Obituary Notice

JOHN MASSON GULLAND, 1898–1947

British science sustained a grievous loss by the tragic death of Prof. J. M. Gulland in a railway accident at Goswick, near Berwick-on-Tweed, on 26 October 1947. He was a biochemist whose work was founded on a solid basis of achievement in the field of pure organic chemistry, and he will be remembered above all for his work on nucleic acids. His contributions to the chemistry and biochemistry of these important cell constituents have greatly enriched our knowledge of them and will rank very highly among the pioneer investigations in this field. Gulland was a man of vigour and vivacious charm, of whom Dr Jesse P. Greenstein has written (*Nature, Lond.*, 1948, 161, 87): 'Gulland was one of a group of distinguished foreign guests at the Cold Spring Harbor Symposium held in June 1947. He was easily the dominant figure at that conference, and the charm and ease of his manner, his gentle critical spirit, together with the scholarliness and incisiveness of his thinking, evoked general admiration and affection.' This spontaneous tribute from across the Atlantic describes Gulland in terms which recall very vividly the man whom his friends admired and respected.

John Masson Gulland was born in Edinburgh in 1898 and was the only son of the late Prof. G. Lovell Gulland, Professor of Medicine in the University of Edinburgh. He was devoted to his native city and had an intense love of Scotland. He had a wide and detailed knowledge of the Scottish Highlands, their local customs, history and geology, and he made some delightful water-colour sketches during his many holidays there. He was also a keen fisherman in Scottish rivers. Gulland was educated at Edinburgh Academy and the University of Edinburgh, where he graduated in 1921, after serving as a second lieutenant in the First World War. Having been awarded a Carnegie Scholarship, he went to work at St Andrews under Prof. (later Sir) Robert Robinson, whom he rejoined in Manchester; again later in Oxford Gulland was in the Dyson Perrins laboratory when Robinson was appointed to the chair of chemistry. Gulland became a University demonstrator in chemistry at Oxford in 1924, and was appointed lecturer in chemistry at Balliol College in 1926. These appointments he relinquished in 1931, when he became senior assistant in biochemistry at the Lister Institute, London, and a reader in biochemistry in the University of London. In 1936, Gulland was appointed to the Sir Jesse Boot Chair of Chemistry at University College, Nottingham.

He gave up this post a few weeks before his death to take up a new appointment as director of research to the Institute of Brewing. He was elected a Fellow of the Royal Society in 1945, and the following year he was appointed a representative of the Royal Society on the British National Committee for Chemistry. He was M.A. of Oxford, Ph.D. of St Andrews, D.Sc. of Edinburgh, and a Fellow of the Royal Society of Edinburgh and the Royal Institute of Chemistry. In 1924 he married Ruth Madeline Ida Russell, also an Edinburgh graduate and daughter of the late Sir James A. Russell, and is survived by his wife and two daughters.

Although he has a large amount of first-rate scientific achievement to his credit, Gulland was not quite so prolific a contributor to the original literature as some of his contemporaries. This is partly due to the formidable nature of the problems which he tackled; he never engaged in trivialities. It is probably due also to the fact that his earlier ardour for work at the bench tended to be subordinated later to his interest in organization and administration, for which he had a real flair. He served on the councils of the Chemical Society and the Royal Institute of Chemistry, and was an honorary secretary of the Chemical Society during 1933–6. From 1932 until 1934, he was secretary of Section B of the British Association, and during 1935–7, he was recorder to the Section. In the early years of the Second World War he was senior gas adviser to the North Midland Region of the Ministry of Home Security, and during 1943–4 he was assistant director, Chemical Research and Development, Ministry of Supply. In this capacity he was concerned with the organization and instigation of research and development by firms, research associations, government establishments and universities on a variety of aspects of such topics as general chemicals and explosives, flax, camouflage, adaptation of army equipment of all kinds for use in the tropics, plastics, textiles, paper and rubber. It was in this period also that he was attracted by the potentialities of alginic acid as a chemical raw material, and he took an important part in the establishment of the Scottish Seaweed Research Association. He became a member of its Board of Management, and Chairman of its General Purposes and Chemical Advisory Committees. He was instrumental in forming the Lace Research Council, of which he was a member, and was an independent member of the Board of Trade Working Party on the Lace Industry, appointed in 1946.

A full appreciation of Gulland's scientific work cannot be given here and a general indication of some of its main trends must suffice. During his St Andrews and Manchester days, he worked on the morphine group of alkaloids, and the constitution which is now generally accepted for morphine was first adumbrated in two classical papers, published in 1923 and 1925, by Gulland and Robinson. With R. D. Haworth, Gulland published a series of papers on the aporphine group of *isoquinoline* alkaloids (1928-9). New methods were devised by which were synthesized, among other compounds, bulbocapnine methyl ether and corytuberine dimethyl ether. Gulland also made other chemical studies of compounds of biological interest, including pellitorine, the pungent principle of *Anacyclus pyrethrum*, and the active constituents of *Taxus baccata* (1930-1). His work then followed a more definite biochemical course. With R. A. Peters, in 1929, he investigated the antineuritic properties claimed for certain quinoline and iminazole derivatives and showed that the compounds in question were inactive. Gulland and Peters also showed that pigeons' blood is much richer in reducing substances than is mammalian blood and found that this is due mainly to sulphhydryl compounds; ergothioneine hydrochloride was isolated. In the course of an examination of the spermicidal activity of various quinones and aromatic aldehydes and their derivatives, Gulland found that certain aromatic aldehydes were highly effective spermicidal agents, and he showed how their efficiency could be correlated with some of their chemical reactivities and physico-chemical properties. Between 1932 and 1940, Gulland published a series of papers, in conjunction with T. F. Macrae and other collaborators, on the oxytocic principle of the posterior lobe of the pituitary. He described methods of purification and assay of the hormone, and elucidated something of the chemical nature and active groups by studying the action of nitrous and nitric acids, of oxidizing and reducing agents, and of various preparations of proteolytic enzymes. He was able to show that the oxytocic principle repre-

sents an oxidation-reduction system, but it did not appear to contain peptide linkages. Some synthetic esters of choline had analogous properties, but the activity was very slight.

In 1933 Gulland and Macrae published the first of a series of papers on purine nucleosides. These compounds, with the related nucleic acids, formed the subject of Gulland's main research interests thereafter. His contributions in this important field were noteworthy, not only for their intrinsic value, but also because of the interest which they stimulated in other laboratories. He has himself summarized some of this work in three reviews (Gulland, *J. chem. Soc.* 1938, p. 1722; 1944, p. 208; Gulland, Barker & Jordan, *Ann. Rev. Biochem.* 1945, **14**, 175). By using ultraviolet absorption spectroscopy, Gulland and his collaborators showed the points of attachment of the sugar residues to the bases in the nucleosides, and his conclusions were substantiated by similar measurements on synthetic products by Kenner, Lythgoe and Todd. Again, in the course of a series of investigations on yeast nucleic acid, Gulland (with G. R. Barker) confirmed the identity of the sugar component as D-ribose. Among his last publications was one in this *Journal* (1948, **42**, 308) on the nature of the reaction of nucleic acids with mustard gas, and a series of three papers in the *Journal of the Chemical Society* (1947, pp. 1129, 1131, 1141) on the deoxypentose nucleic acid of calf thymus. It is a great loss to British science that his investigations in a field of such supreme biological importance should have been brought to a sad and premature close. It is certain, however, that other workers will come forward to build upon the foundations which he has laid, and there can be no doubt that this is the memorial to his work which he himself would have desired.

(The writer is glad to acknowledge his indebtedness to Mrs J. M. Gulland for some of the personal details, and to the Editors of *Nature* for permission to use as a basis for this tribute a somewhat shorter notice which he contributed to *Nature*.)

J. W. COOK