

who presented themselves for the examination for the graduateship grade of membership were successful; twelve were university graduates and fourteen held the Higher National Certificate in applied physics. Forty-one colleges presented 637 candidates for the Ordinary National Certificate in applied physics and twenty colleges 246 candidates for the Higher National Certificate.

A joint committee of the Institute and the Physical Society has been set up to inquire into the post-graduate training of physicists and has held discussions with university and industrial physicists. The report on "The Teaching of Mathematics to Physicists", which was prepared by a joint committee of the Institute and the Mathematical Association and published originally in 1943, is now being revised. The Institute was invited to give its views on the subject of grants to students, and the text of the memorandum submitted by the Board to the governmental committee under the chairmanship of Sir Colin Anderson was published in the January issue of the Institute's *Bulletin*.

Satisfaction is expressed in the annual report at the standard and increased circulation of the Institute's older monthly, the *Journal of Scientific Instruments*. There was no significant change in the circulation of the other monthly, the *British Journal of Applied Physics*, but both journals suffered a further decline in advertisement revenue. New arrangements for selling advertising space to become effective during 1959 and for widening the scope and content of the *British Journal of Applied Physics* have been decided upon. A new feature in the 1958 *British Journal of Applied Physics* was the introduction, in the June and October issues, of a 'New Books' section which together contained reviews of 87 books. The type size of the *Bulletin* was reduced for the 1958 volume. This resulted in a considerable saving in paper, but the 366 text pages, comprising twenty-five articles and fifty-two book reviews, etc., contained more material than the 404 pages of the previous volume.

The first annual dinner of the Institute was held on March 26, 1958, at the Savoy Hotel, London, when 267 members and guests were present.

The Institute maintains nine branches and seven specialist groups in Great Britain, and two branches overseas, in Australia and Malaya respectively. The activities of these sections are briefly described in the annual report, together with extracts from the reports of the Board's representatives and nominees on joint and other committees and organizations. The South Australian Division held the sixth Australian instrument exhibition in Adelaide during August 19-22, at the same time as the Adelaide meeting of the Australia and New Zealand Association for the Advancement of Science. The second Einstein Memorial Lecture was delivered in October in Adelaide by Prof. B. J. Bok, who took as his subject "Stellar Evolution". The London and Home Counties Branch held a joint meeting in March with the London Section of the Royal Institute of Chemistry on the subject of science and society, and the South-Western Branch joined with the Education Group in a three-day conference in April at the University of Bristol on "Physics in Schools". The Electronics Group and the Midland Branch collaborated in a one-day symposium during April on some applications of solid-state physics in computers and automation, and in September the Group held a two-day conference on "Solid-State Memory and Switching Devices" at University College, London. The Non-Destructive Testing Group held its summer meeting in Paris jointly with the Société Française de Métallurgie, when the subject of discussion was "The Utilization of Physical Properties for Studying Relationships between the Constitution Structure and Service Behaviour of Metals".

At the general meeting of the Institute, the following were elected to take office on October 1: *President*, Sir George Thomson; *Vice-President*, Dr. J. M. A. Lenihan; *Hon. Treasurer*, Dr. J. Taylor; *Hon. Secretary*, Prof. F. A. Vick; and *New Ordinary Members of Council*, Dr. V. E. Cosslett and Mr. L. Rotherham.

SOME INTERNATIONAL GEOPHYSICAL YEAR ACHIEVEMENTS

THE Royal Society has issued under the above title a small pamphlet constituting an interim statement at the end of the observational phase of the International Geophysical Year. The pamphlet contains short notes, arranged under the fifteen subject fields, of statistical details of the work done and of important new deductions so far made from the International Geophysical Year observations. Some features of special interest are as follows.

Meteorology. Ozone observations at the Royal Society base, Halley Bay, Antarctica, show an annual variation in total ozone content with a sharp increase in early summer markedly different from the variation over the Arctic where there are smooth rises and falls about an autumn minimum.

Geomagnetism. Halley Bay is found to have been most advantageously sited for recording geomagnetic disturbances as it is the only antarctic station just outside the zone of greatest concentration of ionospheric currents. In one magnetic storm the range of the fluctuations in horizontal force reached the

enormous value of one-sixth the average value of horizontal force.

Ionosphere. Halley Bay has recorded remarkable features in the diurnal variation of ionospheric electron density in winter. The noon value in winter exceeds that at noon in summer and is ten times that at midnight. In summer the diurnal range is small with a minimum at midnight. These variation types change over suddenly near the equinoxes.

Solar activity. United States ionospheric observations made by rocket reveal the existence of a powerful flux of solar X-rays at the time of a solar flare. This X-ray flux produces the increase in D-level ionization which in turn affects long-range radio communications.

Cosmic radiation. Cosmic ray measurements made by Van Allen with the United States artificial satellites have, as is now well known, revealed the existence of an intense belt of cosmic radiation surrounding the Earth.

Oceanography. British ships have observed directly the deep ocean currents of the North Atlantic using the 'Swallow' acoustic signalling float which can be set to drift at the required depth. One of the currents measured was a southward one below the Gulf Stream.

Nuclear radiation. The existence of the International Geophysical Year network of nuclear sampling stations in Europe permitted a detailed study to be made of the diffusion of radioactive material released by the Windscale nuclear reactor accident in November 1957.

The full prescribed observational work ceased with 1958 and the main task of the present and future is the study of the observations made during the

year. It is, however, planned to continue some observations, apart from those which are part of regular meteorological, etc., services, during 1959 under the title "International Geophysical Co-operation 1959".

The International Council of Scientific Unions has formed special committees to co-ordinate further international work in antarctic research, oceanic research and space research.

A further possibility is the making of a magnetic survey on a world-wide scale during the next sunspot minimum for comparison with the magnetic observations made during the maximum period with which the International Geophysical Year was timed to coincide.

RADIO FIELD-STRENGTHS IN THE TROPICS

IT is well known that radio-communications conducted by waves which are propagated by reflexion from the ionosphere are critically dependent on the properties of the layers of ionized gas which transmit and attenuate the signals. The regular observation of the characteristics of the ionosphere at stations distributed widely over the Earth's surface has made it possible to understand and explain many phenomena which were obscure even ten years ago. The International Radio Consultative Committee has, among its other studies, been investigating many technical problems involving the propagation of radio-waves by way of the ionosphere; and of these a most important one is that of tropical broadcasting, for which high-frequency waves are much more effective than medium waves on account of the very high atmospheric noise-level present in most tropical regions. Unfortunately the attenuation of the signals in the higher-frequency bands is much greater during the day than is usual at higher latitudes and the reflecting layers are also less stable. Thus the problem of providing an adequate signal-to-noise ratio is considerably more difficult in the tropics.

The past studies of the International Radio Consultative Committee had shown that the standard methods of computing the field-strength of sky-wave signals were considerably in error at low latitudes;

but it also became clear that the additional basic data obtained in recent years provided an explanation of many of the discrepancies disclosed. In a report* by W. R. Piggott, recently published by the Department of Scientific and Industrial Research, Radio Research Station, this subject is reviewed with the aid of an analysis of the problem of identifying the most effective type of ionospheric reflexion for particular circumstances. This report shows that some of the difficulties in interpreting the results of field-strength measurements at low latitudes have been due to changes in the dominant mode of ionospheric propagation, and the consequent variations in the attenuation of the waves, and the angle of elevation at which they arrive at the receiver. The rate of advance of knowledge of this subject depends on the continual interplay of practical observations with theory; and it is hoped that the publication of this report, together with its presentation at the Plenary Assembly of the International Radio Consultative Committee recently held in Los Angeles, will encourage radio research workers in low latitudes to investigate their wave-propagation phenomena in more detail.

* Department of Scientific and Industrial Research. Radio Research. Special Report No. 27; The Calculation of the Median Sky Wave Field Strength in Tropical Regions. By W. R. Piggott. Pp. 38. (London: H.M. Stationery Office, 1959.) 2s. 6d. net.

BRITISH BOOKS AND FOREIGN MARKETS

IN reply to a series of questions in the House of Commons on June 22 regarding the supply of British books and periodicals overseas, Dr. C. Hill, the Chancellor of the Duchy of Lancaster, made a long statement which was circulated in Hansard. The study of ways and means of increasing the flow of British books and periodicals overseas has now been completed. Recognizing that British books can do much to help other peoples to understand our way of life and that they make a very real contribution to the life and thought of other nations, the statement points out that there is an ever-increasing demand for reading-matter in English, and we must do more to promote the flow of British reading-matter overseas. Other countries are already producing large amounts of well-produced attractive literature which

is easy to read and inexpensive and is aimed particularly at Asian and African countries. Although in 1958 exports totalled nearly £24 million, or almost two-fifths of the turnover of the United Kingdom book trade, several countries impose, for currency reasons, substantial restrictions on imports of British books and periodicals and our exporters cannot make further headway in these markets. Low individual incomes in many countries and the lack of effective library and other distribution systems are also major difficulties.

Accordingly, the Government has decided to take five steps to promote the export of British books and periodicals:

(i) To enter into negotiations with various countries with the aim of establishing schemes operating