

from aircraft cannon fire. 'Plastic armour' consisted of a tightly packed mass of stone particles held together by a bituminous mortar and backed by a steel plate; 'plastic protective plating' was an even denser material with a higher stone content compacted by vibration and encased in thin sheet steel. In essence, these devices provided a protective layer, the resistance of which to penetration was highly irregular, thus causing projectiles to yaw away from a straight path.

Mr. Waters joined the Bituminous Section of the Road Research Laboratory in 1936: at the time of his death he was in charge of the Laboratory's Scottish branch at East Kilbride. His colleagues will long remember his originality of mind, enlivened always by gaiety and wit.

Dr. Ernst Wanner

Dr. ERNST WANNER was born in Zurich on July 22, 1900. In 1925, he was awarded the degree of doctor of mathematics at Zurich for work on groups of linear transformations, and in 1928 was appointed to the Swiss Meteorological Service, where he remained until his death from a heart attack on November 4, 1955.

He worked on magnetic variations at Regensburg and on seismology at Zurich. Latterly he was vice-director of the Swiss Meteorological Service and responsible for personnel. That he was successful in both these fields is a tribute to him both as a scientist and as a man. He was basically good-natured, modest and very straightforward.

With A. Kreis, Wanner constructed a 1,000-kgm. vertical seismograph, which assisted him in obtaining data for the study of Swiss earthquakes and their impact on Alpine structure. He also studied Swiss earthquakes historically, compiling a catalogue of shocks between the dates 1856 and 1879. With all this material he was able to work out the correlation between earthquake epicentres in Switzerland and Swiss Tertiary volcanics and thermal springs. He used a method due to G. Polya and F. Eggenberger on the coupling of earthquake aftershocks. Finally, with P. L. Mercanton, Wanner studied the magnetic anomaly in Jorat, near Lausanne.

Wanner was president of the Swiss Committee of the International Union of Geodesy and Geophysics, vice-president of the International Association of Seismology and the Physics of the Earth's Interior, and the Swiss representative on the European Seismological Commission. He was unmarried.

ERNEST TILLOTSON

NEW FELLOWS OF THE ROYAL SOCIETY

AT the meeting of the Royal Society on March 15, the following were elected to fellowship:

DR. N. P. ALLEN, superintendent, Metallurgy Division, National Physical Laboratory, Teddington, Middlesex, distinguished for his work on alloy steels, their transformations, and their engineering properties

PROF. J. F. BAKER, professor of mechanical sciences, University of Cambridge, distinguished both for his experimental and theoretical investigations of steel structures and for services to education in engineering.

PROF. R. M. BARBER, professor of chemistry, Imperial College of Science and Technology, London, distinguished for his work on the mechanism of adsorption and diffusion of gases in solids and the problem of molecular sieves in zeolite minerals.

DR. R. BROWN, head of the Agricultural Research Council Unit of Plant Cell Physiology, Oxford, distinguished for his work on germination of parasitic seeds and isolation of germination hormones, also for studies of factors involved in cell division and development.

PROF. J. A. V. BUTLER, professor of physical chemistry, University of London, distinguished for his work on thermodynamics, and the application of physical techniques for the solution of problems of molecular structure of deoxyribonucleic acids.

DR. D. GABOR, Mullard reader in electronics, Imperial College of Science and Technology, London, distinguished for his work on transient electric phenomena, electron microscopy, the theory of communication and the electric arc plasma.

DR. H. GRÜNEBERG, reader in genetics, University of London, distinguished for his investigations into the expression of genes during development in mammals.

DR. C. S. HALLPIKE, director, Otolological Research Unit of the Medical Research Council, London, distinguished for his investigations of the physiology and pathology of the internal ear and the mechanisms of hearing and equilibration.

PROF. J. E. HARRIS, professor of zoology, University of Bristol, distinguished for his researches in several branches of experimental zoology.

W. K. HAYMAN, reader in analysis, University of Exeter, distinguished for his contributions to the theory of functions of a complex variable.

PROF. N. KEMMER, Tait professor of natural philosophy, University of Edinburgh, distinguished for his pioneering work on the fundamental particles of physics, particularly on the meson and its role in determining forces within the atomic nucleus.

DR. N. KURTJ, lecturer and demonstrator in physics, University of Oxford, and Senior Research Fellow, Brasenose College, distinguished for his work on phenomena at very low temperatures, particularly in paramagnetism and nuclear alignment.

DR. R. G. MACFARLANE, Radcliffe lecturer in hæmatology, University of Oxford, distinguished for his studies on blood coagulation and their application for the treatment of hæmophilia.

DR. R. MARKHAM, principal scientific officer, Plant Virus Research Unit (Agricultural Research Council), Cambridge, distinguished for his studies on plant viruses and for his contributions to knowledge of nucleic acids.

DR. J. W. MITCHELL, reader in physics, University of Bristol, distinguished for his work on the action of light on crystals, particularly in photographic emulsions, and on the nature of the photographic latent image.

PROF. W. D. M. PATON, professor of pharmacology, Royal College of Surgeons, London, distinguished for his work on the relation between chemical structure and pharmacological action, and for the discovery of several important new drugs.

DR. A. B. PIPPARD, lecturer in physics, University of Cambridge, distinguished for his work on the electrical properties of metals at radio-frequencies, and for his studies of the superconducting state.

DR. HELEN K. PORTER, principal scientific officer, Research Institute of Plant Physiology, Imperial College of Science and Technology, London, distinguished for her work on fructosans of leaves, on carbohydrate metabolism of fruits and cereals and for enzymological studies on polysaccharide syntheses in plants.

DR. G. SALT, lecturer in zoology, University of Cambridge, distinguished for his experimental and ecological researches on insects, especially on parasitic Hymenoptera.

PROF. C. W. SHOPPEE, professor of chemistry, University College, Swansea, distinguished for his contributions to organic chemistry with special reference to the elucidation of problems of stereochemical relationships in the steroid field.

PROF. F. W. SHOTTON, professor of geology, University of Birmingham, distinguished for his contributions in stratigraphy and particularly for his work on the Pleistocene deposits of the Midlands.

DR. E. I. WHITE, keeper of geology, British Museum (Natural History), London, distinguished for his research on the earliest vertebrates and fossil fishes, particularly those from the Old Red Sandstone.

DR. M. V. WILKES, director, University Mathematical Laboratory, Cambridge, distinguished for his contribution to the design and construction of automatic calculating machines, and their application to the solution of a wide variety of scientific problems.

DR. D. H. WILKINSON, lecturer in physics, University of Cambridge, distinguished for his researches in nuclear physics, especially his investigation of the properties of the energy levels of light nuclei.

PROF. A. WORMALL, professor of chemistry and biochemistry, St. Bartholomew's Hospital Medical College, London, distinguished for his researches in biochemistry and for his pioneer work in the development of the use of isotopes in immunochemistry.

NEWS and VIEWS

Physical Metallurgy at the Imperial College, London: Mr. J. G. Ball

MR. J. G. BALL, of the Atomic Energy Research Establishment, has been appointed to the chair of physical metallurgy in the Imperial College of Science and Technology, University of London. After leaving the University of Birmingham, Mr. Ball joined the Welding Research Council in 1941. When this became the British Welding Research Association in 1945, he was appointed senior metallurgist with responsibility for establishing and directing the metallurgical laboratories; there he initiated a programme of basic work on light alloy and structural steel welding. Mr. Ball led a strong team on steel welding which has made fundamental contributions to the understanding of welding behaviour and the development of new alloy steels of good weldability. He was particularly associated with developments in the fabrication of Bailey bridges and is a member of a Ministry of Supply Committee on this subject. He joined the Atomic Energy Research Establishment, Harwell, in 1949, to take charge of investigations on the metallurgy of plutonium, and he pioneered the special techniques for handling plutonium and for micro-scale investigations. He was jointly responsible with Dr. R. Hurst for the design of the new plutonium laboratory at Harwell, which is based on new principles and incorporates novel techniques. The plutonium core for the fast reactor Zephyr was fabricated under his direction. For the past three years he has been head of the Reactor Metallurgy Group in the Metallurgy Division, and has given much attention to the problems of irradiation behaviour of fissile materials and the design and behaviour of fuel elements. Mr. Ball is a member of the Council of the Institution of Metallurgists. With Mr. Ball's appointment, it is intended that the development of the research and postgraduate

activities in metallurgy at the Imperial College will have a bias towards the metallurgy of nuclear energy.

Chemistry at Rothamsted Experimental Station: Dr. G. W. Cooke

DR. G. W. COOKE has been appointed head of the Chemistry Department of Rothamsted Experimental Station, in succession to Dr. R. K. Schofield, who has gone to the Department of Agriculture, University of Oxford (*Nature*, 176, 910; 1955). Dr. Cooke was educated at Loughborough Grammar School and (the then) University College, Nottingham, graduating with first-class honours in chemistry in 1937. After postgraduate research in biochemistry with the late Prof. J. M. Gulland, he joined the Chemistry Department at Rothamsted as a Ministry of Agriculture research scholar. In 1940 Dr. Cooke obtained his Ph.D. for a thesis on soil phosphate chemistry. During the Second World War he was concerned with testing new phosphate fertilizers which were made as alternatives to superphosphate. Afterwards he turned his attention to improving the efficiency of fertilizers by developing special methods of application. This work, which proved the value of fertilizer placement practices for certain crops, is already being applied by farmers. His experience in fertilizers has led to Dr. Cooke being invited to carry out short-term work for both the Food and Agriculture Organization and the Organization for European Economic Co-operation. He has been honorary secretary of the Agriculture Group of the Society of Chemical Industry, of which he is at present vice-chairman. He has also served on the Council of the Fertilizer Society.

Symbol for the International Geophysical Year

It has been decided to use the following symbols in connexion with the International Geophysical Year: