried air. Under these conditions of desiccation ammonium chloride could be sublimed from lime without any liberation of ammonia. Gas reactions also were found to be dependent on the presence of moisture, nitric oxide and oxygen, for example, remaining indifferent to one another when thoroughly dried.

The absence of combination between dried ammonia and dried hydrogen chloride was perhaps the most striking effect observed by Baker—certainly the one which attracted most attention, because of the failure of other workers to repeat the observation. It has been maintained that it is impossible to dry the gases in question over phosphorus pentoxide on the ground that ammonia is rapidly, and hydrogen chloride slowly, absorbed by that substance. Baker, however, has shown that, if the preliminary drying of the gas is thorough and if the phosphorus pentoxide has been purified by distillation in a current of dried air, then ammonia can be kept over the pentoxide for many days without more than a slight fall of pressure. He has emphasised also the point that in preparing tubes for the study of intensively dried substances it is not sufficient merely to pass a current of dried air at the ordinary temperature; the tube must be strongly heated during the passage of the air. Quite recently, Smits, following Baker's technique and using phosphorus pentoxide from the same source, has kept ammonia in contact with the purified pentoxide for a long period without any action taking place.

Baker's exceptional skill in the preparation and handling of dried gases was very

PROFESSOR H. BRERETON BAKER, C.B.E., D.SC., F.R.S.

[*To face p.* 1894.

evident in his study of the behaviour of a hydrogen–oxygen mixture. Both H. B. Dixon and V. Meyer had examined these gases and found that the rate of combination of the gases was unaffected by drying. Experiments, however, made by Baker and described in the Journal for 1902 proved that the gases obtained from the electrolysis of a solution of purified barium hydroxide did not explode on heating to redness after drying with distilled phosphorus pentoxide, whereas in tubes containing no pentoxide explosion took place invariably under the same conditions of heating. Many details of the technique requisite for success in this kind of work were described by Baker in 1929—in his last contribution to the Journal of the Society.

The classical experiment on the indifference of intensively dried ammonia and hydrogen chloride was paralleled by the discovery that ammonium chloride, after keeping in an evacuated tube together with phosphorus pentoxide, did not dissociate at 350°, as was proved by measurements of the vapour density. Some years later the case of mercurous chloride was examined and it was found that the dissociation of this substance also is conditional on the presence of a trace of moisture.

These observations on ammonium chloride and mercurous chloride led Baker, in collaboration with Mrs. Baker, to an investigation of nitrogen trioxide, a substance which other workers had found to dissociate almost completely on evaporation. Vapour density measurements made with a specimen of the intensively dried trioxide proved the absence of dissociation and indicated even the presence of a polymeride, whilst on the admission of a mere trace of moisture the vapour broke up into nitric oxide and nitrogen peroxide.

At a later date, 1912, the study of nitrogen trioxide was resumed in consequence of a private communication from Professor Alexander Smith regarding the volatility of dried calomel. Bulbs containing nitrogen trioxide which had been sealed up with phosphorus pentoxide for three years were broken under conditions ensuring rigid exclusion of moisture and the boiling point was determined. It was found to be abnormally high and the abnormality was attributed to the presence of more complex molecules than those corresponding to the formula $N_2O_3$.

This observation stimulated further work on the boiling points of intensively dried liquids, "in order"—to quote Baker's own words—"to see if the dissociability of the vapours is an essential condition for the raising of the boiling points." A number of highly purified liquids were sealed up with phosphoric oxide and set aside : owing, however, to the interruption of work by the War the tubes were not opened for eight or nine years. It was then found that for some ten liquids of different types the boiling point observed was 30—60° above the normal value. Pieces of broken silica were present in the liquids, and boiling, when it did take place, proceeded quietly without any sign of the violent ebullition which accompanies the breaking down of superheated conditions. The temperatures, however, read on thermometers suspended in the vapour above these boiling liquids, were at most 2° above the normal boiling point.

These observations, supplemented by measurements of vapour pressure and surface tension, led Baker to the view that the intensively dried liquids which exhibited abnormally high boiling points must be associated, and his Presidential addresses to the Society in 1927 and 1928 were devoted to the elaboration of this theme. The experiments attracted much attention and gave rise to a good deal of criticism. It has been maintained, for example, that the manner in which the boiling points of the intensively dried liquids were determined did not exclude the possibility of superheating effects, and that until this point has been cleared up the proof of association is not conclusive.

Although it was the study of the influence of moisture that chiefly enlisted his interest and energies, there were other problems which attracted Baker's attention. In the days before the significance of the atomic number had been realised, the apparently abnormal position of tellurium in the Periodic Table was the subject of many investigations, and Baker was one of those who attempted to clear up the difficulty. In a lengthy research lasting 13 years, which was begun at Dulwich, finished at Christ Church, and carried out with the help of A. H. Bennett, the possibility of ordinary tellurium containing another element of higher atomic weight belonging to the same group was exhaustively tested. Fractionation methods were applied to tellurium itself, telluric acid, the dioxide, the

tetrachloride, the tetrabromide and the hydride, but in none of these ways was any change effected in the atomic weight of the element.

During his period at South Kensington Baker initiated two other investigations in the field of atomic weights. One of these, carried out with W. H. Watson, concerned the case of mercury, about the atomic weight of which there was at the time some uncertainty. The method adopted was the synthesis of mercuric bromide, and the final value adopted as a mean of nine experiments was 200·57—very close to the figure now accepted.

The direct ratio of silver to oxygen in silver oxide was the subject of a later research, carried out jointly with H. L. Riley. It was found that in order to prepare silver oxide of atomic weight purity an apparatus was necessary in which precipitation, washing, and filtration could be performed in an atmosphere entirely free from organic matter. Unless the most scrupulous care is taken in its preparation, silver oxide gives a pink chloride on treatment with dilute hydrochloric acid. The quantitative decomposition of the pure silver oxide finally obtained gave for the atomic weight of silver the value 107·864 (O = 16).

Baker was essentially an experimentalist and he was never so happy as when practising the laboratory craftsmanship of which he was a master. After his retirement from administrative duties he came regularly to South Kensington and he continued to find pleasure, even up to within a few weeks of his death, in devising and constructing apparatus for fresh attacks on old problems. He was a modest man of simple tastes and homely interests, whose straightforward character and lovable personality secured for him a warm place in the hearts of his many pupils and colleagues.

J. C. PHILIP.

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## ARTHUR BRAMLEY.

### 1878—1935.

THE career of Arthur Bramley, who died on June 19th, 1935, provides a notable instance of Yorkshire grit and determination. Born at Elland in 1878, he was only fifteen years old when his father died, and at that age he became a mill-worker, assisting his widowed mother to keep the home together and to care for two younger brothers. A wage-earner during the day, young Bramley was a student in the evening, taking technical classes, first at Elland and later at Halifax Technical College. His attendance at Halifax involved a train journey at the end of the day's work, but was nevertheless kept up for many years until in 1904 he was appointed to the staff of the College.

Two years later Bramley gained a County Scholarship and a National Scholarship in chemistry and these awards enabled him, at the age of twenty-eight, to proceed to the Royal College of Science. Here he distinguished himself in all the subjects of the curriculum, and finally, in 1909, he was awarded a First Class Associateship in Chemistry. For some time thereafter Bramley acted as assistant-demonstrator in the Chemical Department of the College, and later he became associated with the writer in various physico-chemical investigations, studying, among other things, the decomposition of ferric and cupric thiocyanates by water and the influence of sucrose and salts on the solvent power of water.

Bramley was an indefatigable worker, and while collaborating with the writer he was at the same time engaged on his own account (frequently till late at night) on an extensive experimental study of the properties—more especially the viscosities, melting points and heats of reaction—of binary mixtures. These investigations, carried out with remarkable accuracy and thoroughness, were the subject of four papers communicated to the Society in 1915—1916, and earned for him in the latter year the degree of Doctor of Science of the University of London.

After a short time on the scientific staff of British Dyes, Ltd., Bramley was appointed as head of the Department of Pure and Applied Science at Loughborough College, and this post he occupied till his death. In this responsible position he first devoted his energies to the development of the necessary theoretical and practical courses appropriate in an institution mainly concerned with engineering, but it was not long before he initiated a

comprehensive research on the gaseous cementation of iron and steel. The thoroughness of technique and the accuracy of analytical practice which had been characteristic of Bramley's earlier work were eminently shown in this new field, and with the assistance of a number of keen research students, a succession of papers issued from the Loughborough laboratory.

The conditions for the uniform cementation of steel bars at high temperatures were worked out in detail and the extent and character of the penetration were deduced from the analysis of turnings stripped off successively from the cemented bars. Thanks to the careful control of the conditions and the accuracy of the analyses, a high degree of reproducibility was achieved, so much so that a mathématical treatment of the results showed them to be entirely in harmony with Fick's law of diffusion.

As a gaseous atmosphere for cementation, carbon monoxide alone was first employed, and later a stream of this gas carrying the vapour of hydrocarbons such as toluene, or of nitrogenous compounds such as ammonia, acetonitrile, and pyridine. Experiments carried out under the latter conditions showed the extent to which carburisation may be stimulated by the presence of the nitrogenous materials and permitted also an exact study of the distribution of nitrogen, as well as carbon, in the cemented zones. The conclusions drawn from the analytical results were confirmed by an extensive series of micrographs; these proved, for example, that the presence of nitrogen entirely alters the micro-structure of iron and carbon alloys. All this work on gaseous cementation and on diffusion of carbon and nitrogen into iron and steel was published in the Carnegie Scholarship Memoirs of the Iron and Steel Institute, and the value of Bramley's contribution to our knowledge in these fields was recognised by the Institute's award of the Carnegie Gold Medal in 1928.

Experience in the field of research just described led to an investigation of an allied problem, namely, the equilibria between mixtures of carbon monoxide and carbon dioxide under various pressures in contact with steel. This work, an account of which appeared in the Journal of the Society in 1932, was carried out with steels of different carbon content and at temperatures between 750° and 1150°. The results were such as to permit certain deductions in regard to the iron–carbon equilibrium diagram.

Bramley was a man of simple kindly character and straight dealing, who, both in himself and through his younger collaborators, exemplified the virtue and value of steady sound work. His native ability was coupled, as the present writer gladly testifies, with a notable capacity for loyalty and friendship. Although fond of travel, Bramley was a real home lover, and he was fortunate in his domestic life; his wife, who survives him, was a constant support and help throughout his career.

J. C. Philip.

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## SAMUEL FRANCIS BURFORD.

### 1857—1935.

Samuel Francis Burford was born in 1857 and was articled to his father (a retail chemist). In 1880 he passed the qualifying examination of the Pharmaceutical Society, and in 1883 gained the major qualification. He studied analytical chemistry under Dr. John Muter, and it was this special course of study which profoundly influenced his later life. On the completion of his studies he commenced business as a homœpathic pharmacist and also established an analytical practice. He later gave up his business as a chemist, and devoted his whole time to professional work. He was a skilful and conscientious analyst and soon won a reputation for sound reliable work. In addition to his private practice he was appointed analyst to the Leicester Corporation Sewage Works, Water Works, and other departments. In 1913 he was appointed Public Analyst for Leicester, and retained this important post until his retirement in 1929.

Burford never forgot his debt to pharmacy, and was in fact President of the Leicester and Leicestershire Chemists Association until a short time before his death. He took a great interest in all branches of chemistry, and in addition to his Fellowship with the

Institute of Chemistry, he was a member of the Society of Public Analysts and the Society of Chemical Industry. He was elected a Fellow of the Chemical Society in 1891.

Burford was an earnest and active Free Church worker. He was Hon. Secretary to the Leicester Highfields Hospital, and associated himself with numerous other benevolent institutions. His life was spartan in its utterly unselfish simplicity. He was generous, broad-minded, and understanding. He had a charming personality, a ready wit, and a delightful sense of humour, and his ready sympathy and practical kindliness endeared him to everyone; he never lost an opportunity of doing good.

Burford's wife predeceased him by only a month; doubtless his sorrow hastened his own end. He leaves a son and a daughter, to whom our deepest sympathies are extended.

SAMUEL B. BRATLEY.

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## HARRY COOPER.

### 1888—1935.

THE many friends and former colleagues of Mr. Harry Cooper were both pained and surprised at the news of his sudden death following an operation for appendicitis in Calcutta on August 28th, 1935.

Cooper was a native of Hythe, Kent. He was educated at the Elementary School, Sandgate, left at the early age of 14 to enter pharmacy, by the old-fashioned though excellent method of apprenticeship, and served four years with a local chemist at Hythe. Whilst extending his experience in pharmacy, he passed both the minor and the major examination of the Pharmaceutical Society at his first attempts, the former in 1912 and the latter in 1913.

In August, 1913, he entered the service of Burroughs Wellcome & Co., Manufacturing Chemists, Dartford, and remained there for six years, gaining experience in analytical and manufacturing methods. Although during the War he was fully engaged in important work connected with medical supplies, he spent his leisure time in military training with the 4th Vol. Batt. Royal West Kent Regiment, one of the platoons in the Dartford Company being made up solely of employees of Burroughs Wellcome & Co., and Cooper attained the rank of sergeant.

In August, 1919, after his marriage to Miss Daisy Prosser, a former colleague, he proceeded to India on the staff of Smith, Stanistreet & Co. Ltd., Calcutta, and was Works Manager and Director of this Company at the time of his death. In 1919 he became a Fellow of the Chemical Society.

Whilst in India, apart from his service to the firm to which he was attached, he became closely associated with the activities of the chemical and pharmaceutical trade and rendered invaluable service to Indian pharmacy. He was Vice-president of the Institution of Chemists (India), acting as hon. secretary from its inauguration in 1928, was co-opted a member of the Faculty of Science of Benares Hindu University, and was a member of the Board of Studies in pharmaceutical chemistry and an examiner for the B.Sc. degree of the University. He rendered valuable service to the Government of India Drugs Enquiry Committee, of which he was a member, and toured the country in 1930—1931 to enquire into the purity of drugs manufactured and imported into India, and to report upon the necessity for legislation to restrict the practice of pharmacy to duly qualified persons. In March last he was elected President of the Bengal Pharmaceutical Association and was keenly interested in raising the status of pharmacy in India. His death will be a great loss to Indian pharmacy, as he had considerable knowledge and experience of both chemistry and pharmacy. He was a man of strong character, very hard-working, robust, and utterly fearless. He leaves a widow and one son, to whom great sympathy will be extended. He was only 47 years of age and in the midst of a career full of promise of credit to himself and of service to the community.

H. A. D. JOWETT.

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## EGBERT GRANT HOOPER.

1855—1935.

EGBERT GRANT HOOPER was born at Bath on July 2nd, 1855, and died on September 17th, 1935. He studied chemistry under Frankland at the Royal College of Science and proved himself an able student, acquiring from that great master not only a sound knowledge of general chemistry but the special technique of the examination of water which was of the greatest use to him in his subsequent career. In 1878 Grant Hooper joined the Government Laboratory, then situated at Somerset House and controlled by the late Dr. James Bell, F.R.S. He soon displayed his practical ability and was placed in charge of the work of the students in this Laboratory. It was not long before Grant Hooper was called upon to assist Dr. Bell in his pioneer work in the examination of foods and later in the work required for the monograph on "The Chemistry of Tobacco." For some years Grant Hooper was occupied in instruction in chemistry; he published one or two booklets on elementary chemistry. In 1881 the malt tax was abolished and the duty on beer was substituted, Grant Hooper thus being given the opportunity of utilising his studies on the chemistry of brewing to which he had devoted much time. He gave a series of lectures to brewing students and in 1882 published the "Manual of Brewing, Scientific and Technical," a work which was one of the most systematic of its time. The first edition was sold in a fortnight and a fourth revised edition appeared in 1891. It was reprinted several times and continued in use for many years. There is little doubt that the book fulfilled a demand, for it was one of the earliest to give precision and quantitative value to the various operations in an art which was slowly emerging from empiricism. Fortunately, Grant Hooper had considerable knowledge of mycology and was an expert microscopist, in this respect standing in the line of his predecessors in the Government Laboratory, and no doubt this contributed materially to his success as a brewing chemist.

The systematic manner in which he surveyed a problem and set about its solution was a constant example to his younger colleagues. In the Laboratory, Grant Hooper found himself in the midst of a wide range of testing and investigation, in inorganic chemistry and in foods and drugs. Varied chemical subjects had to be considered on behalf of Government Departments, and in these Grant Hooper took a prominent part and acquired that wide grasp of technical matters which impressed all who worked with him. Doubtless it was this experience that enabled him to undertake successfully and at short notice many of the problems placed before him in his official career. Amongst these were his investigations on the determination of arsenic in organic materials, on the metallic albuminates in connexion with poisoning by copper, and on the character of the explosive which brought about the Dinas Main Colliery disaster. In 1912 he was appointed Deputy Government Chemist and remained in this post until his retirement in 1919.

Grant Hooper was an active supporter of the principal Chemical Societies and served on the Councils of the Chemical Society, the Institute of Chemistry (of which he was a Vice-President), and the Society of Chemical Industry, being an original member of this Society. He served the last body on its Publication Committee for a long period and was Chairman of its London Section. To those who worked with him, Grant Hooper was courteous and helpful, ready to give them the benefit of his knowledge and anxious to advance their welfare. While in the Government service he received offers of positions in other Laboratories and in the academic world, but he preferred to remain at the Government Laboratory.

J. J. Fox.

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## CHARLES THOMAS KINGZETT.

1852—1935.

CHARLES THOMAS KINGZETT, whose death occurred on July 29th, had been a Fellow of the Society for more than sixty years, for he was elected on April 3rd, 1873.

During his long life, which was prolonged beyond the scriptural span of fourscore years, he had interested himself in all the main movements and developments for the professional

betterment of British chemists. He was one of the Founders of the Institute of Chemistry in 1877 and an original member of the Society of Chemical Industry from its inception in 1881. He was also a prominent member of the Society of Public Analysts. At various times he served on the Councils of these three learned Societies.

Kingzett, who was born in Oxford, received his earliest training in chemistry as a junior assistant in the then new Oxford University Laboratories. In this capacity he was privileged to attend the practical classes of the Demonstrator (Mr. Vernon Harcourt) and the lectures on inorganic and organic chemistry delivered by the Waynflete Professor (Sir Benjamin Brodie). This introduction to chemistry occurred during Kingzett's fourteenth year. He made full use of these exceptional opportunities by utilising the laboratories after working hours and during vacations, so that he soon qualified himself to prepare the demonstrations of H. G. Madan, who had succeeded Harcourt on the latter's appointment to the Lee Readership in Chemistry at Christ Church. He worked through and beyond the regular course followed by undergraduates reading for honours, acquired some skill in glass-blowing, and prepared many of the chemical reagents and standard solutions required in the several laboratories. He also received some personal tuition in theoretical chemistry from John Robinson, private assistant to Brodie, who was then actively engaged in his well-known researches on ozone and its properties.

In his seventeenth year, Kingzett passed a Local Examination as an " Associate in Arts " of the University of Oxford, chemistry being one of the special subjects, and as a mark of distinction he was presented with a well-bound copy of Macaulay's " Essays." Soon after this event he took up teaching, first in Oxford and then in Bloomsbury, London. At that time his ambition was to secure appointment as science master in some public school, and he actually became a candidate for such a post at Clifton College but was unsuccessful. This disappointment became a turning point in Kingzett's career, for during 1870 he was engaged by Walter Weldon of manganese recovery fame as a young chemist to work in a laboratory near London (Putney) in connexion with industrial processes concerning, in the main, the manufacture of chlorine and the recovery of sulphur from alkali waste. Certain of these investigations were tested on a manufacturing scale at Gamble's chemical works at Hardshaw Brook, St. Helens. About this time, Kingzett contributed a series of articles to " Iron " on the alkali trade which were afterwards published (1877) in book form under the title of " The History, Products and Processes of the Alkali Trade."

Leaving Weldon's employment in 1872, Kingzett was appointed chemist and technical manager of a soda works in Liverpool run by Thomas Snape and subsequently he became for a short time assistant to Professor A. H. Church at the Royal Agricultural College, Cirencester, in succession to Edward Kinch. After these brief engagements he became chief chemical assistant to Thudichum at Kensington, where the latter was then commencing his prolonged researches on the chemistry of brain matter. These investigations, which included also studies of bile, blood, and urine, were supported by grants from the Local Government Board. Accounts of these researches in brain chemistry were published in Governmental Blue Books and described in Kingzett's book on " Animal Chemistry, or the Relations of Chemistry to Physiology and Pathology," published in 1878. Original contributions on these and kindred subjects were also published in the Journal of the Chemical Society.

In 1877 Kingzett and Dr. B. H. Paul entered into partnership as Analytical and Consulting Chemists, their laboratories being situated in Leadenhall Street, London, and Victoria Street, Westminster, but this collaboration only lasted for two years, after which Kingzett pursued independently a study of the aerial oxidation products of various terpenes and essential oils, a subject which had long interested him. His first paper on this topic was submitted to the Chemical Society in 1874 after a preliminary note to the *Chemical News* in 1872. Although originally Kingzett had no intention of turning the results of his observations to practical account, the necessity of securing a larger income than his earlier work had afforded led him, now that he had married in 1878, to patent the process and then to start the manufacture of these oxidation products, which became known under the generic name of " Sanitas." In 1878 he formed and became Managing

Director and Chemist of the Sanitas Company, Ltd., in which he subsequently became Chairman, retaining this position until he resigned from the office in 1926. The trading and commercial records of the Sanitas Company, which he directed for nearly 50 years, bear witness to a rare combination of scientific outlook with business acumen.

In the earlier years of this long period Kingzett maintained his analytical and consulting practice; he also continued to carry on chemical investigations and to make contributions to chemical literature.

During the years 1874—1877 Kingzett was foremost in a movement initiated by a group of the younger Fellows of the Chemical Society to effect certain reforms within the Society which to them appeared desirable. One burning question turned on the respective values of the Fellowship and the Associateship, the latter being a grade of membership which had failed to secure adequate support. It is to-day almost impossible to appreciate the circumstances in which these discussions took place, and in the present notice it is undesirable to revive the fires of an old controversy. Some heat was engendered which in Kingzett's opinion took time to dissipate. The upshot of the movement was the formation of the Institute of Chemistry in 1877; Kingzett was then elected to the first Council of the new body. Although as recently as the end of last March he was opposed to the formation of the new Chemical Council, it is of interest to remember that he was an early advocate of the still unrealised Chemistry House.

Kingzett was a prolific writer who in spite of business cares and responsibilities made many noteworthy contributions to the literature of his day on the most varied topics of pure and applied chemistry.

His first communication to the Chemical Society's Proceedings (*J. Chem. Soc.*, 1873, p. 456) was on the " Formation of sodium sulphide by the action of hydrogen sulphide upon sodium chloride." Two years later (*J. Chem. Soc.*, 1875, p. 405) he described the isolation for the first time of calcium hypochlorite, obtaining this salt in a crystalline form by slow evaporation from aqueous solutions under reduced pressure. In a subsequent paper (*J. Chem. Soc., Trans.*, 1880, p. 792) on the " Atmospheric oxidation of phosphorus and some reactions of ozone and hydrogen peroxide " he established the fact that when phosphorus is oxidised by air or oxygen while partly submerged in water, not only is ozone formed (as was formerly supposed) but hydrogen peroxide is also produced (which was not formerly known) and dissolved in the water. He also published several papers on his favourite subject, the aerial oxidation of terpenes and allied substances. His original communications published either alone or in collaboration amounted to upwards of seventy separate contributions to various scientific journals. Much of this information concerning Kingzett's scientific activities was summarised by himself in a booklet entitled " A Chemical Retrospect," extended and revised to March, 1929. He had a passion for annotating and I have a copy of this autobiography revised with copious marginal notes up to a year or two before his death. Throughout his long life Kingzett was a diligent and systematic reader of current scientific literature. In this way he kept himself abreast of modern ideas and recent discoveries. In 1917 he published a treatise entitled " Chemistry for Beginners," which has since reached its fourth edition, issued in 1922 with the modified title of " Chemistry for Beginners and Schools." In 1919 there appeared his " Popular Dictionary of Chemistry," which reappeared in its third edition with the new title of " Chemical Encyclopædia." The fifth edition, published in 1932, is a work of more than 1000 pages 8to, which is much more comprehensive than the earlier issues. Apart from its technical merit, it is remarkable as the compilation of an octogenarian who subsequently gave continuous attention to the preparation of a sixth edition until a breakdown in health caused him to desist.

These last literary efforts were characteristic of the man. He had an alert and enquiring mind which ranged over the whole field of chemistry and the allied sciences. An omnivorous reader, he collected and sorted systematically the information he had gathered. His earlier business pursuits had provided him with sufficient wealth to indulge to the full in his main pleasure and recreation—the pursuit of knowledge for its own sake. Even at an advanced age he was indefatigable as an encyclopædist.

As was manifested by his prominence in the movement for founding an Institute of

Chemistry, Kingzett was a man of highly definite views and firm opinions, which he maintained uncompromisingly. His earliest venture into print on a theoretical topic was published in his nineteenth year on the "Oneness of matter," in which he advanced the view that there is but one unit substance or elementary matter which was not hydrogen. From time to time he supported his original thesis with ingenious arguments devised to show that the allotropic varieties and "so-called" isotopes of the elements and indeed all chemical substances are "dependent upon relationed redistribution of energy and matter." He was at one with modern schools of thought in denying the existence of the aether of space. He also had original views on transmutation, catalysis, enzymes, and vitamins. With some practical knowledge of what he termed animal chemistry, he was critical of certain developments in this branch of chemical science. The concluding sentence of his annotated "Retrospect" is not without present-day significance: "It is remarkable that many of the communications respecting biochemistry secure publication, and still more so that they should be favoured with the superabundant and costly abstracts given to them in English chemical journals."

Although consistently a student and investigator, Kingzett did not disdain the social aspects of life. In 1877 he became a Freeman of the City of London as a member of the Needlemakers' Company. In the same year he joined the ranks of Freemasonry (Quadratic Lodge), becoming Master in 1886. He was a member of a pleasant social club known as the "Wanderers," which held weekly meetings with lunch at various old hostelries in and around London. There and at home he was a genial host and charming companion with wide knowledge and culture and with deep human sympathy.

Kingzett was twice married and his second wife, née Lilian Mina Briggs, predeceased him by a few months. He is survived by two sons and a daughter of the first marriage.

G. T. MORGAN.

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## FREDERICK LAWRENCE OVEREND.

### 1863—1935.

FREDERICK LAWRENCE OVEREND, who came of an old Yorkshire family, was born at Rochdale Road, Cheetham Hill, Manchester, in 1863 and died at Walsall on June 5th, 1935, at the age of 71. He was educated at Manchester Grammar School, and in 1878 won an open exhibition to Jesus College, Oxford, obtaining an honours degree in Natural Science.

His first appointment as Science Master was in 1888 to Blair Lodge (Scotland); he left there in 1896 to take up a post at Sheffield Grammar School, and six years later (1902) proceeded to Queen Mary's School, Walsall, where he remained until his retirement through ill-health in 1921.

While at Oxford, Overend was a keen athlete; he played cricket and Rugby football for his College, and was in the trial eights in 1881, being coach of Jesus College boat. He took a great interest in the Queen Mary's School Cadet Corps; in 1914, he was a captain in the 5th South Staffordshire Territorial Battalion and at the outbreak of war immediately volunteered for active service abroad. Owing to his age, he was not at first accepted; but he carried out valuable recruiting work in various parts of the country and in 1916 was sent to France in charge of a labour battalion. He was frequently under fire and had a number of narrow escapes before being invalided home. He was awarded the Territorial Decoration and retired with the permanent rank of Major.

Apart from his professional work, Overend was a prominent Freemason, and was keenly interested in golf, art, music and drama. His widow and five daughters survive him.

Overend was elected a Fellow of the Society on June 16th, 1887.

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## WALTER RITCHINGS.

1879—1935.

WALTER RITCHINGS, Headmaster of the Nether Edge Secondary School, Sheffield, died on August 5th, 1935, at Glasgow. He and Mrs. Ritchings had just commenced a motor tour in Scotland as part of the summer vacation when he was taken suddenly ill near Oban. He died shortly after an operation for peritonitis at a Glasgow nursing home. In these sudden and tragic circumstances sincere sympathy is felt for his widow and family.

Ritchings was born in Bacup, Lancashire, on May 18th, 1879, and was the son of Charles and Hannah Ritchings. He began his education at Burnley and proceeded as a scholar to Owen's College, Victoria University of Manchester, after he had spent some time in the cotton industry. He obtained the B.Sc. degree with first class honours in chemistry in 1904. He began his teaching career as a science master at the Fishguard County School in the same year, and joined the staff of the Burnley Grammar School in 1905.

While at Burnley Grammar School Ritchings gained the degree of M.Sc. Manchester in 1907. His next appointment was at the Cowley School, St. Helens, Lancs., in 1912 as Senior Science Master. In 1920 he became Senior Science Master at the Central Secondary School, Sheffield, and early in 1929 was appointed Headmaster of the Nether Edge Secondary School.

Ritchings was an Associate of the Institute of Chemistry. He was undoubtedly a science teacher of rare ability, possessing a deep and extensive knowledge of the growth and history of science, and of chemistry in particular, coupled with an unusually keen insight into scientific principles. His presentation of his subject was forceful, attractive, and comprehensible even to the weaker students. Those who heard him were inspired by his enthusiasm. He understood the nature and difficulties of the boys he taught and of the students to whom he lectured. He will always be remembered by them not merely as a teacher, but as a friend who was ever ready with invaluable encouragement and advice to help them along the road to success.

When Ritchings was appointed Headmaster of Nether Edge Secondary School, Sheffield, the school had only been opened about two years. His brilliant organisation and originality of ideas, together with the whole-hearted loyalty of his staff, soon placed the school in a high position among the educational institutions of Sheffield. It is to him particularly that the science department of the school owes its efficient equipment and scholarship results.

That Ritchings was not spared at least a few more years to see some of the fruits of his labours was deeply regretted by all with whom he was working. He was engaged on the plans for the new school building just before he died. He was laid to rest in the grounds of Ecclesall Church, Sheffield, where a large gathering of mourners attended the funeral on August 9th. Among those present were representatives of the Sheffield Education Committee and Office Staff, the Furnival and other Lodges of the Freemasons, and the School staff and boys. The address was delivered by the Reverend Sorby Briggs, Vicar of Walkley, one of his former pupils, in whose estimate of him the following words stood out convincingly: "Undoubtedly Walter Ritchings was a great teacher. He understood boys. He knew them and respected them. He always taught us to be fighters—fighters against all that was sham, useless and empty."

FREDERICK POTTS.

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## GEORGE WILLIAM SLATTER.

1851—1935.

GEORGE WILLIAM SLATTER was born in 1851. In 1878 he became an Associate of the Royal College of Science, and two years later science master in the Salt Schools at Saltaire (1880—1888). During this period he published a text book, "Outlines of Qualitative Analysis." He was elected a Fellow of the Chemical Society in December, 1878, and a Fellow of the Institute of Chemistry in 1880.

Attracted by the industrial side of chemistry, Slatter acted as chemist for the large Saltaire Mills for 24 years. The Society of Dyers and Colourists appointed him as their Honorary Secretary for the Bradford Section, a post he held from 1899 to 1904. His services to this Society included membership of the Council and the Publication Committee and the submission of papers, such as "The Eye and Colour Sensation." From 1903 to 1919, he was managing director of Wm. Lynd & Co., Soap Manufacturers, of Leeds. For 15 years he was consulting chemist to the Shipley Urban District Council. Having moved south, he was appointed gas examiner for Teignmouth, Budleigh Salterton, and Paignton by the Gas Referees of London.

Unfortunately, ill health, causing loss of memory, since 1920 incapacitated my old friend and he lived in retirement at Bournemouth in the excellent care of his devoted wife and a lady companion. His death took place on June 22nd, 1935.

In his prime he took an active interest in sports and was chiefly instrumental in starting the Shipley Golf Club and the Saltaire Tennis Club.

I shall always hold "G. W. S." in affectionate remembrance as one of the most amiable and modest of men.

F. W. RICHARDSON.

## CHRISTOPHER CAIGER SMITH.

CHRISTOPHER CAIGER SMITH began his career as a student of chemistry at University College, London, in October, 1920, obtaining the B.Sc. degree with first class honours in 1922. After a period of research on the ionisation of aromatic nitro-compounds in liquid ammonia, carried out under the direction of Dr. (now Professor) W. E. Garner, the results of which were published in the Journal (1925, **127**, 1227), he obtained a post in the Chilean Nitrate Industry, where he carried out several excellent investigations which gave rise to new and improved processes. On returning from Chile, Smith entered the service of Imperial Chemical Industries, Limited, going to Billingham in 1927. After two years at Billingham he was appointed by the firm to be Technical Manager of their associated Company at Rivadavia in the Argentine, in which country he stayed for two years and was responsible for improvements in the factory and developments of several new processes. He returned to Billingham at the beginning of 1932, and was transferred later to the Head Office of the firm in London.

His death was due to a tragic accident which occurred on September 10th, 1935, caused apparently by his slipping from a rock into the sea whilst photographing waves on the Cornish coast.

Smith was a man of strong and fearless character, and noted for his ability in swimming, boxing, and riding. Music was one of his hobbies, and he played the 'cello well. He was extremely popular with all who knew him, both during his College course and in after life. His tragic death is deeply felt by all his friends and associates. He was married and had two children.

F. G. DONNAN.

## ANDREW JAMIESON WALKER.

1873—1935.

ANDREW JAMIESON WALKER came of a Scottish family long resident in Ireland, but was born, on November 30th, 1873, at his grandfather's house in Helensburgh, Dumbartonshire. He was one of seven brothers, all of whom spent their boyhood at Kilcadden, Killygordon, County Donegal. In 1891 he entered Queen's College, Galway, where he became Junior Scholar in classics and modern languages and Senior Scholar in chemistry. After graduating B.A. of the Royal University of Ireland in chemistry and physics in 1894, he remained as demonstrator in chemistry under the late Professor Alfred Senier until 1896.

Walker then studied in Germany and in 1896 matriculated at Heidelberg and had the privilege of attending the lectures of Victor Meyer, and carrying out research with Auwers.

The degree of Ph.D. was awarded to him for his thesis entitled " Über das kryoscopisches Verhalten von *o*-Cyanphenolen," which was published in 1898. An account of the work appears in *Berichte*, 1898, **31**, 3037. About this time the researches of Victor Meyer on steric hindrance were attracting much attention and Walker's thesis contained details regarding the impossibility of hydrolysing 6-nitrosalicylonitrile to the corresponding acid. At the same time he came under the influence of Gattermann, and on many occasions, in teaching, in private conversation, and in writing, he expressed his admiration for the methods of laboratory instruction which he employed.

In Heidelberg Walker came to know his fellow student, O. E. Mott of London, with whom he was afterwards closely associated, and shortly after his return from Germany he approached Dr. A. F. Holleman, at that time Professor of Chemistry in Groningen, Netherlands, with a view to preparing an English translation of his " Organic Chemistry," which had already achieved an almost unique reputation on the continent. Walker was at that time ignorant of Dutch, but with his knowledge of German and the aid of a dictionary, and assisted by Dr. Mott, he completed the task and presented English-speaking students with a manual which, unlike many translations, was noticeable for the clarity and purity of its style. In later years Walker again collaborated with Mott in the production of a small work entitled " An Introduction to Volumetric Analysis " and was also the author of Volume II—" The Alkali Metals and their Congeners "—of Dr. Friend's " Text-Book of Inorganic Chemistry."

Walker's first teaching appointment in England was at the Borough Polytechnic in 1898. In 1900 he was appointed Head of the Chemistry Department at the Technical College, Derby, which had been opened in 1899, where he was soon joined by Mott.

It was in September, 1904, that the writer became a student of Walker's and remained under his tuition for three years. His quiet, dignified, and yet very kindly manner greatly impressed him; those who knew Walker well do not care when thinking of him to use the terms " handsome " or " good-looking." There was something more than that in his tall and straight figure—something which would cause most people to look at him a second time and that with pleasure and instinctive trust.

His first-year lectures were greatly enjoyed. They were clearly given and the experiments were well chosen, simple and often unusual. In the second and third years the number of students was fewer and the organic chemistry class was more in the nature of private tuition. For the text-book instruction of his students he always enjoined the two Hollemans, the two Treadwells, Gattermann, and James Walker's "Physical Chemistry"—a very sound combination, although a distinctly more exacting standard in the last-named branch of the subject is now required.

Walker spared no trouble with his students and was always ready to help them over difficult points in laboratory operations, but he exacted a high standard of attainment. He could always be relied upon for help with the various activities of the Students' Association and frequently attended its meetings.

His interest in students was not, however, confined to the laboratory or to their college life, but continued long after they had passed out of his hands, and with many of them he remained in correspondence. The writer's friendship with him, which began soon after leaving his laboratory, lasted till his death and was maintained by letters and by frequent visits.

During his first few years at Derby, Walker carried out, in collaboration with Miss Elizabeth Smith, an investigation of the properties of *o*-cyanobenzenesulphonic acid and its derivatives (J., 1906, **89**, 350). The corresponding chloride was obtained from " saccharin " by heating with phosphorus pentachloride in a sealed tube. On one occasion the contents of all the tubes were found to be badly charred, whereas the sulpho-chloride was normally pale yellow. It was found that the commercial " saccharin " employed had been adulterated with cane sugar. In 1914 he published a note in the Proceedings (p. 139) with Farmer entitled " Influence of the dilution of hydrogen peroxide on the velocity of precipitation of manganese from ammoniacal solutions in presence of zinc."

Shortly after the outbreak of war Walker and his colleague, Dr. P. E. Bowles, also a Heidelberg graduate, collaborated with Mr. Oliver Wilkins of Derby in the manufacture

of certain dye-intermediates at the colour-works at Derwent Bridge. Here β-naphthol was manufactured in 1916, probably for the first time in England.

Shortly after this Walker resigned his post at Derby and spent some years in technical research work, much of which was carried out in the laboratories of the Institute of Chemistry in Russell Square. On his appointment as H.M. Inspector under the Board of Education he became responsible for the supervision of technical institutions in Hertfordshire, Bedfordshire, and Cambridgeshire, and acted as expert inspector for the teaching of organic chemistry in many technical colleges in different parts of England. From this time until his death he lived in Harpenden.

Dr. Owen E. Mott, writing recently in appreciation of Walker, said " it is impossible to imagine a better or more considerate chief " and laid special stress on the uprightness of his character and the certainty with which he could be relied upon for fairness and consistency.

Dr. P. E. Bowles, another chemical colleague at Derby, writes: " He and I worked literally in the completest harmony for nearly six years and my respect for him is most profound and intense. His high principles were a very fine example to a younger man and the high respect he had for the profession of Chemistry must have created a better appreciation of that science than pertained in his young days." Dr. Bowles closed his appreciation by referring to Walker as " a very brave and courageous gentleman."

The letters quoted so far refer to his early middle life. Dr. A. E. H. Tutton, F.R.S., speaks of his work as H.M. Inspector: " I saw a great deal of him after he joined our Inspectorate of Technical Schools, as he acted as Secretary of the Chemistry Committee, of which I was Chairman. His coming was a great help to me and strength to the Committee, and his services were of very considerable value both to the Board and to the Schools, in which his reputation for sound knowledge and teaching power caused his visits to be much appreciated and very welcome. . . . The dullest business was rendered pleasant by his genial smile and jolly countenance."

The Registrar of the Institute of Chemistry, Mr. R. B. Pilcher, writes: " He was a member of the Joint Committee of the Institute and the Board of Education from the inception of the scheme for the award of National Certificates in Chemistry. He was indefatigable in dealing with all details and a most valuable ' liaison ' between the Institute and the Board, and the Institute and the technical institutions. . . . He was a master at summing up a discussion."

Walker believed in being prepared for all the minor eventualities of a chemist's life and could always be relied upon to produce from one or other of his waistcoat pockets, a nickel spatula, a pair of crucible tongs and a folding metal rule. It is impossible to think of him without these adjuncts. Those who know him well will also recall with pleasure the characteristic play of the long fingers as he filled the bowl of a slender-stemmed pipe.

He had a great love of the country, especially of its by-ways, and a particular affection for the county of Donegal. As a student he was a keen cyclist, often riding from Donegal to Galway in the days of " cushion " tyres, and he rode a motor-cycle not long after the abolition of the red flag. He was entirely at home in any kind of boat, and was also an expert photographer.

Just over a year after his retirement he passed away suddenly while driving his car. Mrs. Walker was with him at the time. He left a family of five daughters and a son, two of whom were of school age at the time of his death. He had, however, the great satisfaction of seeing the three elder girls obtain good positions.

This account of his personality and work may fittingly close with a tribute, from one with whom he was closely associated for many years, which seems to the writer to sum up the man simply and yet most happily and completely: Mr. Ralph M. Archer, who was lecturer in physics for many years at Derby, writes: " I can speak from long experience of his strong character and high courage. He had great organising and administrative powers. In manner he was quiet and dignified, and with strangers perhaps a little reserved, but his tactful strength and good-humoured reasonableness won the respectful affection of all his students. No one ever took any liberties with Dr. Walker, but no one who came to him for help or advice was sent empty away. Those who knew him well knew a shrewd,

warm-hearted and humorous personality with a strong sense of justice, and high ideals in science and education—and they will miss him sadly."

FREDERICK CHALLENGER.

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## FRANCIS SAMUEL YOUNG.

### 1871—1934.

FRANCIS SAMUEL YOUNG was born at Harlow, Essex, on October 14th, 1871. He was educated at Bishop's Stortford College and Queen's College, Oxford, where he had gained an open scholarship in Science. On going down from Oxford he joined the staff of Mill Hill School as a science master. In 1900, at the age of 28, Young was appointed Headmaster of his old school, Bishop's Stortford College. He retired from this position in December, 1931, and took orders in the Church of England. He served as Curate at Church Stretton, but after a short time illness necessitated his giving up his work and he made his home at Sawbridgeworth, where he died on September 2nd, 1934.

Young gave his life work to Bishop's Stortford, where, during 32 years of headmastership, he served the College with most loyal devotion. He came to a small proprietary school of 85 boys and he changed it into a modern well-equipped Public School of 350 boys. The accomplishment of such a task tells its tale of true courage, of infinite patience and of abounding faith. Nor could it have been achieved if Young had not gained the respect and admiration of his colleagues, of parents and of boys.

In his earlier days Young was a fine athlete. He rowed for his College at Oxford, he played Rugby Football for Rosslyn Park, and gained his Middlesex County Cap; he was a good cricketer and a keen mountaineer.

In 1908 Young married Margaret Good and he has left also two daughters and one son.

Generations of Stortfordians pay homage to his influence and acknowledge with deep gratitude all that he has meant to the school. Young was intensely ambitious for the school and never spared himself; in his life work he carried out to the full the ideal expressed in the school motto: "Soli Deo Gloria."

H. L. PRICE.