

OBITUARY NOTICES.

HARRY BOWES.

1869—1935.

BOWES was educated at the Manchester Grammar School, and articled to Messrs. Crace-Calvert and Thomson, Royal Institution, Manchester. He became chief chemist at those well-known chemical laboratories in 1887, and retained the position until, in 1893, he was appointed chemist at Messrs. J. F. Hill and Co.'s Bowker Bank Calico-Printing Works. He afterwards joined the Grossmann Cyanide Syndicate and conducted considerable research on the manufacture of cyanides.

In 1903, Bowes commenced business, in conjunction with Mr. W. Edgar Sims, M.Sc., as analytical and consulting chemist, eventually founding the business of the Reliance Manufacturing Company, at Radford Street, Blackley, Manchester, in which he was actively engaged until his death at the age of 66.

Bowes was admitted a Fellow of the Institute of Chemistry in 1894. He was a member of the International Society of Leather Trades Chemists, and for 30 years was analyst and consultant to the Manchester Board of Guardians. He was also consultant to the rubber-proofing, cotton, and leather trades, on the technical chemistry of which he was a recognised authority. He did much research work on cutting-tool lubricants; on the tanning and treatment of leather; and, in conjunction with Dr. Arnold Renshaw, on antiseptics and bacteriology; but he did not seek publicity and his work is not recorded in the technical journals. His energies were constantly directed towards improving the standard of his own manufactured products, with increasing success.

Bowes's recreations were golf and the cultivation of flowers. He was a Fellow of the Royal Horticultural Society and, of late years, spent most of his leisure time in his beloved garden. He was a man of outstanding personality, of high character and integrity in business; generous and open-handed to a degree. He will long be held in grateful remembrance by many friends who had the felicity to know him intimately. W. L. GADD.

SAMUEL HENRY CLIFFORD BRIGGS.

1880—1935.

SAMUEL HENRY CLIFFORD BRIGGS was the son of Joseph and Martha Ellen Briggs. He was born at Cleckheaton in Yorkshire on April 13th, 1880, and almost all his life was connected with this part of the highly industrial West Riding. His school days were spent at Ashville College, Harrogate, where he already displayed marked ability. He then proceeded to the Yorkshire College, Leeds, at that time a constituent College of the Victoria University. In 1900 he graduated B.Sc. in physics and chemistry and two years later he was awarded a First Class in the Honours School of Chemistry. The next year he obtained the degree of M.Sc. In that year he was elected to an 1851 Exhibition Scholarship, but owing to what he felt to be the greater claim of continuing the business connection established by his father he relinquished the scholarship, thus giving up a professional career in chemistry which was of great promise. Entering industrial life, he established a successful worsted spinning business at Providence Mills, Cleckheaton, and he was associated with his younger brother in the direction of it until his untimely death.

In 1914 Briggs married Margaret Hartley of Castleford and they had one daughter. Both his wife and his daughter survive him.

Although Briggs gave up a career in chemistry, he could not throw off the spell which his few years' research work at Leeds had cast over him. He fixed up a laboratory at home in a disused coach house and continued there investigations which he had begun at the Yorkshire College. The only time available was in the evenings and at week ends, but he made good use of it, as his considerable output of published papers, for one so situated, shows. All his work after he left Leeds was carried out in this home-made laboratory or in others which he subsequently made at Gomersal and in turn at Birstall, where he went to live after his marriage. He was still able to keep in touch with his former Leeds colleagues through the Priestley Club, a scientific club which meets at the University, and he attended its meetings with great regularity. In 1910 he was awarded the degree of D.Sc.

Although he kept up his interest in chemistry in this way and utilised a great deal of his spare time in its pursuit, he had other claims on his leisure. His business activities brought him into a sphere in which his qualities of mind and temper were highly prized and he was not long in becoming one of the trusted advisers in that particular section of the textile industry with which he was associated. It is therefore not surprising that he was chosen to represent the Worsted Spinning Section of the British Commercial Economic Mission which visited the Far East a few years ago. He also acted for a time as Chairman of the Chamber of Commerce of the Spen Valley and his scientific knowledge combined with his experience of the textile industry made him a much valued member of the Council of the Wool Industries Research Association which has its headquarters at Torridon in Leeds. At the time of his death he was Vice-Chairman of this Council. He had been a member of it and of its Research Control Committee for fifteen years.

Briggs's first three published papers were in the organic field and dealt with work which he carried out as a research student with Professor A. G. Perkin and the late Professor J. B. Cohen. During this period he became interested, and in later years intensely so, in the structure of inorganic compounds. One of the reasons which led to this was the attempt which he made, whilst still a post-graduate student, to prepare the normal chromates of copper, nickel and allied metals. Although this failed, he obtained some new double chromates containing these metals and they were described in a paper published in the *Transactions* in 1903. This was the first of a series, the last of which was published in 1929, which described the preparation, properties and significance, from the point of view of inorganic structure, of many new co-ordination compounds of chromium and molybdenum. His preoccupation with work of this character led him to consider the detailed structure of the compounds involved and in pursuance of the views on this subject which he expressed in 1908 he described in 1911 two forms of potassium ferrocyanide analogous to the α - and the β -form of the ferricyanide described by Locke and Edwards. After Bennett in 1917 had shown the α - and the β -ferrocyanides to be crystallographically indistinguishable, Briggs re-examined the matter and demonstrated that the β -ferricyanide was a compound of the true ferricyanide with the aquopentacyanoferrate, whereas the β -ferrocyanide was a mixture of ferrocyanide proper with a very small amount of aquopentacyanoferrate.

In later papers he pursued the theoretical aspects of co-ordination in their relation to the modern development of the theory of valency, publishing his last discussion of the matter in the *Philosophical Magazine* in 1926. In 1929 he contributed his last experimental work, which was concerned with chromatocobaltiammines.

This account will have shown that Briggs was a true representative of that type of highly competent amateur (in the best sense of the word) with which this country has been notably endowed in the past but which owing to the stress of modern life is unfortunately much less frequently encountered to-day.

The daily demands of business affairs and his chemical work did not leave him much leisure for other pursuits. He was not very successful at games, but music was one of his relaxations. He was a good pianist and Beethoven and Bach rather than the Moderns were his favourite composers. He got exercise by walking over his native moors, and the wilder and rugged landscape of the hill country made more appeal to him than the more comfortable and less exciting valleys. On such walks he was a good companion and those who trudged and talked with him on these occasions will not easily forget the breadth and range of his views, his essential gentleness of nature, and his rigid firmness where principles were concerned. His outlook on world affairs was flavoured somewhat by pessimism. He saw the great problems and had not much faith in man's efforts to solve them. Anything he took up himself he pursued with great zeal and fervour. He could not have achieved all he did without much more than ordinary industry and great constancy of purpose. It is greatly to be deplored that all these activities came to an end on August 24th, 1935, when he succumbed to a sudden heart attack. One of his oldest friends said of him, "As a personal friend he was a treasure—unpretentious, kind, sincere, highly appreciative of the beautiful in nature and art and with a keen sense of humour. He was a lovable companion and one of Nature's gentlemen in the best sense." All who shared his friendship would gladly say how accurately this described him.

H. S. RAPER.

ARTHUR DEHON LITTLE.

1863—1935.

ARTHUR DEHON LITTLE died at the age of 71 after a long and active life devoted to the interests of chemistry both in its academic and in its industrial aspects. It was a science he loved and during the course of his life he was able to enrich it by the full use of the ample qualities of heart and brain with which Nature had so generously endowed him. As a chemist he will be remembered because he was ever in the forefront of the march of progress and because his investigations led to an improvement in industrial conditions which is difficult of realisation excepting by those who were cognisant of chemical industrial conditions at the latter end of the last century. His visits to this country were all too few, but he was here when President of the Society of Chemical Industry and the writer has vivid recollections of the tour of the United States and Canada by the Chemical Engineers and the Society of Chemical Industry when he and his wife were able to spend many hours in the company of Dr. and Mrs. Little and to found a friendship which, despite distance, has been maintained ever since. For it is as the man rather than the chemist that he will be best remembered by those who were privileged to know him. The kindly gentleman beloved by all and always welcome to any gathering social or scientific. His fund of stories and his genial manner made him *persona grata* to all his fellows. His loss is a sad one both to chemistry and to his friends—to the former because it could ill afford to lose his great influence on the direction of chemical matters and to the latter because he represented all that was best in the domain of human friendship.

Little was born in Boston on December 15th, 1863, and at the time of his death was Chairman of the Board of Arthur D. Little, Inc., of Cambridge (Mass.), a firm of Chemists and Engineers which he had founded with the late Roger B. Griffin forty-nine years ago. He began his professional work as chemist to the Richmond Paper Co., Rumford, R.I., the first mill in the United States to manufacture wood pulp by the sulphite process. In 1886 he opened a laboratory in Boston in partnership with R. B. Griffin to engage in the general commercial practice of chemistry, and it was at about this time that he published, in conjunction with his partner, a book on "The Chemistry of Paper Making," a treatise which for some 30 years remained the outstanding authority on the subject. Mr. Griffin was killed by an accident in 1893 and for seven years thereafter Little carried on the business alone. He formed a new partnership with Dr. William H. Walker in 1900 which continued until 1909, when the business was incorporated. In 1917 the laboratories were moved to their present position in Cambridge (Mass.).

The early years of the concern were mainly pioneering in a new and undeveloped field. Industry was antagonistic and the "technical" man was looked upon with suspicion. During those critical years it was only Little's unflinching optimism and faith in his profession that kept the path open for his future success. During that period Little took out patents of processes for the manufacture of chrome-tanned leather, chlorate of potash, and cellulose acetate and later invented processes for smoke filters, paper from southern woods, and others dealing with the recovery of naval stores from lumbering wastes. During the war he acted as consultant to the Chemical Warfare Service and the Signal Corps. He was in charge of special researches on aeroplane dopes, acetone production, smoke filters, etc., and was the inventor of the so-called "sucked-on" gas filter which became part of the standard equipment of the United States Army. Among other contributions from his laboratory are several important processes connected with pulp and paper-making, non-inflammable movie films, artificial silk, the production of alcohols, esters and other compounds from the waste gases of oil refineries, aeroplane dopes, motor-car finishes, phonograph records, and others of a widely diverse character. Truly a wonderful record and, long though his life was, it seems almost incredible that one man should have accomplished so much, and if to this is added the influence he exerted by his writings it will be realised that here, indeed, was an exceptional man.

Little was a member of the class of 1885 of the Massachusetts Institute of Technology and, as an undergraduate, had been one of the first editors of "The Tech." His first literary production had been the book on paper-making already mentioned and as soon as

his power of expression became evident he was asked for more. The grace and dignity of his style caused him to be acknowledged as the spokesman of his profession and he became the author of many addresses delivered on special occasions when the views of chemistry required expression. His address entitled "The Fifth Estate" given at the centenary celebration of the Franklin Institute is, perhaps, the best known of these, but of equal merit are the series of articles and addresses published under the title of "The Handwriting on the Wall." He is stated to have said that his chief contribution to the welfare of his fellow men was in preaching the gospel of industrial research and it is evident that his efforts in this direction have produced results of the highest importance not only to his own country but to the industrial world at large. At the beginning of the present century industrial research was confined to practically one nation, the other nations adopting the trafficker's method of buying either the process or the finished product. The meaning of the handwriting on the wall became evident when the war broke out and parlous indeed was the position of those countries which found themselves unable to make essential materials. Little was one of those who translated the handwriting and made its meaning clear—in consequence there are few industrialists to-day who have not had their eyes opened. Such lessons are, however, soon forgotten and, after all, the methods of the trafficker are the easiest and give immediate results. Already there are indications that, in this country, we are slipping back into the old bad way; let us see to it that Little did not preach in vain.

Little was untiring in his endeavours to place chemistry on a par with the other recognised professions and urged unceasingly upon the practitioners of chemistry the importance of upholding the high standards of the profession. No one has done more for the chemical profession in America in this connexion than he has, and no inconsiderable part of the recognition and standing now accorded it both in this country and in the States is due to him.

Little was Chairman of the Advisory Committee of the National Exposition of Chemical Industries and had served as a member of the Division of Engineering and Industrial Research, National Research Council, U.S.A., as well as of the Advisory Board of Superpower Survey, U.S. Geological Survey. He was President of the Alumni Association of the Massachusetts Institute of Technology in 1921-22 and was made a life member of the Corporation of that Institution in 1923. His conception and initiation of the School of Chemical Engineering Practice at M.I.T. based on "unit operations" showed him to possess the true instincts of a "Chemical Engineer." In 1931 he was awarded the Perkin Medal as "the American chemist who has most distinguished himself by his services to applied chemistry." In 1918 the University of Pittsburgh conferred on him the honorary degree of Doctor of Chemistry and in 1929, when he was President of the Society of Chemical Industry, he was made Honorary Associate of the College of Technology, Manchester, and the University of Manchester conferred on him the honorary degree of Doctor of Science. Honorary degrees were also conferred on him by Tufts College in 1930 and by Columbia University in 1931. He was a member of many societies both in this country and in the States and served as President of the American Chemical Society, the American Institute of Chemical Engineers, and the Society of Chemical Industry.

Little died suddenly on Thursday afternoon, August 1st, at the Rock End Hotel, North-east Harbor, Maine, where he was spending the summer with Mrs. Little. He leaves a widow (formerly Henrietta Rogers Anthony), a brother, Edward H. Little of Newtownville, and a nephew, Royal Little of Providence, R.I. No better epitaph could be found for him than the citation by President Nicholas Murray Butler of Columbia University on the occasion when he received the Honorary Degree of D.Sc. "*Arthur Dehon Little, Chemical Engineer*—native of Massachusetts; a captain in the organisation and direction of research in the Science of Chemistry in all its manifold revelations; covering in his field of interest and influence almost every aspect of chemical engineering practice; fertile in invention, practical in application and a genuine leader in the preservation and advancement of that organized body of knowledge which we know as Science; one who, as even Sir Humphrey Davy would admit, pursued Science with true dignity."

J. F. THORPE.