OBITUARY NOTICES.

LANCELOT SALISBURY BAGSTER.

1887—1940.

L. S. BAGSTER, D.Sc., Professor of Chemistry in the University of Queensland, Brisbane, died suddenly on March 14th, 1940, at the comparatively early age of 53.

Bagster was a graduate of the University of Adelaide, completing the course in science with first-class honours in 1908 under the late Professor Rennie. In the following year, he was appointed Government Research Scholar in the Department of Chemistry of the University of Melbourne and conducted research work under the general direction of Professor D. O. Masson.

When Professor Steele was appointed to the Chair of Chemistry in the University of Queensland, he urged strongly upon the Senate the desirability of giving special attention to chemistry in industry. In May, 1911, the Senate appointed Bagster and sent him abroad for approximately two years to gain the necessary industrial experience to enable him to take charge of this applied chemical work. He returned to these duties early in 1913, and from that date until his death was active in his University post.

He was a keen research investigator, and in 1920 gained the Doctorate of Science of the University of Adelaide, his main thesis being in connection with the effect of nitric acid on copper. In 1931, he was appointed in succession to Professor B. D. Steele to the Chair of Chemistry, and, as Professor of Chemistry, has, in addition to his onerous duties, had much to do with the designs of the new chemistry building to be erected at the University site at St. Lucia, Brisbane.

A foundation member of the Australian Chemical Institute, he always showed a lively enthusiasm for its welfare, and, in common with its founder, the late Sir David Masson, had strong views as to the services a chemist could render to the community. In this field of endeavour he gave his best.

Nine years ago he was President of the Queensland Branch of the Institute, and in association with the late Mr. G. J. Twine he assisted in the negotiations leading to the incorporation of the Institute by Royal Charter in 1932.

At the time of his death, Bagster was Dean of the Faculty of Science and had been a member of the Queensland State Committee of the Commonwealth Council for Scientific and Industrial Research for over 10 years. He was a Fellow of the Australian and New Zealand Association for the Advancement of Science and was President of the Chemistry Section at the Sydney meeting of that Association in 1932.

In personality, he was genial and unaffected, ever ready to help, and by reason of his general attitude of friendliness, his relationship with all those with whom he came into contact was invariably of the happiest nature.

T. G. H. JONES.

THOMAS BENNETT CASE.

1871—1941.

T. B. CASE was born on February 17th, 1871, and was educated at Winchester and Magdalen College, Oxford. He was a son of the President of Corpus Christi College, Oxford, and grandson of Sterndale Bennett, the composer. He took first class honours in Natural Science (Chemistry) at Oxford, and besides his scholastic attainments was a fine athlete, winning the Public Schools Doubles at rackets and obtaining his Blue at Oxford for cricket.

In 1893 Case joined the brewing staff of Guinness in Dublin at a time of considerable activity in the scientific world associated with the brewing industry. His influence was seen in the establishment in 1901 by the Directors of the Company, of the "Guinness Research Laboratory," in which he acted as Administrator, with Horace T. Brown as Research Director. To put the results of the "Guinness Research Laboratory" into practice, the firm erected an experimental brewery and an experimental malt house, and to carry out this work, Case enjoyed the collaboration of his colleague and brother-in-law (the late Alan McMullen). Methods developed under the research scheme were introduced into a routine laboratory which Case had inaugurated. Much information was thus acquired, and the data collected were examined statistically by another colleague, the late W. S. Gosset ("Student" of *Biometrika*).

Much of the original work of the laboratory was published in the form of "transactions," and the gist of it was given to the Institute of Brewing by H. T. Brown in 1907 in a paper entitled "The Nitrogen Question in Brewing."

After the initial work had been completed, the " Guinness Research Laboratory " was removed to other quarters, which it occupies to the present day. The character of the work changed somewhat to meet the special requirements of the Guinness products and their manufacture. Case, meanwhile, took up other activities in connection with brewing, never, however, losing touch with the work of the laboratories. When he became a Director of the firm in 1919, his interest in research was revived with renewed enthusiasm. With the passage of time the research laboratory has greatly increased in scope, particularly during the last 3 or 4 years. Yet Case, despite the increasing weight of responsibility due to world conditions, spared no pains to follow the latest developments, and was a constant source of inspiration to those who worked with him. His close touch with the laboratories, both routine and research, enabled him to put into practice in the main brewery such improvements as were indicated by the results obtained.

Thomas Case put his whole heart into everything he did. His friends will remember him chiefly for his extraordinary kindness, his courtesy, his self-effacement and his infinite capacity for taking pains in everything he undertook. They will be glad to know that his end was peaceful.

Case was elected a Fellow of the Chemical Society in 1895. He died on November 10th, 1941.

C. J. N.

WILLIAM LASH MILLER.

1866—1940.

WILLIAM LASH MILLER was born at Galt, Ontario, on September 10th, 1866. After graduation at the University of Toronto in 1887 he studied in Berlin, Göttingen, and Munich (Ph.D. 1890). He joined the staff at Toronto as fellow in 1890, was appointed lecturer in 1894, associate professor in 1900, and professor of physical chemistry in 1908. He became honorary member of the American Chemical Society in 1926 and Commander of the British Empire in 1935. During 1934—35 he was president of the Royal Society of Canada. He was retired at the age of 70 and became professor emeritus. He died on September 1st, 1940, after a two years' illness.

The death of William Lash Miller deprived the world of a great chemist and a great teacher. Miller dominated the chemical activities of Toronto for nearly fifty years. Although he was official head of the department of chemistry only since 1920, his dominant influence was felt from the time he joined the staff as fellow in chemistry in 1890; and yet " dominating " is the last word that could be used of his character. Insistent he was, and with good reason, for his decisions in the long run were always right, though they might at times be wrong for the moment in their effect on people. How often one heard " I disagreed with him at the time, I didn't like what he did, but he was absolutely right." All his work bore the mark of his extraordinarily accurate and logical mind and of his painstaking care. He had infinite patience with things, often little with people, but his small patience with human pettiness was more than made up for by his generosity of heart, innumerable instances of which have only come to light years later through casual mention by old students and friends.

He had little faith in formal lectures; during his own lecture hours he lounged on the edge of the table, smoking and talking cheerfully to his class, but the students neither lounged nor smoked, and woe betide any who missed one step in the relentless logic of his cheerful words. His terrifying insistence on clearness of thought and expression cut deep into his students and colleagues and left a lasting mark on their characters.

How great was Miller's contribution to science will probably not be fully realised until a new philosopher arises who does for chemistry what Ernst Mach did for physics; then Miller's fundamental thinking will be made plain to the ordinary man.

Miller's research work was so varied that it cannot be described in a few pages; it cannot even be found in the abstract indexes without careful search, for most of it he published generously under his students' names. Only the general outlines of his work will be indicated. His first physico-chemical research (1892) on the electromotive force of metal electrodes gave a confirmation of a prediction based on one of Willard Gibbs' equations. This was Miller's first introduction to Gibbs' thermodynamics, which became his predominant interest for a number of years and on which Miller's fame as a scientist and teacher chiefly rests. It was natural, therefore, that his first series of researches should be on equilibrium phenomena. Later, about 1902, he attacked the problem of reaction velocity and a long series of papers appeared on this subject. It was characteristic of him that during this work, being dissatisfied with the abstract journals of the time, he made a card catalogue of all rate measurements by paging over all the earlier volumes of the standard journals. Following this there were many publications on electrochemistry, transport numbers, overvoltage, diffusion and high-current arcs. In connection with his work on induced reactions and overvoltage he (with Roseburgh) published the first tables of certain

functions of e^{-x}, which have been widely used for other purposes since that time. In this period also appeared his well-known paper on " The mathematical treatment of diffusion and chemical action at electrodes " (with Roseburgh). A paper published much later (with Gordon) on " The numerical evaluation of series and integrals in problems of linear heat flow and electrochemical diffusion " may be included in this group.

In 1923 Miller was invited as one of the " seven most eminent physical chemists of the world " to give an address at the opening of the Sterling Laboratory at Yale. There resulted the publication of " The method of Willard Gibbs in chemical thermodynamics," in which a perfectly clear but comprehensive treatment of the subject is condensed into fifty pages, for Miller was one of the few who *could* write perfectly clearly about thermodynamics.

During the last twenty years of Miller's life bios claimed more and more of his interest; in all, about fifty-six papers were published on it and allied subjects. But the germ of the idea was already in his mind at a much earlier time. It was when he was writing his paper on the second differential coefficients of ζ in 1897 that the possible connection between the toxicity of phenol towards bacteria and its chemical potential occurred to him. The work on this idea led to the search for a less dangerous organism than anthrax or *staphylococcus* for the measurement of toxicity; and the study of yeast, chosen for this purpose, led to bios.

Of Miller's attitude towards scientific work, let his own words speak. After heartbreaking failures to get to the bottom of some problem which a lesser man would have given up as hopeless: " Never mind, the chemicals are trying to tell us something." His delight over a confirmation of some deductive reasoning, especially if the foundation for it was the potential concept of Willard Gibbs, is shown by his account (*Proc. Roy. Soc. Canada*, 1935) of the realisation of his prediction, from experiments with anthrax spores, " that mercuric chloride should be less soluble in 30% alcohol than in any other strength; we tried it, and by Jupiter it was—a curious way to predict solubility relations."

His method of investigation by deliberate concentration on a few ideas is also best given in his own words, in which, as always, he gives the credit to others: " They thought of microbes merely as a pinch of powdered chemical material, like some precipitate in a test-tube. . . . This was a narrow view to take. But the very division of Science into branches emphasises the importance of this narrow view, of concentration on a few ideas at a time. . . . Again, this chemists' point of view might seem too trivial to deserve attention. It is easy to imagine someone asking: ' you say a million microbes constitute a kind of dust, no doubt they do; what of it? ' The proper answer to this question is ' Why then, mercuric cyanide will not be poisonous! ' Links in the argument are here omitted, but they exist " (*Proc. Roy. Soc. Canada*, 1935). It was this apparently " trivial point of view " which was the foundation of all Miller's work on bios and which led him to success where specialists in bacteriology or zymology failed.

Miller was a conservative scientist " as all good scientific men should be," but he realised both the virtues and the defects of this attitude. After showing how many facts about the poisoning of micro-organisms could be explained on the theory of potential: " Perhaps you will excuse us for having got potential on the brain, as they say. It seems to me that it was not only excusable, but our bounden duty, and in the best scientific tradition. For, whether or no scientific discoveries are revolutionising the world, it is certainly true that the minds to which these discoveries are due are for the most part those of diehards; most of the millions of facts recorded in chemical handbooks are the results of pattern-work. Science is inherently conservative. . . . But when we tried acids as poisons instead of phenol, we suffered from the defects of our virtue, and went on poisoning yeast with acids for a whole year before realising that the toxic power of acids in moderately dilute solutions may have nothing whatever to do with potential, concentration, or p_H."

It is fitting to close this obituary with Miller's views on research work, as stated (*Proc. Roy. Soc. Canada*, 1935) in connection with *i*-inositol, which one of his students had identified as a constituent of bios: " Then, of course, there is Immortality. The hundredth part of one per cent. of Beilstein's handbook is given to *i*-inositol, two pages and a little overleaf out of the 22,479 to date. In the next edition or in a supplement, there will be added half a line: ' Active principle of Bios I, Eastcott, JPC **32** 1094.' This is immortality of a kind, for they print Beilstein on good paper; but it is the grey immortality of a breath of thought, immortality as conceived by Plato. Nothing in Beilstein of the winter spent on improving the analytical methods for phenol until they were adequate to potential determinations; nothing of the little group crowded round a kitchen table in the cellar while Clark plotted his rate measurements; nothing of the years of work before the first constituents of bios were obtained as crystals; nothing of the baffled instincts when the weaker phenol solutions proved more poisonous than the stronger, or when the potential concept failed us in the work on acids; nothing of the perplexities when one day the yeast would spore and the next day not. I sometimes wonder whether there is anything in Beilstein

half as important as the things he leaves out. From the University's point of view there certainly is not; for Universities exist to supply the world with trained men and women; supplying lines to Beilstein is a minor object. In fact the only justification for the years that students spend in cellars with professors, is the training they receive there; training not merely of the mind, but of the will and character as well. The ancient Persians were an outdoor folk, who, we are told, trained their children to ride straight, shoot straight, and tell the truth. Research chemists, unfortunately, must work indoors; but they can teach *their* children, children of the spirit, to work hard and like it, to think straight—and to tell the truth."

FRANK B. KENRICK.

LEONARD TEMPLE THORNE.

1855—1941.

IN 1873 Thorne became an assistant to Prof. Edward Frankland at the Royal College of Chemistry and after carrying out some work on the luminosity of benzene he was nominated by his Professor in 1875 to the first Jodrell Scholarship in Chemistry. He received the diploma of the College and then went to Würzburg and there took his first Ph.D. degree, an academic distinction rarely accorded at that time to English students. Towards the end of his studentship at Würzburg he became lecture assistant to Wislicenus and thus was probably the first Englishman to act as *Privat Docent* in a German University. On his return to this country Thorne became research assistant to W. H. Perkin. For a short time in 1886—7 he was a deputy for Prof. Humphridge at the University College, Aberystwyth. For the next 8 or 9 years he was chemist to Brins Oxygen Co., later known as the British Oxygen Co. In 1895 he became chemist to Garton Hill and Co., manufacturers of brewers' and confectioners' sugars, an appointment which he held until his retirement in 1935.

Early in life he associated himself with the activities of our Society and he found congenial work as Hon. Librarian, when, in 1884, he succeeded Henry Watts in that position. Those of us who were members in those days will not forget his kindly assistance in " reference hunting."

He was an original member of the Society of Chemical Industry and also took a very active interest in the Institute of Brewing, of which he was made an Honorary Member in 1939, a fitting acknowledgment of the work he had done for that body and of the regard in which he was held by the brewing industry.

Thorne was the " academic " type of chemist with an excellent knowledge of the literature of the subjects he was interested in. Although successful in his technical activities, those who knew him felt that he was more adapted to University than to factory life. The time he spent in Germany made a great impression on him and he had claims to be an authority on the writings of Goethe.

He was somewhat of a shy and retiring nature, but very kindly and gentle in his dealings with his fellow chemists, to whom he freely gave any assistance in his power. He was greatly respected and liked by those with whom he came in contact. He leaves a widow and two sons, one an engineer, the other Bishop of Nyasaland.

JULIAN L. BAKER.
