

and distribution, together with the testing of chronometers and navigational instruments. Though in the past the director has always been primarily an astronomer, changing conditions have made the Observatory mainly a meteorological station with a regularly working seismograph.

The Tidal Institute was founded so recently as 1919, and its work has often been referred to in our columns.

Five years ago an agreement was made between the Dock Board and the University whereby both these institutions were placed under the government of a joint committee of the Board and University, and a large measure of co-operation has resulted. For example, the tidal predicting machine has been housed in the Observatory building, so that the major part of the work of constructing tide-tables has been done at Bidston. The new arrangement, which comes into force on Jan. 1, goes much further than this and completes the association of these two types of scientific activity. The work in meteorology and seismology hitherto carried out at the Observatory will be continued, the testing of chronometers and instruments will be undertaken, and the time-gun at Birkenhead will be fired as heretofore.

The last director of the Observatory, Mr. W. E. Plummer, died a few months ago. The new combined institution will have for director Prof. J. Proudman of the University of Liverpool, and for associate director Dr. A. T. Doodson, who will reside at the Observatory. The total scientific staff will consist of five men and three women.

Properties of Electrons.¹

C. G. DARWIN.—(1) On the magnetic moment of the electron. Starting from the wave equations for an electron and the associated electric density and current, it is shown how the electromagnetic fields of a moving electron can be attributed partly to the convection of electricity and partly to an intrinsic magnetisation. A geometrical construction shows the relation between the wave constants and the magnetisation. The formulæ, first worked out for slow motion, are easily generalised by relativity for high speeds, and in this case there are electric as well as magnetic moments, and various invariant properties are given.

A comparison is made between an electron wave and a light wave, and the resemblance may be loosely expressed by saying that a light-quantum is an electron without charge or mass.

(2) On the diffraction of the magnetic electron. The problem is solved of the diffraction of an electron wave by a line-grating exerting periodic electric or magnetic forces; this represents the essential features of diffraction by a crystal. The incident wave is supposed to be magnetised in a definite direction, and it is shown that, when the grating exerts only electric forces, the effect is to rotate the direction of magnetisation through a definite angle about an axis perpendicular to the incident and diffracted rays, and no polarisation can be produced by the diffraction. For some magnetic forces a similar rotation occurs, but in general the simultaneous action of electric and magnetic forces may produce a partial polarisation, though the case is too remote from experiment to be worth treating in detail.

G. TEMPLE.—The scattering power of a bare nucleus according to wave mechanics. A direct proof is given of Mott's result (*Proc. R. S.*, vol. 118, p. 542) on the scattering of an infinite plane wave by a bare nucleus. The accurate expression for the incident and scattered waves is obtained, together with the complete asymp-

totic expansion, leading to a rigorous proof of Rutherford's formula for the scattering power. The same problem is briefly considered on the basis of the relativistic wave equation, and the necessary modification of Rutherford's formula is obtained to the usual approximation, neglecting the terms involving the square of the electrostatic potential.

J. E. LENNARD-JONES AND H. J. WOODS.—The distribution of electrons in a metal. The distribution of electrons in a two-dimensional metal is worked out by statistical methods on the assumption that the assembly of electrons is 'degenerate' in the sense of Fermi and Dirac.

University and Educational Intelligence.

BIRMINGHAM.—Dr. Leonard G. Parsons, physician to the General Hospital and senior physician to the Children's Hospital, has been appointed professor of infant hygiene and diseases of children.

The Council has approved an expenditure of about £300 for the preparation of a laboratory to be used specially for tissue culture in connexion with the Department of Physiology.

From October 1929 there is to be a considerable reduction of fees for engineering students.

The degree of D.Sc. has been conferred on R. H. Hopkins for contributions to biochemistry.

CAMBRIDGE.—Prof. Eddington, Mr. Landon, Mr. R. H. Fowler, and Mr. Rideal have been appointed members of the council of the school of physical sciences, and Sir F. G. Hopkins, Prof. T. B. Wood, and Mr. C. F. Cooper have been appointed members of the council of the school of biological sciences.

EDINBURGH.—At a graduation ceremony on Dec. 14, the degree of D.Sc. was conferred upon Sunder Lal Hora (Assistant Superintendent, Zoological Survey of India) for his thesis on "Ecology, Bionomics, and Evolution of the Torrential Fauna, with Special Reference to the Organs of Attachment"; and on Richard Maclean, for his thesis on "Strengthening of Certain Important Bridges of Main Line of Bombay, Baroda, and Central India Railway."

LIVERPOOL.—At the meeting of the Council of the University on Dec. 11, Prof. J. H. Dible, professor of pathology and bacteriology, Welsh National School of Medicine, Cardiff, was appointed to the George Holt chair of pathology.

At the same meeting Prof. Warrington Yorke, who has held the Walter Myers chair of parasitology in the University since 1914, was appointed to the Alfred Jones chair of tropical medicine as from Jan. 1, 1929.

MANCHESTER.—The council has accepted the resignation of Dr. Stuart Thomson, senior lecturer in zoology; Dr. Stuart Thomson has been a member of the staff of the Zoological Department since 1910.

The Council has elected the following to honorary research fellowships in physics: Dr. A. G. Bradley, Dr. Szabo V. Naray, Dr. Felix Machatshchki, Mr. J. West, and Dr. W. H. Zachariassen. The following have been awarded elected research studentships: Mr. Harold Walkden (in botany), Dr. Werner Albrecht (in physics).

THE Phonetic Institute of the University of Vienna has assigned tables for foreigners who wish to study their own speech by the graphic method. Four tables are now used for Czechisch, Hungarian, Yiddish, and Hindustani. Two others are available. Applications may be made to the Director, Prof. E. W. Scripture, Strudelhofgasse, 4, Vienna.

¹ Abstracts of papers read before the Royal Society on Nov. 1.