fore maintained with other national bodies, research associations, manufacturers, universities, engineering institutions, professional institutes and scientific societies.

The nature of the scientific work of the Laboratories may best be indicated by summarizing some of the investigations which have been undertaken or are now in progress. When 132-kV. overhead lines and substations were first put into operation in industrial areas, difficulties were experienced due to the flashover of insulators in fog, and research was initiated with a view to solving this problem. The immediate object of this work was to devise a method of measuring the performance of insulators operating in these conditions; the best available type could then be employed, and improved designs could be developed. This work next led to a study of the electrical properties of aqueous films on porcelain surfaces and then to the elucidation of the mechanism of insulator flashover in humid and polluted atmospheres. Furthermore, it was found that the reliability and efficiency of high-voltage insulators could be increased if the voltage distribution were controlled in such a way as to prevent excessive voltage gradients or spark discharges. One method of achieving this is to glaze the porcelain insulators with a glaze having the required resistance, and this led to the development by an English manufacturer of a semi-conducting ceramic glaze. Semi-conducting glaze consists essentially of a mixture of metallic oxides incorporated in a glassy matrix; this material has an interesting structure, and work is at present in progress on its electrical characteristics and on the contact phenomena between the glaze and a metal or cement electrode.

Certain aspects of insulating liquids are also being investigated. For example, a D.C. conductivity test has been devised for controlling the condition of hydrocarbon oils used in transformers and switchgear. In this connexion, the mechanism of conductivity in insulating oil containing very small quantities of free water is being studied. Experimental investigations are also being made on the oxidation of oil and on the interfacial tension at an oil-water interface.

An important programme of research on high-voltage transmission has been started recently. An experimental transmission line, 800 yards long, has been built for this work, and is at present being operated at 250–300 kV. Measurements are being made of the power loss due to corona discharge and insulator leakage in various weather conditions. The intensity of the radio interfering field from this line is also being measured, and comparisons are being made of the signal/noise ratio for amplitude-modulation and frequency-modulation transmissions. Interference with television reception is being studied, and it has been found that good reception can be obtained with the television aerial only ten yards from the line conductors.

About forty per cent of the breakdowns on the overhead lines of the National Grid system are due to lightning, and much attention has therefore been directed to methods of improving the performance of power systems when subjected to high surge voltages. Three lines of investigation are at present being followed: in the first place, the electric strength of insulating materials and power system plant is being studied under impulse conditions—the new 1,400-kV. surge generator at Leatherhead will be of assistance in obtaining experimental data in this wide field; secondly, radio methods are being used to give the control engineers objective information about the occurrence of thunderstorms in the areas under their control; and finally, the records of system breakdowns due to lightning are being examined statistically. It is noteworthy that a recent analysis of breakdown records for fourteen years gives a reliable picture of the seasonal and diurnal variations in thunderstorm severity and of the fluctuations from year to year.

About twenty thousand miles of steel-cored aluminium conductor is in use on the Grid lines, and development work is continually in progress on methods of jointing and protection against corrosion in industrial and coastal atmospheres. Samples of conductor from various parts of Great Britain are examined, and an interesting result of this work is that pure aluminium has been found to corrode progressively—the commonly accepted view that a protective layer is formed which prevents further attack is erroneous.

Other transmission problems which are being studied are conductor vibration, earthing, deionization of arcs, radio and inductive interference, harmonics, and the measurement of noise from transformers and air-blast switchgear.

As the new Laboratories have grown from the transmission background of the Central Electricity Board, it is only to be expected that most of the work should be devoted to electric power transmission. The scope of the work is now being extended to cover generation and distribution more adequately. For example, investigations have been made to develop methods of reducing the precipitation of moisture from generating-plant water-cooling towers. This apparently mundane problem has led to interesting experiments with a model cooling tower and to a study of the physical and meteorological phenomena relating to water droplets. The results obtained may then suggest possible ways of improving cooling-tower efficiency. Thus, as frequently happens, an operational trouble leads to testing and development, then to 'pure' research, and finally, through 'applied' research, back to normal practice.

OBITUARY

Dr. G. A. Waterhouse

GUSTAVUS ATHOL WATERHOUSE, who died on July 29, took a prominent part in the development of natural history in New South Wales over a period of more than forty years. He was born at Waverley, Sydney, on May 21, 1877, and was educated at Sydney Grammar School and the University of Sydney. He graduated B.Sc. in 1899 and B.E. in 1900. After graduation he was appointed to the assay staff at the Sydney branch of the Royal Mint and remained there until the Mint was closed in 1926, when he retired. In 1924 he obtained the degree of D.Sc. at the University of Sydney for his work on the hybridization of butterflies.

Waterhouse made important contributions to science in Australia in two ways: first, by his researches on Australian butterflies and, secondly, by his activities in connexion with the advancement and administration of scientific societies and institutions. His collection of butterflies which ultimately became the finest existing collection of Australian species

was commenced in 1893 while he was still at school. It is now preserved in the Australian Museum, to which he presented it about fifteen years ago.

Waterhouse took an active part in the Australian societies interested in science in general and natural history in particular, and most of them he served in an executive capacity at some time. The Royal Entomological Society of London conferred on him the unusual distinction of Honorary Life Fellowship. He was honorary entomologist of the Australian Museum from 1919; an elective trustee from 1926 until his resignation in 1947 on account of ill-health; and president of the Board of Trustees in 1930.

For any ordinary man it might be expected that an absorbing interest in Lepidoptera and intense activity in scientific societies would occupy all the leisure time available. But Waterhouse was remarkably active, both physically and mentally, and always had some interests in addition to those mentioned. About 1900 he was interested in the distribution of basic volcanic dykes in the Triassic Hawkesbury Sandstone Series in the Sydney district; for many years he collected Mollusca, of which his mother presented a fine collection to the Australian Museum; and he was a keen philatelist. He is survived by his widow, two sons and two daughters; one son was killed on active service in New Guinea during the Second World War. A. B. WALKOM

NEWS and VIEWS

Civil Engineering at Liverpool:

Prof. R. G. Batson

PROF. R. G. BATSON retires at the end of September from the John William Hughes chair of civil engineering in the University of Liverpool. After leaving King's College, London, he received practical training at Woolwich Arsenal. In 1908 he went to the National Physical Laboratory and was one of a team of five members in the Engineering Department at that time. For some years he carried out research of a mechanical engineering nature, but later became a principal scientific officer on road research and was in charge of the Road Research Board. He was appointed to the chair of civil engineering in the University of Liverpool in 1936, and since that time he has directed the teaching of that branch of engineering in an energetic, enterprising and sympathetic manner. He has introduced new courses of lectures, and his success may be gauged by the readiness with which his students secure satisfactory appointments. During his tenure of the chair, Prof. Batson has been dean of the faculty of engineering for a continuous period of ten years. The holder of a number of awards for original papers, Prof. Batson is also the joint author of a well-known book on "Mechanical Testing" and has recently published a book on "Roads".

Dr. J. B. B. Owen

DR. J. B. B. OWEN, who succeeds Prof. R. G. Batson on October 1 at Liverpool, is thirty-nine years of age and obtained a first-class honours degree in civil engineering in 1931 at University College, Cardiff. He was awarded the Meyricke Scholarship to Jesus College, Oxford, in 1931, where he studied for two years in the Engineering Laboratory and graduated as B.Sc. (Oxford) for research on "Problems of Stress Distribution in Frameworks". He obtained his doctorate (D.Sc.) at Oxford this year. After leaving Oxford in 1933, Dr. Owen was engineering scientific assistant for two years at the British Cotton Industry Research Association, where he was employed on the development of machinery for opening and cleaning cotton, and afterwards for one year in the Design and Stress Office of Messrs. A. V. Roe, Manchester, on the development of autogyros and aeroplanes. Dr. Owen spent twelve years, 1936–48, on the scientific staff of the Royal Aircraft Establishment, where his main duties consisted of research on aircraft structures and instruction of staff investigating aircraft accidents, airworthiness, and full-scale structural research in flight and landing. Most of Dr. Owen's work while at the Royal Aircraft Establishment has been published as *R.A.E. Reports* or as *Reports and Memoranda* of the Aeronautical Research Committee.

American Geographical Society Awards

THE following awards have been announced by the American Geographical Society: Cullum Geographical Medal, to Dr. H. W. Ahlmann, professor of geography in the University of Stockholm, for inspiring "international cooperation in world-wide glacier study"; Charles P. Daly Medal, to Prof. L. Dudley Stamp, professor of social geography in the London School of Economics and Political Science, University of London, and adviser on rural land utilization to the Ministry of Agriculture, for "contributing much to the increase of food production in Britain and for a leading part in recent efforts at town and rural planning for optimum use of the land"; David Livingstone Centenary Medal, to Prof. R. L. Pendleton, principal soil technologist, Office of Foreign Agriculture, U.S. Department of Agriculture, "as one of the world's leading experts in soil survey and classification".

Air Conditioning and New Lighting at the National Gallery, London

AIR-CONDITIONING plant and modern artificial lighting have recently been installed by the Ministry of Works in a gallery of the National Gallery, Trafalgar Square, London, W.C.2, and the public was admitted on August 21. This installation puts the National Gallery among the most advanced of its kind in Europe. During the Second World War, when the national collections were stored in Manod Quarry in a constant air-conditioned atmosphere (see *Nature*, 151, 123; 1943), the absence of the fluctuations in relative humidity which normally occur in the London climate reduced damage to the pictures by 75 per cent (this damage is more marked for pictures painted on wood rather than canvas). The experience of the War years led to the Weaver Report in 1947, when it was urgently recommended that air-conditioning plant should be built for