be free to publish their findings, to discuss their work and to enter fully into the life of the scientific community. The Institute will continue the well-established, close association between the universities and the Inveresk laboratory.

The new Institute, which is known as the Arthur D. Little Research Institute, is governed by a Board of Management of which Lord Bilsland is chairman. The other British members of the Board are Sir Robert Erskine-Hill, Sir David Anderson, director of the Royal College of Science and Technology, Glasgow; and Sir Ian Heilbron, director of the Brewing Industry Research Foundation, Nutfield, Surrey, professor emeritus of organic chemistry, University of London, and war-time scientific adviser to the Minister of Production. The American members are Mr. Raymond Stevens, president of Arthur D. Little, Inc., and Dr. L. W. Bass and Mr. W. A. W. Krebs, vice-presidents.

Since 1944 the Institute of Seaweed Research has been elucidating many of the scientific problems associated with the marine algae and their utilization. This work, which has stimulated great interest in practically every maritime country in the world, has aided the development in Britain of a new industry based upon seaweed now using annually more than 40 thousand tons of a crop which, until recently, was looked upon as useless. The industry has brought much-needed employment to the highlands and islands of Scotland.

By agreement, the work on seaweed which is being continued under the ægis of the Institute of Seaweed Research financed from the Development Fund is still based on the Inveresk laboratories. This will be independent of the new Institute, and its main responsibilities are now to support fundamental seaweed research at the universities, to operate an information service particularly for the use of industry, and to give technical assistance and advice to those interested in seaweed utilization in the crofting communities. Mr. E. Booth is in charge of these operations and is answerable to the Institute of Seaweed Research Board, which has been reconstituted in line with the change in emphasis of its work.

The Arthur D. Little organization, which is situated next to the Massachusetts Institute of Technology on the Charles River in Cambridge, Massachusetts, is the oldest and most diversified of the private industrial research organizations in the United States and works on problems of both basic and applied research brought to it by industry and by Governments.

Although the American organization's activities have been mainly concerned with the application of technical knowledge to industrial problems during the past seventy years, it has also undertaken fundamental investigations in a variety of fields such as solid-state physics, low-temperature physics and chemistry, meteorology, biological research connected with cancer problems, the last-named under the auspices of the U.S. National Institutes of Health. More recently, experts from Arthur D. Little, Inc., have been asked to assess unutilized resources in a number of areas such as Manitoba, Newfoundland and Nova Scotia in Canada as well as in Honduras, Jamaica, Puerto Rico, Egypt and Iraq, and to advise the Governments concerned as to how best these can be developed.

The Arthur D. Little organization has had many connexions with the United Kingdom; in 1928–29 the late Dr. Little served as president of the Society of Chemical Industry and was awarded its Perkin Medal in 1930.

The Arthur Dehon Little Memorial Lectureship at the Massachusetts Institute of Technology has been held by a number of distinguished British scientists, including Sir Edward Appleton, principal and vice-chancellor of the University of Edinburgh, and Sir Alexander Todd, chairman of the Advisory Council on Scientific Policy.

The new Institute at Inveresk is the first of this type in Britain. It is international in direction and outlook and will open up further channels of communication between North American scientists and their British and Continental colleagues.

OBITUARIES

Prof. Walter Bothe

PROF. WALTER BOTHE, head of the Department of Physics at the Max-Planck-Institut für medizinische Forschung, Heidelberg, died on February 8 after a long illness. He was born in Berlin on January 20, 1891, and was educated at the University of Berlin as a pupil of Max Planck. In 1914 he obtained a doctorate for an investigation on the molecular theory of refraction, reflexion, dispersion and extinction. During the First World War, while a prisoner of war in Russia, he continued his work in this field. From 1920 until 1931 he was working as a member of the Physikalisch-Technische Reichsanstalt in Berlin-Charlottenburg, in 1931 became professor of physics in Giessen and in 1933 head of the Physics Department of the present Max-Planck-Institut in Heidelberg.

At Berlin-Charlottenburg his activities turned first to the theoretical problems of radioactive decay. But working there along with H. Geiger, he became one of the best experimental physicists in the field of radioactivity and cosmic radiation. He realized the troublesome conditions for single scattering of beta-rays, especially for large angles, and in later years he investigated very carefully the transition between multiple scattering and the diffusion of the electrons for electrons emerging from a foil. The problem of single and multiple scattering of beta-rays held his interest throughout his whole life.

Bothe had an unusually comprehensive faculty for dealing with very different problems experimentally as well as theoretically. One of his most important investigations was carried out in 1924 together with Geiger, when they proved experimentally that the conservation of momentum and of energy is valid in the elementary process of the Compton effect, and not only statistically as suggested from some quantum-mechanical considerations. In these experiments the coincidence method was developed which Bothe and Kolhörster applied later to provide evidence of the existence of high-energy particles in cosmic radiation. The discovery of the neutron started in 1930 with the observation of a very penetrating radiation by Bothe and Becker when bombarding certain

light elements, and especially beryllium, with alpha-particles from polonium. Bothe and Becker concluded that this radiation consisted of gamma-rays of several million electron volts energy. This conclusion was completely right, since their Geiger counter was not sensitive for neutrons. Yet even if the authors could not detect the neutron by their experiments, they had discovered the artificial excitation of nuclear gamma-rays and thereby paved the way for the discovery of the neutron.

From Bothe's wide range of work there may further be mentioned the method of determining gamma-ray energies by measurement of the absorption of the secondary electrons produced by the gamma-rays in an appropriate foil, and his investigations on the diffusion of neutrons in different materials.

Bothe was a very good teacher, exacting in his demands but highly stimulating, and many of the younger physicists in Germany as well as in other countries have been his students. His hobbies were music and painting, in which he found recreation and delight.

In 1954, Bothe received the Nobel Prize for Physics (jointly with Max Born), for the development of the coincidence method and the results obtained by its application.

LISE MEITNER

Dr. P. Grodzinski

THE death was reported on February 20 of Dr. Paul Grodzinski, who died of a heart attack at the age of fifty-six.

Grodzinski, born in Berlin, studied at Dresden in the Faculty of Engineering, and from 1932 onwards worked as a freelance technical writer with a special interest in mechanisms. In 1938 he settled in London, and two years later was largely responsible for the founding of the *Industrial Diamond Review*. From the very first Grodzinski became the technical editor, which position he occupied until his death. In 1943 he became head of the Industrial Diamond Information Bureau of the Industrial Distributors (Sales), Ltd., and in that capacity was responsible for the publication of the "Bibliography of Industrial Diamond Applications".

He was the author of several very valuable books, among which were "Diamond Tools" (1936 and 1944), "Diamond and Gem Stone Industrial Production" (1942), "Practical Theory of Mechanisms" (1947) and in particular and most outstanding, "Diamond Technology" (1953). This last book is easily the most outstanding contribution in the field, an 800-page treatise which, in effect, was the accumulation of his life's work.

Grodzinski had a flair for inventing fine mechanisms and in particular his double-cone diamond indenter and his machine for the production of spherical diamond surfaces were outstanding achievements.

In his capacity as head of the Diamond Information Bureau many users of diamond, whether it was a question of cutting an optical grating or a question of pure history, found, on turning to Grodzinski, an amazing and profound knowledge of a vast literature. He himself had a particular interest in the history of the use of diamond and made several novel contributions to the subject, unearthing a number of unusual prints and engravings bearing thereon. His knowledge of the literature extended far beyond that of diamond, for hard materials and the production and testing of superfine finishes were, to him, as important as the diamond itself. His passing leaves a void which will be difficult to fill.

S. TOLANSKY

NEW FELLOWS OF THE ROYAL SOCIETY

AT the meeting of the Royal Society on March 21, the following were elected to fellowships:

PROF. S. ADLER, professor of parasitology in the Hebrew University, distinguished for his researches on pathogenic protozoa and the diseases caused by them, especially visceral and cutaneous leishmaniasis.

PROF. E. C. AMOROSO, professor of physiology in the University of London, distinguished for his studies on reproduction in vertebrates.

DR. CHARLOTTE AUERBACH, lecturer in animal genetics in the University of Edinburgh, distinguished for her pioneering work on the chemical induction of mutations.

DR. G. K. BATCHELOR, lecturer in mathematics in the University of Cambridge, distinguished for his contributions to the theory of turbulence, and other branches of fluid mechanics.

PROF. W. E. BURCHAM, Oliver Lodge professor of physics in the University of Birmingham, distinguished for his experimental work with particle accelerators, and particularly for his investigations of alpha-particle emission from the excited states of light nuclei.

PROF. F. S. DAINTON, professor of physical chemistry in the University of Leeds, distinguished for his contributions to physical chemistry and particularly his work on reaction kinetics, polymerization processes and radiation chemistry.

PROF. J. F. DANIELLI, professor of zoology in the University of London, distinguished for his work in cellular biology, particularly on the nature of the cell surface and on the intracellular localization of enzymes.

FRED HOYLE, lecturer in mathematics in the University of Cambridge, distinguished for his work on stellar constitution, on nuclear reactions in stars and on cosmological theory.

PROF. J. K. N. JONES, professor of chemistry in Queen's University, Kingston, Ontario, distinguished for his structural studies of complex macromolecules and his investigations on the biosynthesis of simple sugars.

PROF. H. S. LIPSON, professor of applied physics and director of the Laboratories in the Faculty of Technology, University of Manchester, distinguished for his work on the crystal structure of inorganic compounds and metallic alloys, and his development of computational methods in X-ray analysis.

PROF. J. MCMICHAEL, professor of medicine in the University of London, distinguished for his contributions to medical knowledge, especially on the mechanisms of heart failure.