Prof. W. Wardlaw, C.B.E.

THE very large number of scientists who knew him personally were grieved to learn of the death of Prof. William Wardlaw on December 19, at the age of sixty-six.

Wardlaw was educated at Newcastle upon Tyne, first at Rutherford College, and then at Armstrong College, in the University of Durham. Although he lived for a large part of his life in the Midlands and in London, he never forgot his connexion with Northumberland and often referred with pride to his early days in the North Country. In 1918 he joined the staff of the Department of Chemistry, University of Birmingham. He proved to be an admirable university teacher and progressed to the rank of senior lecturer in inorganic chemistry. He was appointed to the chair of physical chemistry in the University of London, tenable at Birkbeck College, in 1937, and he held his professorship for twenty years until his retirement in 1957, when the title of professor emeritus was conferred on him.

For more than forty years Wardlaw carried out valuable research in inorganic chemistry. During the early stages of his career he investigated some inorganic oxidation processes and made contributions to the chemistry of molybdenum. In the 1930's his interest turned to the stereochemistry of metal complexes. This subject continued to hold his attention for the rest of his life, and by his work he made an important contribution in this field of study. On taking up his appointment in London, Wardlaw had barely succeeded in getting his new department organized when the Second World War began and a halt was called to his research activities. At the conclusion of hostilities he was faced with two major tasks. He had to build up afresh a research group, and to plan and equip a new department, since his College was transferred to new quarters in Bloomsbury. He attacked both tasks with characteristic vigour. An extensive programme of research on the esters of transition metals was initiated, and under his direction a flourishing research school was developed in the new well-equipped laboratories. The results of this last phase of his research work have had an important influence on the development of modern ideas of the inter-relation of physical properties with molecular structure.

Wardlaw held strongly the belief that university scientists should not lead an 'ivory tower' existence, and he seized every opportunity to broaden the impact of chemistry upon the community. He sought to widen the range of contacts of scientists in the universities, in industry, and in research associations, and his membership of the Society of Chemical Industry dated from 1917. He was extremely sympathetic towards the difficulties which faced science masters in schools through poor laboratory accommodation, and often spoke up strongly on this point. Scientific publication interested him enormously, and he gave considerable thought to the best ways of dealing with the ever-increasing volume of chemical papers. To the professional societies he gave generously of his time and found much pleasure in this service. In later life he reached high office in these societies, but his many friends testify that his support was equally enthusiastic at the commencement of his career.

During the difficult period 1940-48, he was honorary secretary of the Chemical Society, and he became president for 1954-56. His first membership of the

Council of the Royal Institute of Chemistry dates from 1929 and at the time of his death he was president. To be elected president of both the Chemical Society and the Royal Institute of Chemistry is an honour accorded to few, and is a measure of the esteem in which Wardlaw was held by his professional colleagues and the confidence which his sound judgment inspired.

He had strong sympathy with the aims of the British Association, and the active part he played in its affairs demonstrates his strong conviction that the chemist has responsibilities which extend beyond the boundaries of his profession. In 1952 he presided over the meetings of Section B (Chemistry) and more recently took office as one of the general secretaries. He was closely connected with the current developments in the activities of the Association.

During the Second World War Wardlaw was a joint secretary of the War Cabinet Scientific Advisory Committee, after which he became scientific advisor to the Committee of Appointments in the Ministry of Labour and National Service. Undoubtedly he had a flair for accurate judgment of character and ability, and his advice has been of great national benefit. In 1949 he was created C.B.E.

Wardlaw was always sympathetic to his students and ready to assist in their problems: they responded to his interest with a deep sense of respect and grateful affection. He could not bear slipshod work or laziness, and on occasion his comment and censure could be forthright.

Being a humorous man of much charm, he had a great many friends. His colleagues at Birkbeck College and throughout the University of London always welcomed his company and found joy in his unvarying friendliness. His devoted and wholly selfless service to learning, the public welfare, the advancement of science and the selection and production of scientists, add up to a life-time's work of inestimable value. Scientists, and especially chemists, owe a great deal to Wardlaw, and it is hard to realize that no longer will it be possible to call on his services or to seek his wise counsel.

In 1932 he married Doris Whitfield, who had herself been trained as a chemist, and he never failed to pay tribute to her sympathetic understanding and help in his work. She and their daughter survive him.

W. G. OVEREND

Prof. A. R. Fulton, M.B.E.

ANGUS ROBERTSON FULTON, emeritus professor of engineering and drawing in the University of St. Andrews, died at his home in Dundee on November 21.

Born in Dundee on June 23, 1871, he suffered the early misfortune of being left an orphan at the age of five. This affected his opportunities for education, but by courage and determination he acquired a training as an engineer. On qualifying, he worked for some years with Hurst and Nelson, of Motherwell, and it is a testimony to his ability that, although up to that stage he had no university degree, he was invited by Prof. T. Claxton-Fidler to be his assistant in the Engineering Department of University College, Dundee. He spent the rest of his professional life, from 1902 until 1946, on the staff of that Department.

He graduated B.Sc. in 1907, and was the main assistant, first, to Prof. Claxton-Fidler, then to his successor, Prof. A. H. Gibson. During the First World War he served for some time in the Royal

Flying Corps and worked as an investigator of accidents caused by mechanical failures. For this work he was mentioned in dispatches and was made M.B.E.

On returning to Dundee, he continued his researches on stresses in materials and received the degree of D.Sc. in due course. He was appointed professor of

engineering and drawing in University College, Dundee, in 1920, and held this post until he retired in 1946. During 1939-46 he was also principal of University College, Dundee. In both posts he was highly respected by his colleagues for his academic abilities, for his powers as an administrator, and for his sincerity. J. DICK

NEWS and VIEWS

Zoology at Cambridge :

Sir James Gray, C.B.E., F.R.S.

SIR JAMES GRAY, who is to retire from the chair of zoology at Cambridge in September, has been one of the chief architects of the structure of modern British zoology. He and the men and women he has trained have been largely responsible for the growth of experimental zoology and for the replacement of comparative anatomy by studies of the living animal in zoological laboratories throughout the Commonwealth. After serving with distinction in the First World War, he returned to Cambridge as Balfour student and then as reader in experimental zoology; his cytological researches during this period culminated in the publication of "Ciliary Movement" in 1928 and "A Textbook of Experimental Cytology" in 1931. The design and building of the new zoology laboratory at Cambridge during 1932-34 provided him with his first major administrative task and it is a tribute to his skill that few people who work there to-day would wish to change the building. He was appointed to the chair in 1937 at a time when his interests were moving away from cytology to the analysis of animal movement, and he pioneered the application of physical principles to many different aspects of this study. Until after the Second World War his work was perhaps not widely known to the world at large, but this was remedied in 1951 by a series of Christmas Lectures at the Royal Institution, which were afterwards published under the title "How Animals Move". Before, and even more after, the War he has been active in the wider spheres of administration, being president of the Marine Biological Association, twice on the Council of the Royal Society, a member of the Agricultural Research Council during 1942-47 and for many years a development commissioner and chairman of the Advisory Committee on Fishery Research. This year he is president of the British Association. As editor, almost from its inception until 1954, of the *Journal of Experimental Biology* he has made a notable contribution to clarity in the publication of scientific results. Altogether, his influence will continue to be felt in his subject for many years.

Prof. C. F. A. Pantin, F.R.S.

DR. C. F. A. PANTIN, who has been elected to succeed Sir James Gray as professor of zoology in the University of Cambridge, has been reader in invertebrate zoology in the University since 1937. After taking his degree from Christ's College, Cambridge, he was physiologist to the Marine Biological Laboratory, Plymouth, during 1922-29, and returned to Cambridge as Harding Lecturer and Fellow of Trinity College in 1929. His researches have ranged over a wide field of invertebrate zoology. During 1923-31 he published a series of papers which laid

the foundation of our knowledge of amœboid movement; in 1931 he established the role of calcium in the osmotic regulation of the body fluid of the marine worm *Gunda* (*Procerodes*). His analysis during 1934-36, of the physiology of crustacean muscle was the starting-point for extensive subsequent work on this tissue; at this time also he became interested in the Coelenterata, the neuromuscular physiology of which he has continued to clarify in a series of papers since that date. On his appointment to the readership, he found time to study the terrestrial Nemertines, hitherto largely unknown in Britain. His experiments have been characterized by a clarity and simplicity which has made them the basis of practical courses in comparative physiology throughout the world; his insistence on the need for a parallel study of structure and function has done much to unify the different approaches to the study of invertebrate animals.

Dr. Pantin was president of Section D of the British Association in 1951, Croonian lecturer of the Royal Society in 1952 and is now president of the Linnean Society. He has given much assistance and encouragement to marine biology overseas, particularly in New Zealand and Brazil. Since 1947 he has been editor of the *Quarterly Journal of Microscopical Science*. His wide experience and skill as a teacher will ensure the continuation of the high standards of zoology at Cambridge.

California Institute of Technology, Radio Observatory :

Dr. J. G. Bolton

JOHN GATENBY BOLTON has been appointed the first director of the California Institute of Technology's newly established Radio Observatory, which is situated near Big Pine in the picturesque Owens Valley of California. Bolton, while a member of the Radiophysics Division of the Australian Commonwealth Scientific and Industrial Research Organization, was responsible for some of the pioneering discoveries in radio astronomy, notably of the existence of 'radio stars'. In 1947, he was the first to put an upper limit (8' of arc) on the size of the previously reported source in Cygnus, to define its position with sufficient accuracy to be able to say it was in a region of the Galaxy distinguished by the absence of bright stars and nebulae, and to point out that the radio noise from it was out of all proportion to the optical radiation. Soon after, in 1948, he announced the position of other point sources; made the first identification with an optical object—that in Taurus with the Crab Nebula, the remains of an old supernova; and took some of the first steps in using the radio observations to throw new light on the structure of the Galaxy. With this background, it is not surprising that the research programme of the new Radio Observatory will be concerned prin-