

OBITUARY NOTICES.

REGINALD GRAHAM DURRANT.

1859—1945.

REGINALD GRAHAM DURRANT, who died on Oct. 4th, 1945, was one of the oldest members of the Chemical Society, both in terms of years and length of fellowship, since he became a Fellow of the Society in 1883. He was born on Jan. 22nd, 1859, at Halesworth, Suffolk, one of the family of five sons and two daughters of the Rev. R. N. Durrant. He was educated at Taunton and Keble College, Oxford, which he entered with a science scholarship. After graduating in 1882 he worked for a year at Mason College, Birmingham, under Dr. (later Sir William) Tilden. He went to Marlborough College in 1883 as a temporary master and was appointed to the staff of assistant masters in the following year, remaining at Marlborough until his retirement in 1919. At the commencement of this long period he was probably the only science teacher at Marlborough, but at the end of it there were more than ten. There can be little doubt that his keenness and ability and capacity for interesting, not only his pupils, but others in scientific matters were in large measure responsible for this great increase in the science teaching at Marlborough. In 1919 he joined University College, Reading, as a lecturer in Chemistry and remained there and at the University of Reading, latterly as Honorary Research Fellow, until 1940. War-time difficulties, rather than lack of energy or inclination, led to his final retirement from active chemistry in that year when he went to live with his sister, first in Wales and then in Torquay. He had a slight stroke about Christmas 1944 and returned with his sister to his old house in Marlborough a few months before his death.

Durrant had an unusual personality and one which endeared him to young and old alike. Though he was never married he would have made an ideal husband and father. Many generations of schoolboys and students had passed through his hands, including many who subsequently became eminent in various walks of life, and all remember him with affection. His keenness and enthusiasm were infectious. Dr. Ulick Evans writes, "He was a good friend to whose kindness I owe very much. More than anyone else he gave me a taste for scientific *exploration* into new fields—as opposed to the detailed *survey* of fields already roughly known."

Durrant's approach to his work was essentially that of the explorer, and in 1903 he did a little mild exploration in the geographical field, visiting two brothers in South Africa and trekking with them with bullock cart from Johannesburg to Victoria Falls before the days of the railway.

He had many open air interests, more particularly fly-fishing, golf, and water colour sketching. He helped to lay out the links at Poldhu in Cornwall and that on Marlborough Common, while fly-fishing and sketching played an important part in all his holidays. The writer well remembers a long tramp in the Berwyn Hills, when after lunch in the heather Durrant brought out his sketch book and in a surprisingly short time had produced a very pleasing picture. He must have made hundreds of sketches in this way. Their production gave him great satisfaction and they were attractive to others, for he had a keen eye for scenery and no mean ability in recording it. His interest in colour led him in later years to a process for colouring roofing slates by means of metal hydroxide sols but, although this appeared promising, it never became commercially successful.

Durrant had very wide interests, a keen sense of humour, and a good fund of stories and anecdotes largely from his own experience. He was essentially human and very unselfish. His remembrances and stories of other people were always kind, and as he was a generous and delightful host it is not surprising that he was much sought after and always welcome at all social gatherings. He was a keen bridge player.

He was a born experimenter and a good example of the schoolmaster who had always kept alive his interest in research. While at Marlborough he managed to find time for several investigations and published papers in the *Journal* on green compounds of cobalt produced by oxidising agents (1905, also notes on the same subject in the *Proceedings* for 1896); the action of stannous chloride on sulphuric acid and on sulphurous acid (1915); and the interaction of stannous and arsenious chlorides (1919). A paper on ionic migration in the natural diffusion of acids and salts published in the *Proceedings of Royal Society* (1906) describes interesting experiments on diffusion in jellies and concentrated solutions without the use of jellies. One theoretical paper on the numerical relation of atomic weights to atomic numbers was published in the *Journal of the American Chemical Society* (1917). At Reading he was able to exercise this bent for research to the full, and during the twenty years he spent there he almost lived in his laboratory and was an inspiration to younger men. He carried out in collaboration with the writer a series of investigations which were published in the *Journal*. These were on the action of ammonium nitrate and of aqueous ammonia on copper, and properties of cupric tetrammine nitrite and nitrate (1922); the action of thiosulphates on cupric salts (1923); the interrelationships of the sulphur acids (1927); colloidal sulphur (1931); and equilibria and changes in metal hydroxide sols (1942). His approach to these problems was often novel and led to results of importance.

His long life was a happy one and well spent.

H. BASSETT.

JAMES HART-SMITH.

1877—1946.

JAMES HART-SMITH was born in London and received his early education at Berkhamsted School, from where he obtained scholarships both to Christ's College, Cambridge, and to the Royal College of Science. He accepted the latter, and in due course qualified for the Associateship of the Institute of Chemistry. He continued at the Royal College for two years as a Demonstrator in Chemistry, and collaborated with the late Sir Martin Onslow Forster on work in the terpene field, particularly on the isolation and characterisation of neobornylamine (*J.*, 1900, **77**, 1152). Subsequently he was engaged for another two years teaching science at Hinckley Grammar School, Leicestershire.

In 1902 he joined the staff of Battersea Polytechnic where he served as Senior Assistant Master and Senior Science Master at the Boys' School. This school was originally an integral part of the Polytechnic, but during his 26 years' service it developed and flourished so vigorously that ultimately it split off from the parent body and became the Henry Thornton School with premises at Clapham Common.

Hart-Smith's chemical activities were not confined solely to teaching. In 1918 he published "Recent Discoveries in Inorganic Chemistry," and it is characteristic of the author that a chapter on radio-activity had to be omitted because of the heavy weight of extra war-work which he had undertaken whilst the book was in preparation.

Hart-Smith retired from teaching in 1937, but remained a busy and active man. The treasurership of the Secondary School Teachers' War Relief Fund, which he had accepted at the inauguration of the Fund in 1916, he retained until 1945, and he was in addition for many years a member of the British Social Hygiene Council, and of the Council of the Safety First Association.

He was residing at Bournemouth at the outbreak of war in 1939, and immediately attempted to obtain some chemical war-work. This he found very difficult on account of his age, his attempts, for instance, to obtain employment in a cordite works being frustrated by the fact that he was seven years older than the maximum age allowed. When the air-raids started, however, he became one of the Head Fire Guards for Bournemouth, and later, with the help of his wife, founded and maintained the Southbourne National Savings Centre.

When the war ended, Hart-Smith looked forward keenly to the opportunity of resuming the photographic studies in which he had long been interested. In 1946 he went to Seaford for his first holiday since 1939. The sea wall had recently been severely damaged by heavy gales; when attempting to photograph the damage, he became dazzled by the glare of the sun from the sea, and slipped from the wall, receiving severe injuries which subsequently proved fatal.

No account of Hart-Smith's career would be complete without reference to the influence which he exerted on the many generations of pupils who passed through his hands whilst he was a chemistry master at Battersea. In his teaching he united a fine gift of exposition with an exceptional ability for inspiring interest in his subject. These qualities, combined with his very kindly although firm manner, gave a most stimulating atmosphere to his classes, and the many Fellows of our Society who were fortunate to be his pupils look back on Hart-Smith with gratitude and affection.

F. G. MANN.

HERBERT INGLE.

1861—1945.

HERBERT INGLE was one of the first chemists trained at the Yorkshire College of which he became an Associate by examination in 1880 before the University of Leeds received its charter, but in a period when A. H. Green, A. W. Rücker, T. E. Thorpe, and L. C. Miall were already, as professors of science, staking out claims for its future. Following on a notable career as a student, he became a member of the staff of the Department of Chemistry, and successive generations will remember gratefully their introduction to laboratory work at his hands. Brought up on a farm, with first-hand knowledge of its working, he became an obvious choice for a newly instituted lecturing post at Leeds in the then obscure subject of Agricultural Chemistry, on which he wrote a text-book. When, at the end of the Boer War, Milner gathered round him a staff of experts for the administration of South Africa, Ingle was appointed Agricultural Chemist for the Transvaal. This was useful and interesting work, but was terminated by the retrenchment which followed the grant of self-government, and he returned home. Then followed a new kind of activity. With the support in succession of two Leeds citizens, John Bray and Robert Armitage, he engaged on the preparation of pure solid extracts of coffee and tea, bringing the process to successful issue. This was his main professional interest up to the time of his death on Oct. 27th, 1945. He had married Alice Roddis of Birmingham who died only a few weeks before him; two daughters and a son survive him. He had become a Fellow of the Chemical Society in April, 1889, a Fellow of the Institute of Chemistry in 1888, and had been granted the B.Sc. degree in 1905 when the University of Leeds received its charter.

Herbert Ingle's varied career was rendered possible by an unusual combination of scientific knowledge and the faculty for its application. On any problem which presented itself his judgment was almost invariably

sound and often refreshingly independent. This was well known to a limited circle, but a very much wider, more public reputation would have been his if he had not estimated so highly the privileges of privacy and been so apt to think that what was obvious to himself was the same to others, needing no explanation and least of all public explanation. I write as an early student of his and a friend of long standing. The same preference for privacy was displayed in his choice of the perfect holiday, which meant for him rock-climbing in the Lake District with a few trusted companions.

JOHN W. COBB.

WILLIAM JAMES COLTART ORR.

1911—1946.

WILLIAM JAMES COLTART ORR was born in Edinburgh on 23rd December, 1911. After a preliminary schooling in Ireland, he was educated in Dunbar Secondary School and Ayr Academy, from which he entered Edinburgh University in 1929 as an Ayr County Scholar. He graduated with First Class Honours in Chemistry in 1933, being first of his year, and was thereupon awarded a Carnegie Scholarship, which enabled him to return to the University for research under the supervision of the writer. For his researches, which were concerned with the reactions of heavy water with various organic substances and with the diffusion of deuterium hydroxide in water, he was awarded the Ph.D. degree in 1935. At this period his strong leaning towards theoretical investigation showed itself and he also made an analysis of the factors determining the electrolytic dissociation of salt molecules in water (*Phil. Mag.*, 1934, 18, 778).

In 1936, having been awarded a Carnegie Research Fellowship, he went to the Colloid Science Laboratory at Cambridge to work under the supervision of Professor E. K. Rideal and the late Dr. J. K. Roberts. His first research there was an examination in detail, both experimentally and theoretically, of the behaviour of simple non-polar molecules adsorbed on ionic salt lattices. The degree of Ph.D. (Cantab.) was conferred on him in 1939.

From 1939 to 1941 he held an 1851 Exhibition Senior Research Studentship, during part of the tenure of which he was engaged in confidential work for the Air Ministry and Ministry of Supply. Part of this work has been published (*Trans. Faraday Soc.*, 1941, 37, 587) in a paper on isotopic separation by fractional crystallization. During this period he also began experiments on the thermodynamic behaviour of gases, such as hydrogen, helium, and neon, at low temperatures, but owing to the prevailing conditions they were not completed. His theoretical work was continued in a paper on the determination of internal energies by inductive analysis (*Proc. Camb. Phil. Soc.*, 1942, 38, 224) and in a continuation of his work on the factors determining electrolytic dissociation (*Phil. Mag.*, 1941, 31, 51). He also contributed a general review on the subject of intermolecular energies to the Annual Reports of the Chemical Society.

From 1941 to 1945 he was a research chemist with the British Rubber Producers Research Association, and carried out for them both theoretical and experimental researches on the thermodynamic behaviour of polymer-solvent systems. Two papers on this work have been published (*Trans. Faraday Soc.*, 1944, 40, 306, 320) and two more are in course of publication. The last (with Dr. G. Gee) gives experimental data for the system natural rubber-benzene and contains the most reliable data so far obtained on the dependence of heats of mixing on concentration.

In October, 1945, Orr returned to Scotland as an I.C.I. Fellow in the University of Glasgow. He had begun his work there and was enthusiastically settling down to a programme of teaching and research, when he was stricken with influenza from the effects of which he died on March 13th, 1946. By his early death the country is deprived of a combination of mathematical and experimental ability which is all too rare, at a time when it had just reached its full maturity. Having a critical and cautious attitude, he was not satisfied until he got to the bottom of his problems, and his papers show a willingness to spend time clearing up fundamental points before attacking the more complex problems. Kindly and unassuming, he was always ready to help his colleagues and fellow students, and when his help was asked no trouble was too much for him to take.

J. A. V. BUTLER.

WILLIAM POLLARD.

1870—1946.

WILLIAM POLLARD was a Fellow of the Chemical Society for forty-eight years and, although he retired from the Geological Survey in 1913 on account of ill-health, he maintained a lively interest in scientific matters until within a few weeks of his death.

After leaving Harrow in 1888, he spent six months in Dresden and then proceeded to Gonville and Caius College, Cambridge. He has been described as an enthusiastic undergraduate who with Professor Arthur Hutchinson (then a research worker in the college laboratory) carried out useful work on the preparation and nature of lead tetra-acetate and explored the possibilities of the preparation of other salts of quadrivalent lead (*J.*, 1893, 63, 1136; 1896, 69, 212).

From Cambridge he went to Tübingen University where he worked under Professor Lothar Meyer and

obtained his doctor's degree in 1894 for his work on the estimation of molybdic acid and the determination of the atomic weight of molybdenum.

He returned to Cambridge and continued to work in the Caius laboratory where he collaborated with Mr. Pattison Muir and Dr. R. S. Morrell, until in 1898 he was appointed chemist (nominally a geologist) to the Geological Survey. In spite of few facilities for laboratory work in the Jermyn Street museum at that time, he carried out many useful analyses of silicate rocks and minerals, and made a systematic study of South Welsh Coals, which contributed to knowledge of the processes of formation of anthracite. He later transferred his attention to the study of rare earths. From 1901 to 1913 he was in charge of the new chemical laboratory at Jermyn Street, and he trained E. G. Radley who came to him from a technical post at Dulwich College, so that he in turn was responsible for much valuable analytical work.

During the 1914—1918 war, in spite of heart trouble, Dr. Pollard carried out investigations on gas protection in Cambridge and at his private laboratory at Oakfield, Hitchin. His valuable services as a voluntary worker to the Chemical Warfare Committee received official appreciation from the War Office and the Army Council.

Dr. Pollard's enthusiastic interest in many aspects of chemistry and his entertaining reminiscences of various laboratory incidents and contretemps with railway officials about the transport of dangerous chemicals were most stimulating to his companions. It was a great pleasure while staying at his home to listen to his accounts of his own experiences and of those of his chief associates, who, besides those already mentioned, included Professor J. Stanley Gardiner and Edward Wilson of the Antarctic.

In 1903 he married Georgina Evelyn, only child of the Reverend George Potticary, late Rector of Girton, Cambridge. He is survived by his widow and three sons. He was a keen shot until his eyesight gave him trouble, and he was also an efficient amateur photographer. He found the recent war a great strain, particularly as he was not well enough to work himself, although he followed scientific developments with keen interest.

For information of Dr. Pollard's work at Cambridge, the writer is indebted to Dr. R. S. Morrell of Wolverhampton; and for details of his work on the Geological Survey to Dr. Hallimond and to Sir John Flett's History of the First Hundred Years of the Geological Survey of Great Britain.

F. M. F. THOMAS.

ALEXEJ EUGUENIEVITSCH TCHITCHIBABINE.

1871—1945.

ON August 15th, 1945, died in Paris the celebrated Russian chemist Alexej Euguenievitsch Tchitchibabine (Tschitschibabin), who was born at Kusemino, near Poltava, on March 17th, 1871.

From 1888 to 1892 Tchitchibabine studied at the University of Moscow. While still a student he made his first communication to the chemistry section of the Society of Natural Science at Moscow. The first steps of his career, however, were not easy. At first the very independence of his character and originality of his mind told against him: for he directed his first researches to pyridine chemistry, a field at that time little known, and apparently of so little interest that, in the eyes of some of his teachers, this choice was a token of mediocrity. But Tchitchibabine was not deterred either by their discouraging advice or by the material difficulties in which he found himself, and he forged ahead with the task which he had set himself.

He obtained a science degree from the University of Moscow in 1892, and in 1902 he was appointed "Magister Chimia" at Moscow after having presented a thesis on the effect of alkyl halides on pyridine and quinoline. Later he was made a Doctor of Chemistry of the University of St. Petersburg, in Russia a rare honour. In 1908 he was appointed Professor of Organic Chemistry at the Imperial College of Technology of Moscow, and from 1909 to 1929 he was Dean of the Faculty of Chemistry of this College; from 1918 to 1923 he was also Professor of Chemistry at the University of Moscow.

During the first world war he directed his energies to the organisation of the pharmaceutical chemical industry of Russia. Thanks to his efforts, in the face of extreme difficulties, Russia was soon manufacturing a large number of chemical products (in particular alkaloids) which had previously all been imported from Germany.

From 1931 until his death, Tchitchibabine lived in Paris where he had been given a laboratory at the Collège de France.

Tchitchibabine published more than 250 papers in various fields of organic chemistry. The majority deal with pyridine chemistry. In his researches directed towards a synthesis of compounds having a pyridine nucleus, he studied the condensation of aldehydes and ketones with acetylene and ammonia and showed that while at a moderate temperature (180°) under pressure α -substitution derivatives are obtained, at higher temperatures (about 400°) under normal pressure and with catalysts the synthesis will give γ -derivatives (*e.g.*, γ -picoline). By using different aldehydes (or ketones) it was thus possible to obtain very varied derivatives, and by employing a mixture of acetaldehyde and acrolein Tchitchibabine achieved the synthesis of pyridine itself. One of his last achievements was that of modifying the synthesis of quinoline by substituting acrolein for glycerol.

In 1913 Tchitchibabine and his co-worker Seide made the remarkable observation that sodamide acts on pyridine and its derivatives, giving good yields of aminopyridines (in particular, the α -aminopyridines). This discovery was of major importance in the development of pyridine chemistry since the introduction of the

amino group greatly activated the pyridine nucleus. The phenomena of tautomerism in the amino-pyridines and -picolines observed and studied by Tchitchibabine and his collaborators also increased the theoretical interest and the variety of possible applications of this work. Again, by studying the action of alkyl halides on sodium derivatives of picoline, Tchitchibabine succeeded in obtaining higher homologues of pyridine.

His fundamental work on pyridine chemistry, a subject which has been gaining in importance ever since, led to the synthesis of a great variety of natural products, pharmaceutical chemicals, etc. Tchitchibabine's research was not, however, confined to this field; he did outstanding work in other branches of chemistry. At the beginning of the century he carried out extensive research on the problem of trivalent carbon, and in 1912 he was invited to England by the British Association to lecture on this subject. There were, too, his investigations of the composition and synthesis of various alkaloids and other plant products (pilocarpine, santonin, bergenin, etc.), his work on the alkylation of phenols in the presence of various condensing agents, in particular phosphoric acid, his study of new reactions with organomagnesium compounds which led to methods of synthesis of acetals and alkoxy-ethylenic acids, and his study of naphthenic acids from Russian oils. We also owe to him the synthesis of thiodiglycol from ethylene oxide and hydrogen sulphide.

In 1924 appeared in Russia his treatise "Basic Principles of Organic Chemistry" which has been revised several times and also translated into French. As we open the book we read: "To the memory of Natacha Tchitchibabine, my beloved daughter, my ablest assistant and my best friend, I dedicate my life's work." Natacha, his only child, also a chemist, was killed in 1930 in an explosion in a chemical products factory.

Tchitchibabine was fortunate in having by his side, throughout his brilliant but arduous career, his wife Vera Vladmirovna Tchitchibabine, also a scientist, whom he had known from her schooldays.

I. MARSZAK.

KAPILRAM HARDEVARAM VAKIL.

1884—1946.

MR. KAPILRAM HARDEVARAM VAKIL was born in Surat (India) on 28th May, 1884, of a family of lawyers, and was a grandson of the late Mr. Nanabhai Haridas, the first Indian Judge of the Bombay High Court. He was educated at Bharda New High School, Bombay, Elphinstone College, Bombay, and Manchester College of Technology. He passed the B.A. examination of the University of Bombay in 1906, and was awarded the Bell Prize in Physics. He proceeded to England in 1909 for further studies and obtained the B.Sc. (Tech.) degree of the University of Manchester with First Class Honours in dyeing, bleaching, and oils and fats. On his return to India he joined the Jamshed Oil Mills of Tatas at Kurla as manager and consulting chemist and did the pioneering work of developing the cotton-seed oil industry in India. Later, he started independent consultant practice and helped a number of industrial concerns with his technical advice.

He was greatly interested in research work from the beginning of his career, and his first paper, on the chemical examination of ghee, was published in 1915 (*J. Soc. Chem. Ind.*, **34**, 320). He had invented and was the patentee of several processes for refining oils and fats. During the First World War he proceeded in 1916 to the Manchester College of Technology and was awarded the Manchester Corporation special research scholarship. During this period he carried out, in collaboration with Prof. Green, research work on the sulphonation of β -naphthylamine which was published in the *Journal* (1918, **113**, 35). While he was in England he read an important and valuable paper on cotton-seed products before the Manchester Branch of the Society of Chemical Industry which was subsequently published (*J. Soc. Chem. Ind.*, 1917, **36**, 685). He was awarded the M.Sc. (Tech.) degree of the University of Manchester in 1917 and was also admitted to the Associateship of the Institute of Chemistry, of which he became a Fellow later. He received an offer of the Privy Council Scholarship for continuing research work at Manchester and was invited by Lever Bros. to act as their consultant in the East, but he preferred to join the Tatas as consulting chemist and in this capacity he carried out surveys and research work on a number of important industrial problems.

Early in his career, Vakil had realised the great importance of establishing key chemical industries—particularly the alkali industry—in India, and his whole life was devoted towards the achievement of this ideal. As early as 1917, he carried out extensive surveys for a suitable site for salt works on the Eastern coast of India for the then proposed heavy chemicals, etc., industries of Tatas at Sakchi (now Jamshedpur), and in 1920 he investigated the prospects of establishing an alkali industry at Kodinar in Kathiawar. In this connection he was also deputed by Tatas in 1920—1921 to visit the various alkali works in Europe and America, and had discussions and consultations with a number of well-known alkali experts. In 1923 his services were engaged by Dhrangadhra State (Kathiawar) for their soda-ash project which he successfully completed, and in 1926 he started the Okha Salt Works at Mithapur, where he carried out his pioneering work of recovering and manufacturing important by-products from bitterns. In 1937 the Tatas accepted his scheme for establishing the heavy chemicals industry at Mithapur (Kathiawar), and Tata Chemicals, Limited, was finally started in 1939 with Vakil as Technical Director. Tata Chemicals is the largest chemical concern in India and is the crowning glory and fulfilment of his life's mission.

Vakil was a member of a number of scientific societies, and had the distinction of being the first Indian to be elected directly to the full membership of the Institute of Chemical Engineers and also to the membership of the Society of Public Analysts. He contributed a number of original papers to scientific journals and is the

author of two authoritative books on salt and Indian coal. His advice was sought by a number of organisations and he served on a large number of important Government and other Committees. He was held in the highest esteem by his friends, colleagues, and subordinates, and the Government of Baroda bestowed on him the high honour of Raj Ratna in recognition of his services in developing the salt industry in the State.

Vakil was a very widely travelled man and had visited foreign countries a number of times. In his early days he was an active member of Indian National Congress, but on the advice of Mahatma Gandhi left politics and devoted his whole attention to the development of chemical industries in India. To attain his long cherished goal of putting India on the industrial map of the world he spared no pains and lived the life of a recluse wholly devoted to work. As a result of long and continuous hard work his health broke down last year and he was advised to rest. He, however, was so devoted to work that he disregarded the advice of his physicians and died in harness on 29th January, 1946, through heart failure. His death has been a great loss not only to his family and friends, but also to India, who has lost by his death one of her ablest and most eminent technical chemists and chemical engineers.

N. A. YAJNIK.

ERNEST ADAM WAGSTAFF.

1907—1942.

PILOT OFFICER ERNEST ADAM WAGSTAFF was shot down over France on October 25th, 1942, and lies, with his air-crew, buried at Moulin-sur-Touvent some 25 miles N.E. of Paris.

He was educated at Nottingham High School and the University College of Nottingham. As an undergraduate, although his physical presence was conspicuous his reticence and diffidence made him little known. As a research student it was otherwise. After a short spell in a sugar beet factory he returned to the college to engage in research in organic chemistry. A little the senior of the other students and a lot taller he assumed a station *in loco parentis*, his former diffidence vanished and his strikingly original character revealed itself. He studied the nitration of β -phenylethyl-, styryl-, and phenylacetylenyl-pyridines and, as one of his contemporaries remarked, "he nitrated stilbazole with a zeal which was at once an example to, and the wonder of, us all." The results of the work were published in four papers in the *Journal*.

Wagstaff's enthusiasm for organic chemistry was not born of a narrow-minded lack of interest in all else. He was well acquainted with all branches of chemistry and had not a little knowledge of botany and geology. Outside science his interests ranged from mediaeval alabaster carvings and windmills to Norman castles in Pembroke and Iron-Age camps in Dorset, from the operettas of Gilbert and Sullivan to the writings of Belloc, Chesterton, and A. E. Housman. He was an excellent shot with both the .22 and the service rifle, and was a member of the winning Nottingham Team in the Inter-Universities Small-Bore Championship. He walked extensively both in this country and on the continent and attended the Sixth International Congress of Agricultural Chemists at Budapest in 1939.

As a writer of letters he was inimitable and could express himself as readily in verse as in prose; in choice of word and turn of phrase he was always original and often strikingly effective.

After obtaining the degree of Ph.D. of London University Wagstaff joined the Research Department of the Distillers Company in January 1933. From 1934 to 1937 he was in charge of the Molasses Control Laboratory. From April 1937 until he joined the Royal Air Force as a volunteer he was one of a team of workers engaged in process development work in connection with a vapour-phase catalytic oxidation reaction.

It may have been the repeated bombing to which he was subjected whilst engaged in the erection of a chemical plant that induced him, in October 1940, to enlist in the Royal Air Force. He did not analyse his motives to others but said later that he did not regret his decision except insofar as his action made others restless. Writing from "the quiet of an R.A.F. training camp" he said that, hearing of the trials under bombing of those left behind in his former job, he felt "something of a shirker." He made friends in the R.A.F. and seemed to enjoy barrack life for its own sake. After training in this country and in North America he was commissioned in April 1942, and saw much of the Britain he loved before those inimitable letters, coming now from an aerodrome in Lincolnshire, suddenly ceased.

Wagstaff's original work was, for the most part, not for publication; this circumstance, together with his untimely death, prevented him from making for himself a name in chemistry commensurate with his talents. He died, as he had lived, for an ideal; in the lives of the few who knew him well his passing leaves a void which can never be filled.

B. D. SHAW.