

Co.'s Research and Development Department and the research associations, universities and Government departments. He made a strong plea for the expansion of Government research activities by enlargement of such establishments as the National Physical Laboratory. There is a great lack of fundamental data now badly needed by industry. Germany was, before the War, a substantial contributor to the pool of fundamental knowledge, but this source has dried up. The work of the N.P.L. and similar establishments is valuable, but much more is needed.

The universities should not generally be used as consultants by industry, but should concentrate rather on the task of providing men of sound character and personality who can think honestly and convey their thoughts with facility to others. Government grants to students and research workers are more helpful in this direction.

Mr. R. M. Winter (I.C.I. Ltd.) urged that fundamental research at the universities should not be swamped by purely tutorial duties. The training of first-class research workers is of more importance than a large output of technicians trained mainly in manipulative skills and laboratory methods. The present urgent requirements for scientific man-power should not be allowed to lower the standards of training of fundamental scientific workers. The Government's spending of £69 millions in 1947-48 on research and development, of which recurrent grants to universities and similar institutions accounts for only £3½ millions, invites comment, Mr. Winter said.

The discussions which followed each of the five sessions were so varied and often lively as to make them difficult to summarize. There appeared, however, to be a general concern over both the quantity and quality of new recruits to the industrial research laboratories. The problem of quantity is largely a result of heavy demand coupled with interruptions to the normal flow of graduates from the universities caused by the War and by the subsequent arrangements for military service. On the side of quality, there was a strong feeling that scientific education should be on broader and less specialized lines, particularly up to the first degree.

As regards the conference as a whole, there was a general impression that it had provided an excellent opportunity for the airing and discussion, between research executives in different industries, of many common problems and interests.

W. C. F. HESSENBERG

OBITUARY

Dr. G. Shearer

GEORGE SHEARER died on March 13 in Addenbrookes Hospital, Cambridge, on the eve of his fifty-ninth birthday.

Shearer entered the University of Edinburgh from George Watson's College in 1907, having taken high places in both the John Welsh Classical and Mathematical Bursaries lists. For his first session he read Latin and Greek, and graduated as M.A. and B.Sc. in 1911 in mathematics and natural philosophy. He remained at Edinburgh as an assistant in natural philosophy until the outbreak of the First World War, and during this period published his first papers, on atmospheric electric potential, and Fourier and periodogram analysis, in collaboration with Dr.

G. A. Carse; during this period, too, he began, under Barkla, his X-ray work, which was to be the main subject of his scientific work for the next quarter of a century. As an instructor lieutenant in the Royal Navy during 1914-19 he served afloat on navigational and gunnery duties.

On his release from war service, Shearer resumed his X-ray researches, going to Emmanuel College, Cambridge, as an 1851 Exhibition research student, and working at the Cavendish Laboratory under Rutherford. In 1922 he moved to London, as chief research assistant to Sir William Bragg, first at University College and, from 1923, at the Davy Faraday Laboratory, Royal Institution. During this period he was particularly interested in the newly discovered technique of X-ray photography of powders, and developed the application of this method to the study of the geometry and the symmetry, both of the crystalline arrangement and of the molecules themselves; one of his outstanding achievements was the X-ray chemical analysis and identification of long-chain ketones.

In 1927 Shearer was appointed to the National Physical Laboratory as a senior assistant to take charge of the work for the Committee on the Application of X-ray Methods to Industrial Problems. The group under his charge developed and used both X-ray and electron diffraction techniques, and devised various special items of equipment, such as a rotating anode tube. The problems tackled included the structure of many industrial materials (special steels, paint materials, carbon blacks, insulating materials, etc.) and the basic properties of metals. On the outbreak of the second World War, he was transferred to the Metrology Division for work on gauges for war production. In 1941 he was seconded, and in 1948 was posted, to the Research Department (now the Armament Research Establishment) of the Ministry of Supply, in which he served until his death; in this last appointment he returned to Cambridge in charge of an out-station, and in 1947 his promotion to senior principal scientific officer enlarged his responsibilities to include the charge of other out-stations. The group of which he was the inspiration was studying the penetration of armour by projectiles, and their work contributed largely to the effectiveness of the British anti-tank artillery and aircraft cannon. Shearer's encouragement and guidance greatly facilitated the application to ballistic problems of such techniques as 'Arditron' flash photography and Kerr cell shutters.

Shearer was granted the degree of Ph.D. at Cambridge in 1921 and D.Sc. at Edinburgh in 1923 for his X-ray work. He was a fellow of the Institute of Physics and of the Physical Society, and a member and past president of the British Institute of Radiology. He also served as a member and chairman of the Committee of Visitors, and as a member of the Committee of Managers, of the Royal Institution.

On his return to Cambridge in 1941, Shearer again had rooms in his old College, Emmanuel. This was a great joy to him, although the arduous nature of his duties left him little leisure for his favourite recreations, bridge and golf, at both of which he was no mean performer. During these years he made a real contribution to the social life of the High Table and the Parlour of the College, and his wide interests and broad sympathies made him a gracious host to many official visitors. An able physicist, a wise administrator, and a modest man, he will be missed by many friends.