OBITUARY NOTICES.

VICTOR LEFEBURE.

1891—1947.

VICTOR LEFEBURE was born on September 13th, 1891, at Tufnell Park. He was educated at the William Ellis School, from which he proceeded in 1909 to University College, London, where he obtained the degree of B.Sc. in 1911. He remained at University College until 1914. He was awarded an 1851 Exhibition Scholarship for research and a Tufnel Research Scholarship that year. During this period he was the joint author of chemical papers with Ramsay and Caspari. He then became a lecturer at Wye Agricultural College. During his College days he distinguished himself in both cricket and football. He was also a notable tennis player.

In March 1915 he was commissioned in the 3rd Essex Regiment, from which he was subsequently transferred to the Special Brigade, R.E., constituted in 1915 to undertake offensive operations with the new methods of chemical warfare. As a Company Commander in the Special Brigade he carried out on the night of October 5—6th, 1916, one of the most successful cylinder gas attacks of the war on the French front at Nieuport. Brigadier-General Foulkes, the Commander of the Special Brigade, wrote :

> " Although he was the junior of the two Company Commanders, I put Captain Lefebure in charge of the operation, because he was the better linguist and it was essential that no misunderstandings should occur in making the arrangements with the French Staff."

General Balfourier, the Commander of the French 36th Army Corps in the Nieuport area, paid tribute to the technical skill and success with which the operation was conducted, in spite of intensive German artillery retaliation as soon as the gas discharge started.

In 1917, because of his excellent field knowledge of chemical warfare and his linguistic ability, Lefebure was appointed with the rank of Major as the British Chemical Warfare Liaison Officer with the French, with Headquarters in Paris, and held this appointment until the office was closed in the spring of 1919. In this connection he was a member of the Inter-Allied Secretariat for Chemical Warfare and of the Chemical and Explosives Committees of the Inter-Allied Munitions Council. He carried out his duties in Paris with conspicuous success and was instrumental in putting the relationships between the British and French Chemical Warfare Research and Experimental Departments on an entirely new footing of the closest friendship and collaboration. For his war services he was appointed an officer of the British Empire Order, a Chevalier of the Legion of Honour, and an Officer of the Crown of Italy.

After demobilisation, he joined the British Dyestuffs Corporation Limited at Blackley in April 1919 to take charge of the newly formed development department. He remained there till January 1924, and during the whole of the time did extremely useful work on various products, mainly organic rubber accelerators. He afterwards joined his friend Colonel Mulliner in a small firm making rubber products in Fulham. He was later closely associated with William Willett Limited as Managing Director of one of its subsidiaries. During this period he developed among other things rigid rubber paving blocks and floor tiles with a basis of " Poilite ". He did pioneering work on decorative processes in relation to asbestos and also specialised in, and originated, new types of material for interior decoration made from plastic substances.

Through his association with Mulliner, he became a Director of the Warren Portland Cement Works at Hartlepool where he discovered an anhydrite (calcium sulphate) mine under the cement works. He worked out numerous applications of this material such as quick-setting plasters, and developed its use in the manufacture of plaster board and other building materials. The catalysis of anhydrite to give a quick-setting plaster without the furnacing which must be applied to gypsum was followed by the application of this principle to the manufacture of decorative flooring and wall compositions and light constructional building blocks for which a substantial demand developed. This work was carried out in conjunction with Imperial Chemical Industries Limited, which Company he joined in 1932 and from which he retired in 1944. While with I.C.I., he was on the Board of I.C.I. (Lime) Limited as Technical Director. From 1944 till his death on August 13th, 1947, following an operation, he was acting as adviser to a syndicate of French Industrialists called " *Placopatre* ", which was building and equipping factories for the manufacture of plaster board in France. In the

course of his career, he travelled extensively through India and the Americas on various official and commercial investigations and inquiries.

Lefebure became a Fellow of the Chemical Society in 1913, and an Associate of the Royal Institute of Chemistry in 1918.

He married in 1917 Mary Isabel Clark, of Doncaster, who survives him; he also leaves a son and two daughters.

By the death of Victor Lefebure, the building industry and in particular the Building Industries National Council has lost a distinguished member who has made many noteworthy contributions to its progress and development. His work on cements and plasters had tremendous practical effect on the range and scope of adapted building materials. As Chairman of the Research Committee of the B.I.N.C. he did work which will long be remembered. He also rendered his country good service as a member of various Building and Fire Advisory Committees of the Ministry of Home Security during the last war.

The following extract from an obituary notice by Mr. H. B. Bryant in " The Builder " indicates the high respect in which he was held in the building industries :

> " His painstaking efforts on behalf of practical research into the work of the materials and problems of the building industry will long be remembered with gratitude and with much inspiration by his colleagues. His approach to this side of his interests was marked by a democracy of procedure more than usually rare in this field of activity. In all his dealings in life he was essentially the intelligent but humble democrat. Bureaucracy was to him the cancer of social life. It was because of this quality that he was able to make such a distinguished contribution to both the work and deliberations of B.I.N.C. throughout his association with that body. He was intensely interested in the objects of the Council, as he was in all the many efforts for scientific progress."

Great as were his achievements in the building industry, Victor Lefebure has perhaps a greater international reputation because of his two books, the first " The Riddle of the Rhine " published in 1920, and the second " Scientific Disarmament " published in 1931.

In the " Riddle of the Rhine ", he traced the history of chemical warfare as developed by the Germans in the First World War, and showed the predominant and vital part played by the German Chemical Industry in it. He brought out clearly the great war potentialities of a strong chemical industry and the dangers to future world peace if the German industry was not controlled in some way. His warnings went unheeded, and his prognostications have been completely justified by what took place in the Second World War. Even now the authorities appear to have failed completely to appreciate the intrinsic war potential of a powerful chemical industry not only because of the adaptability of its plant and equipment to war-like purposes but what is even more important because of the large cadre of scientists and technicians which it maintains, capable of developing and producing whatever materials may be required for war-like purposes. The treatment which is now being given to the German chemical industry looks like repeating the mistakes made after 1918.

" Scientific Disarmament ", which was prefaced by many distinguished personalities of the day, caused great international interest at the time of the Disarmament Conference in 1932. His main objective was to stimulate and obtain a real international effort to limit the unleashed forces of national armament development which in his opinion could lead only to war. He reproached scientific men for the readiness with which they gave their knowledge and inventive ability to the needs of national armament. He wanted a new scientific morale in regard to war—a cosmopolitan or international morale. The book was written on idealistic lines, and, while it contained many valuable suggestions which merited more study than they received, it failed to appreciate adequately the problem of bad faith and the impossibility, where bad faith existed, of devising any international machinery which could effectively carry out the objects in view. Nevertheless, the book will well repay detailed study at the present time in connection with the problems of future world peace.

As a man of science, Lefebure added to a high degree of professional competence a stimulating originality of outlook, the ability to present his ideas in a reasoned and interesting manner, and the drive and energy to carry his technical achievements through to the stage of exploitation—gifts which are given to but few.

As a man, he was an outstanding though modest personality with a very lovable character. In spite of the fact that he was a crusader and an iconoclast he was a true and loyal friend. His passing is an intense personal loss to his colleagues in the Building Industries.

J. Davidson Pratt.

ALFRED WALTER STEWART.

1880—1947.

ALFRED WALTER STEWART was born at Glasgow in September, 1880. He was the youngest of three sons of the Rev. Dr. Stewart, Clerk to the University Senate and Professor of Divinity. There is no doubt that Stewart inherited many mental gifts from his father, and he found that the library in his home provided an abundant source of information on many attractive subjects. Thus at an early age his inborn appetite for literature was stimulated. After attending Glasgow High School he entered the University, and in 1907 he graduated, taking chemistry as his chief subject; his outstanding performance in this examination earned him the Mackay-Smith scholarship. Stewart spent another year at Glasgow University during which he found time to make fuller use of the University library and thereby laid the foundation of the extensive knowledge and literary capacity which was characteristic of his later life.

After spending the succeeding year at Marburg, where he was engaged in research under Professor Zincke, he was elected to an 1851 Exhibition Scholarship and then (1903) entered University College, London. Here he began his first independent research. This dealt with the activity of aliphatic ketones in their reaction with bisulphite and hydroxylamine. It was found (1905) that substitution by alkyl at the α-carbon atom diminished the rates of oximation and bisulphite addition. This fact appeared to be well explained by the theory of steric hindrance which was prevalent at the time; but when Stewart found that other groups, notably carbethoxyl, produced the reverse effect, he concluded that current theory was inadequate and needed revision. This work, embodied in a Thesis, gained him the D.Sc. degree of Glasgow University, and he was soon elected to a Carnegie Research Fellowship (1905—1908). In the meantime Baly had begun his studies of the selective absorption spectra of organic compounds and had obtained (1905) interesting results from acetoacetic ester and related substances. Stewart now joined forces with Baly, hoping to get further information on his problem. The carbonyl group of ethyl pyruvate had shown remarkable activity, and this ketone was the first subject of their experiments (1906) which were soon extended to α-diketones and to *p*-benzoquinones. It is not possible here to record in detail the interesting results of this collaboration, but it may be said that the chief outcome was the conception that a state of balance existed in the valency distribution of the forms which these substances could assume without shift of any atom. This condition was termed " isorropesis ". To the writer it appears noteworthy that this conception, expressed some twenty years before electronic theory had been extensively applied to organic chemistry, evidently contains a tentative step towards a theory of mesomerism.

At that time little was known of the relations between general absorption and constitution. Stewart now began (1907) a study of these by an examination of fatty acids; he showed that unsaturated acids have a greater general absorption than saturated, and noted that this relation has a parallel in the molecular rotation of their amyl esters. The *trans*-forms of unsaturated acids were found to have greater absorption than the *cis*-forms. Other topics occupied his attention at the same time. He developed a rapid method for determining (1908) the dielectric constants of organic substances with the intention of studying them more fully. Also he began with Wilsmore to examine the pyrolysis of organic compounds by means of a heated platinum wire; these experiments had led (1907) to the preliminary isolation of a substance regarded as keten, but Stewart felt obliged to give up his share of the work owing to pressure of other matters.

He had now decided on an academic career, and being interested in teaching he wrote (1908) " Recent Advances in Organic Chemistry " which was intended to bridge the gap in an advanced student's reading between the usual formal textbook and the *Annual Reports* or original literature. The book proved as welcome to students as Lachmann's " Spirit of Organic Chemistry " had been to those of a former generation, and its success encouraged him to write (1909) a companion volume on Inorganic and Physical Chemistry.

After the Royal University of Ireland had been dissolved, the college at Belfast became the Queen's University, and in the reorganisation which followed Stewart was appointed (1909) to the new lectureship in organic chemistry there. After reorganising the teaching of the subject and providing the equipment which available funds permitted, he resumed his experiments on general absorption. The results of a series of papers (1911, 1912, 1917) may be summed up by the conclusion that conjugation of unsaturated centres leads to the extension of general absorption; the application of this to determining the structure of terpenes was recommended. He also devised (1913) a colour test with tetranitromethane for compounds containing elements capable of undergoing a change of valency. In 1914 he was appointed Lecturer in Physical

Chemistry and Radioactivity in the University of Glasgow, and it is a tribute to his versatility and wide knowledge that he was able to turn with confidence to this post from one in organic chemistry. During the period of the war which followed, much of his time was taken up by work for the Admiralty, and he was unable to resume his own research. It is, however, worth noting that in 1918 he drew attention to the result of a β-ray change in a radio-element and suggested the use of the term " isobar " as complementary to " isotope ".

At the conclusion of the war Professor Letts retired from the Chair of Chemistry at Queen's University, and Stewart was elected (1919) to succeed him. Returning to Belfast, Stewart found an arduous task before him. The difficulties of accommodation which most Universities suffered at that time were increased by his desire to extend the advanced teaching of the subject and particularly by the need of providing and equipping a new laboratory for physical chemistry. With the funds available the last object could not be quickly attained, but after a few years of patient economy he was able to take up research again. His interest had been attracted by some experiments of Wiedemann, who had obtained (1895) continuous emission spectra from a few organic substances by submitting their vapour to the discharge of an induction coil. The method was confined to the more stable hydrocarbons, the majority of carbon compounds being merely decomposed. Stewart and his colleagues found (1923, 1924, 1929) that by using the discharge of a high tension transformer and by reducing the vapour pressure of the substance examined it is possible to obtain pure emission spectra from substances of even moderate stability. Examination of a large number of substances showed relations between the chemical nature of a compound and the type of luminescence which it emits. Certain general types of structure were found to be associated with emission in definite parts of the spectrum. Five chief regions of this kind can be detected, and if a substance contains more than one luminescent group the emission may be extended to more than one region. The effect of simple substituents on the fundamental group could also be traced; some, such as amino- or hydroxyl, shift the luminescence to the red end of the spectrum, and others towards the violet. It is remarkable that the carbonyl group and the benzene nucleus are the only simple systems capable of emitting luminescence, and of these the latter is the more interesting. The seventy fine bands of the benzene luminescence spectrum can be resolved into eight groups each of which in its internal structure resembles its neighbours. Moreover the bands of each group fall into five series in which the arrangement clearly indicates the super-position of five rotation-spectra on one another. After discussing the possible modes of vibration of the benzene ring, Stewart was able to explain the influence of substitution by simple groups on the luminescence. Another interesting feature of this emission spectrum of benzene lies in the fact that it was found to be the reversal of the absorption spectrum; this was the first instance of the Frauenhofer effect observed in a complex molecule.

Much of Stewart's time during his early years at Belfast was taken up by reorganising the teaching; all branches of the work interested him. He was an attractive lecturer. His first year course was illuminated by his sense of humour and wide culture, and his lectures were illustrated by numerous experiments which were continually being improved; some of his inventions were published (1912). His work as a teacher is reflected by the success of his advanced students. He endowed them with something of his own critical powers and independent thought. The fact that so many of them occupy responsible positions in nearly all branches of the profession shows the quality and breadth of their training.

Stewart was not a man of great physical energy, but any lack of this quality was more than balanced by his extraordinary mental activity. It was his custom on returning home from a day's work at the University to spend the evening or sometimes, indeed, most of the night, in discussions with any friends who might have called on him, or in literary work. He enjoyed writing on any subject and found relaxation in it, in fact it became his hobby. At first this interest was satisfied by writing his scientific publications and succeeding editions of his textbooks, but to anyone who knew Stewart and his store of literary knowledge it was not at all surprising when he published his first novel (1923). This was " Nordenholt's Million " which perhaps is the most remarkable of all those he wrote; recently (1947) it has attained a wide circulation in a popular form. Soon afterwards it was followed by " Almighty Gold ", in which he astonished and amused his friends by a profound knowledge of dubious methods of finance. These and all the novels he subsequently wrote were published under the name " J. J. Connington "—the surname being adopted with slight modification from the translator of Horace. For some years he had suffered from deafness; he now found that it was increasing, and felt obliged to face the prospect that in the not far distant future he might be unable to continue an academic career. Accordingly he decided to pursue his literary work, and turned to detective fiction. In

his spare time during the years which followed he wrote seventeen novels of this character, nearly all of them being composed in the hours around midnight. In these he made full use of scientific methods and facts which were presented with an accuracy and clarity unusual in this type of novel. Some were translated into four or five other languages; in fact, their success ultimately gained him an international reputation. Stewart was of course gratified by this result of so much labour, but he found even greater pleasure in the literary friendships which ensued. His correspondence became extensive, and his help to other authors was freely and happily given. His last book was published shortly after his death; it appeared under his own name and bore the title " Alias J. J. Connington ". Although not an autobiography, this book provides more information of Stewart himself and his wide interests than the writer can hope to have given in this notice.

While Stewart was thus engaged in the twofold task of academic and literary work he found that his sight was failing; the cause was later found to be cataract, and was soon remedied by operation. Apart from a keen interest in the possible causes of the condition and some regret concerning the interruption of his work, Stewart seemed to treat the matter lightly. A few months later symptoms of heart trouble appeared; these increased until in 1944 he felt obliged to resign from his chair at the University; soon afterwards the title of Emeritus Professor was conferred on him. Although now in failing health he continued his literary work as usual until he passed away while engaged with it in the early morning of July 1st, 1947.

Stewart was a man of calm and resolute courage. In spite of the afflictions and physical distress he was called upon to endure his sense of humour and his vivid interest in life and humanity remained undimmed; never at any time, even to those most intimate with him, did he utter complaint. He preferred to treat his constant and increasing burden as a matter for philosophic discussion and psychological study. By his death the profession of chemistry has lost a talented scholar and one whose wide culture enabled him to view the science against the larger background of human endeavour. There are some, too, not all of them chemists, who mourn the loss of a true and kindhearted friend.

In 1916 Stewart married Miss Lily Coats, daughter of the Rev. Jervis Coats of Glasgow; she and a daughter survive him.

S. SMILES.