

world. He forms an admirable link whereby the industrialist can get into touch with Government departments—and vice versa. During recent years, in furtherance of his duties, he has made voyages to South Africa, the Argentine, the United States, etc. He has been of great service to the Royal Society and has given lectures, generally in connexion with electrical subjects, to many scientific and industrial societies in towns in all parts of the kingdom. He has been president of the Physical Society and of the Junior Institution of Engineers, and has been given various degrees by universities in Great Britain and abroad. He has been awarded the Hughes Medal of the Royal Society, the Duddell Medal of the Physical Society and the Faraday Medal of the Institution of Electrical Engineers. All men of science will hope that his advice will be available to us for many years to come.

#### Prof. E. V. Appleton, F.R.S.

H.M. THE KING has approved the appointment of Prof. E. V. Appleton to succeed Sir Frank Smith as secretary to the Committee of the Privy Council for Scientific and Industrial Research. Prof. Appleton, who will take up his new appointment on February 1, has been Jacksonian professor of natural philosophy in the University of Cambridge since October 1936. He is a fellow of St. John's College, Cambridge; and, after a period of service on the staff of the Cavendish Laboratory, he held the post of Wheatstone professor of physics in the University of London during 1924-36. Prof. Appleton's research work has included a study of the operation of thermionic valves and their associated circuits, the nature and origin of atmospherics and the phenomena associated with thunderstorms; but he is perhaps best known for his investigations on the ionized regions of the upper atmosphere, and their influence on the propagation of radio waves. In this field the results of his work have been of far-reaching importance both in connexion with our knowledge of the physics of the atmosphere and also in assisting the general development of long-distance radio communication. It is well known that by using waves sufficiently short to penetrate the Heaviside layer, Prof. Appleton was able to demonstrate the existence of a second, similar but denser, ionized region at a greater altitude. Most of this research has been conducted on behalf of the Radio Research Board, of which Prof. Appleton has been a member for many years. The work itself has brought him international recognition: he was awarded the Morris-Liebmann prize of the American Institute of Radio Engineers, in 1929 and was elected a vice-president of the Institute in 1932. He has been president of the Union Radio Scientifique Internationale since 1934, and in this capacity he conducted the general assembly of the Union which took place in Italy last September.

#### Prof. P. G. H. Boswell, O.B.E., F.R.S.

PROF. P. G. H. BOSWELL, who has resigned from the professorship of geology at the Imperial College, is followed by Prof. H. H. Read, who succeeded him

as George Herdman professor at the University of Liverpool. After some early work on the glacial deposits of eastern England, Prof. Boswell's researches on the Tertiary rocks of the London Basin extended the study of detrital minerals originated by H. H. Thomas to the elucidation of problems of genesis, provenance and age. He thus gave a new life and meaning to the old "test by included fragments", inaugurated a method of research which has been widely followed, threw new light upon processes of sedimentation, and laid the foundation for his work on sands and other mineral substances of vital importance to the metallurgical, glass and brick-making industries during the War. He also devoted much attention to the Chalk, its movements and its sub-Tertiary surface, to the history of the Suffolk rivers, to the Pliocene 'Crags', and to the classification of the Glacial Drifts especially in their relation to early man, on which he gave his presidential address to Section C of the British Association at York. As an authority on East Anglia, his services were called upon by the Geological Survey for three of its memoirs, while he contributed a series of articles to the "Encyclopædia Britannica" and to "Regionale Geologie" and its successor the "Handbook of the Geology of Great Britain"

WHEN Prof. Boswell moved to Liverpool to take the chair of geology there, he tackled the difficult area of the Denbighshire Moors, which had been long neglected by geologists, and started a series of papers on their geology which he has since continued. He was able to give advice on the geological conditions of the Mersey valley which contributed no little to the success of the new tunnel; and, later, he was sent out to adjudicate on disputed evidences on the age of human skeletons obtained from Kanam and Kanjera in Kenya. In spite of all this research and the stringent duties of his chair, he found time to make a translation of Heritsch's "Nappe Theory on the Alps", which an eminent German professor was heard to say he preferred reading to the original. He has acted as president of the Prehistoric Society, as secretary of the Geological Society, and as a general secretary and treasurer of the British Association. In his latter positions he has taken an active part in the recent increased activities of that body. We may look forward with confidence to a rich harvest of further research from him now that he is free from the heavy strain of professional duties.

#### Technical Non-Teaching Staff in Laboratories

AN important unit on the science side of educational establishments is that which includes the minor technical staff, namely, laboratory and technical assistants, workshop assistants, store keepers, etc., and science teachers know from experience the help which a really good laboratory assistant renders to a department. This is particularly the case in those departments which employ only one assistant. His experience, probably gained from the problems encountered while performing the tasks associated with his post, covers a wide range, depending upon the particular type of science department in which

he is engaged. One agrees that the services rendered by these assistants should be adequately recognized from a financial point of view. In addition, their conditions of service should be such that they are encouraged to take a real interest in their work, and are given facilities for proper training. There is no need to stress examples of such assistants attaining the highest academic distinctions; but it is a fact that many of them, given help and encouragement, display marked resources, particularly in experimental technique. The conditions of employment are not too good in some institutions, and so within the past three or four years a Technical Non-Teaching Staff Branch of the National Union of Public Employees has been formed to safeguard the interests of such technical assistants.

THE objects of this branch, which is of national character, although its activities have been confined mainly to London, include the following: to improve the status of all stewards and assistants employed in the laboratories, or workshops, of any educational establishment, and to secure a fair wage, reasonable hours of work, suitable working conditions, together with a reasonable expectation of permanent employment. One obvious difficulty is the grading of assistants in university laboratories with those employed in secondary schools. There is no comparison between the ability, responsibilities and skill of the members in the two classes. It must also be remembered that salaries and conditions of employment in educational institutions are bound to vary with the locality. The Branch of the Union is also endeavouring to organize suitable training courses for juniors, and specialized practical classes for others. It is proposed that these classes shall extend over a minimum period of five years, the final specialization being in biology, chemistry or physics—for some reason no mention is made of engineering. After successfully passing through the courses, the candidate would be entitled to receive a nationally recognized certificate, or diploma, which would be a guarantee of competence in laboratory management. It must be remembered, however, that the Institute of Physics has a scheme in operation, whereby certificates are awarded to technical assistants in physics who attend approved courses of instruction, and pass examinations in accordance with certain regulations. Other activities of the Branch of the Union include educational visits to laboratories, factories, etc., and it is hoped to arrange for demonstrations of new apparatus, experiments, etc., similar to those held in connexion with other associations. The secretary of the Branch is Mr. E. J. Chilton, 361 Kingston Road, Ewell, Surrey.

#### Data on the Ionosphere ( $F_2$ Region)

It is important to the radio engineer to know the highest frequency radio waves returned from the ionosphere at any time or season, since this critical frequency represents the division between those frequencies which can be used for long-distance radio communication and those which are suitable for transmission only over quasi-optical ranges. The

same knowledge is of importance also to the geophysicist, since it provides him with a reasonably accurate statement of the most intense ionization existing at any level in the ionosphere. For some years past, the Radio Department of the National Physical Laboratory has conducted a comprehensive investigation into the propagation of waves as part of the programme of the Radio Research Board of the Department of Scientific and Industrial Research. Included in this work are daily measurements of the height and critical frequencies of the various regions of the ionosphere made at the field station of the Radio Department at Slough (lat.  $51^\circ 29' 30''$  N., long.  $0^\circ 33' 30''$  W.). When electric waves from a radio transmitter pass through the ionosphere, they are split into two components with different velocities and opposite senses of circular polarization, under the influence of the earth's magnetic field. The region capable of returning the higher radio frequencies to earth is known as the  $F_2$  region and the highest frequency which can just be returned by that region is known as the critical frequency and refers to the extraordinary component of the wave. It is, however, more convenient to measure the ordinary component, and in the northern hemisphere the plane of polarization of this component has a left-handed direction of rotation when looking along the direction of propagation. The critical frequency for this component is generally about 0.7 Mc./s. lower than that of the extraordinary component in the case of the results quoted. The daily measurements are carried out with waves returned from the ionosphere at vertical incidence, and the values of height and critical frequency of the regions studied refer to this condition. The corresponding values for oblique incidence can be derived from these results, and from these, the conditions for long-distance communication can be deduced.

IN view of the widespread use of long distance radio communication and broadcasting on the short wave band between 10 and 100 metres (3 and 30 Mc./s.), it is proposed that the ionospheric data relevant to this band should be made available as a special service to those interested in the subject. Typescript copies of monthly tables, including sufficient data for any day to enable a simple curve to be plotted showing the relation between height and critical frequency of the region under consideration, and beginning with January 1939, is now available at 2s. 6d. per annum for subscribers in Great Britain or in the Empire overseas, and 5s. per annum for foreign subscribers. Applications, with the appropriate remittance, should be addressed to the Director, National Physical Laboratory, Teddington, Middlesex. Arrangements have also been made by which those desiring to obtain early information on the state of the ionosphere as soon as the data are available may obtain them by telephoning the Radio Research Station (Slough 1560) between the hours of 10 a.m. and 4.30 p.m. Those wishing to avail themselves of this service should write to the Director of the National Physical Laboratory asking

(Continued on p. 71)