

## OBITUARIES

Sir Norman Haworth, F.R.S.

By the sudden and unexpected death of Sir Norman Haworth on March 18 at the age of sixty-six, the world has lost one of its most distinguished organic chemists. Walter Norman Haworth was born at White Coppice, near Chorley, in 1883. His early schooling was at Chorley and Preston, and after a period in business he proceeded to Owens College, Manchester, for which University he maintained throughout his life a deep respect and affection. A brilliant member of a brilliant group of students, he then went to Göttingen, where he obtained his doctorate.

Haworth's first teaching post was at the Imperial College, South Kensington, where he undertook investigations in the terpene group. In 1912 he moved to the University of St. Andrews, which was leading the world in the development of modern carbohydrate chemistry, and there he became interested in the problems which were to become his life-work. After interruption during the First World War, when he took a prominent part in the war-time activities of the St. Andrews laboratories, academic studies were resumed, and in 1920 he was offered the chair of chemistry at Armstrong College, Newcastle upon Tyne, in the University of Durham. It was during this period (1922) that he married Violet Chilton, second daughter of the late Sir James Dobbie, and he is survived by her and by two sons.

In 1925 Haworth became Mason professor of chemistry and director of the Chemistry Department in the University of Birmingham, holding these offices until his retirement in 1948. During this long period a constant and rapid flow of papers on the chemistry of the sugars emanated from his laboratories. Throughout, the work was directed, with the sure touch of a master, to the solution of highly important but often extremely difficult problems. These included the determination of the ring structures of the stable and unstable forms of mono-saccharide derivatives, the names 'pyranose' and 'furanose' by which they are now universally known being assigned to them by Haworth. This work paved the way for the determination of the structures of the di- and tri-saccharides, notably cellobiose, lactose, maltose and sucrose, by the application of ingenious, but rigidly controlled, experimental methods.

As this fundamental knowledge grew in volume it became possible to explore for the first time, by chemical methods, the structure of the complex polysaccharides, and an ever-increasing proportion of the publications of Haworth and his collaborators became devoted to this group. Among many outstanding achievements may be mentioned the work on the chain structure of cellulose and the end-group method for the determination of the size of repeating units; the work on amylose and amylopectin and on the action of the *P*- and *Q*-enzyme systems in the synthesis of starch from glucose 1-phosphate. From his laboratory there came also much pioneer work on the nature of the biologically important bacterial polysaccharides. Besides all this, the Birmingham school was responsible for the structural determination and synthesis of vitamin C; it provided the first unequivocal proof of the structure of glucosamine and published many papers on sugar carbonates, acetone compounds, anhydro sugars and on other subjects too numerous to detail.

In addition to research, Haworth was active in teaching and administration. He excelled as a lecturer both to graduate and undergraduate audiences, and in the administration of his department his methods were efficient and businesslike. He rendered valuable service to the University of Birmingham as dean of the Faculty of Science during three critical and difficult war years, and as vice-principal (1947-48). He served with distinction on many boards and committees, both in peace-time and during the War, when he was prominently associated with the chemical side of research into atomic energy.

Many honours came to Haworth in recognition of his contributions to science. In 1928 he was elected to the fellowship of the Royal Society, of which he was vice-president in 1948. In 1937 he was awarded the Nobel Prize for Chemistry, being the first British organic chemist to receive it. He was president of the Chemical Society (1944-46). He received his knighthood in 1947, and among many other distinctions may be mentioned the Longstaff Medal of the Chemical Society (1933), the Davy (1934) and the Royal (1942) Medals of the Royal Society, many honorary degrees (D.Sc., Belfast, Zurich and Oslo; Sc.D., Cambridge; LL.D., Manchester) and honorary membership of many foreign academies (Haarlem, Brussels, Munich, Vienna, Finland, Dublin, and the Swiss Chemical Society).

His interests were wide and he had friends in all parts of the world. By them and by his students and colleagues he will be remembered with pride, respect and affection. Haworth's outstanding characteristic, a gift given to very few men, was a capacity for inspired leadership which invoked in his colleagues and research workers a passionate enthusiasm for the tasks, no matter how difficult, that lay before them. All who knew him valued his wise counsel and understanding, the uncompromising straightforwardness of his dealings, his unvarying kindness, and his thoughtfulness for others.

E. L. HIRST

## Dr. Robert Gurney

ALTHOUGH he was best known to zoologists for his important work on certain groups of Crustacea, Robert Gurney, who died at Oxford on March 5, was, in fact, a field naturalist of the good old school who combined a love for the wild things of the countryside with a scholarly appreciation of many different aspects of biology.

Gurney was born in 1880, the fourth son of John Gurney, of Sprowston Hall, Norfolk. He was educated at Eton and was a scholar of New College, Oxford, where he graduated with first-class honours in zoology in 1902 and was awarded the D.Sc. in 1927. Most of his scientific work was done at home, at first in Norfolk and afterwards in Oxford, and his modest and retiring nature perhaps delayed recognition of its importance. As a Norfolk man, it was natural that his attention was early turned to the problems of fresh- and brackish-water biology as presented in the Broads, and, with his elder brother Eustace, he established at Sutton Broad, some fifty years ago, the first freshwater station in Great Britain. Many years later he took an active part in founding the Freshwater Biological Association with its laboratory at Lake Windermere.

The bulk of Gurney's scientific work had to do with two groups of Crustacea, the freshwater Copepoda and the marine Decapoda, with special reference to

the larval development of the latter. On the Copepoda he wrote many papers dealing not only with the British species but also with collections sent to him from many other parts of the world. His most important publication on the group was his "British Fresh-water Copepoda", issued by the Ray Society in three volumes (1931-33). In this monograph, abundantly illustrated by his own drawings, he not only described in detail all the British species, with their larval stages where these were known, but also discussed their morphology, classification, distribution and ecology. This work will not soon be superseded as the chief authority on the British species, and may be recommended to young systematists as a model of what such a monograph should be.

Gurney's researches on the larval development of decapod Crustacea began at the Plymouth laboratory of the Marine Biological Association, of which he was a founder member, but were later extended to other and distant seas, partly as a result of his own travels. He took part in the Cambridge Expedition to the Suez Canal in 1924. He worked in 1936 at the Egyptian marine station established by the late Dr. Crossland at Ghardaqa on the Red Sea. In 1935 and again in 1938, in company with his brother-in-law, the late Prof. Walter Garstang, he visited the marine station at Bermuda, where he had a unique opportunity of observing living specimens of the deep-sea fauna. In addition, he reported for the British Museum (Natural History) on the larvæ collected by the *Terra Nova* and the Great Barrier Reef Expeditions and, for the "Discovery" Committee, on the extensive collections from the *Discovery II* voyages. The results of all this work are recorded in a long series of memoirs and are summed up in two volumes published by the Ray Society, a classified "Bibliography" (1939) and "Larvæ of Decapod Crustacea" (1942). Although the general course of the larval development of decapods has been well known for a very long time, there are still remarkably few cases in which the whole sequence of stages is known for a single species. Gurney's work, however, now enables the main features of the series to be defined for a large number of genera in the chief families of the group, and only his diffidence in putting forward any views that might be regarded as 'speculative' prevented him from anticipating conclusions that will doubtless be drawn by others from his data.

Among writings of a less rigidly scientific scope, testifying to the breadth of his interests, mention must be made of his charming little book on "Our Trees and Woodlands" (1947) illustrated by himself. Nor is it irrelevant to remember the large number of young people (not only his Boy Scouts) in Norfolk and elsewhere who owe to him the first stirring of their interest in Nature.

W. T. CALMAN

#### Prof. Johan Harald Kylin

JOHAN HARALD KYLIN, emeritus professor of botany in the University of Lund, who died on December 16, 1949, in his seventieth year, had done much to earn a lasting name among botanists. He graduated at Uppsala in 1901, took his doctor's degree there in 1907, and was appointed professor of botany in the University of Lund in 1920, a position which he held until his retirement in 1944. Many prominent algologists (Bliding, Levring, Papenfuss, etc.) received part of their training in his department. He spent a considerable part of his vacations at the Zoological Station in Kristineberg, where many of

his researches were carried out. He was for many years editor of *Botaniska Notiser* and of other Swedish publications.

The bulk of Kylin's published work refers to seaweeds, of which he possessed an unrivalled knowledge. His earliest papers, dealing with the marine algæ of the west coast of Scandinavia, had an ecological outlook; but he soon turned his attention to various aspects of the biochemistry of seaweeds, topics which continued to rouse his interest up to the time of his death. The biochemical researches that appeared in the *Zeitschrift für physiologische Chemie* in 1913, 1915 and 1918 laid the foundations for our present-day knowledge and did much to stimulate inquiry into the chemical nature of the cell-walls and of the cell-contents of seaweeds. Other investigations of an analogous kind dealt with the resistance of these plants to low temperatures and to variations in the osmotic pressure of the environment, while a whole series of papers were concerned with the iodine economy of seaweeds.

It is, however, in the domain of algal morphology and taxonomy that Kylin made his greatest contribution. His first major paper in this direction, "Studien über die Entwicklungsgeschichte der Phæophyceen", which contained, *inter alia*, a detailed account of the development and life-history of *Chorda*, was published in 1918. This was followed in 1923 by the still more comprehensive "Studien über die Entwicklungsgeschichte der Florideen", in which he brought to bear the experience gained during previously published researches on the life-history of species of *Batrachospermum*, *Nemalion*, *Rhodomela*, *Griiffithsia*, etc. The 1923 memoir was succeeded by others of equal scope which enabled Kylin to rectify many earlier mistakes and to contribute materially to a better grouping of red seaweeds. They include monographic treatments of Gigartinales and Rhodomeniales and a detailed taxonomic survey of the Delesseriaceæ. The volume on the anatomy of the Rhodophyceæ contributed to Linsbauer's "Handbuch der Pflanzenanatomie" in 1937 is largely an epitome of Kylin's own observations. Kylin also edited the Rhodophyceæ for the new edition of the "Natürliche Pflanzenfamilien", a final contribution of his which is about to be published in Sweden.

In the thirties Kylin returned to the investigation of the Phæophyceæ and particularly of the forms grouped by Oltmanns and the writer as Ectocarpaceæ. These researches, in conjunction with those previously published by Sauvageau, threw much light on the nature of the reproductive processes in this order and clarified many taxonomic difficulties. They led Kylin to lay special stress on the life-cycle in the classification of the Phæophyceæ, the bulk of which he grouped into the series Isogeneratæ and Heterogeneratæ, according as the life-cycle is isomorphic or heteromorphic. His investigations on brown algæ also led to a very valuable monographic treatment of the Chordariales and to diverse papers dealing with the Fucales, in particular the structure of the spermatozoids.

F. E. FRITSCH

WE regret to announce the following deaths:

Sir James Henderson, formerly professor of applied mechanics, Royal Naval College, Greenwich, on April 7, aged seventy-nine.

Dr. Hugh Robert Mill, known as geographer and meteorologist, on April 5, aged eighty-eight.