

Board would deliberately arrest a sequential scheme of development, such as that set out in the institution's report. Mr. Fisher promised that the points raised would receive careful consideration. Those who have been intimately acquainted with the working policy of the Board of Education towards junior technical schools will be gratified that a large and influential body of engineers has at last spoken out with no uncertain voice, and will look with renewed hope for the speedy removal of the crippling regulations under which such schools have been governed.

THE widespread disappointment at the Government's decision to postpone for the present any further consideration of Mr. Fisher's Education Bill continues to receive expression in resolutions passed by public bodies and in letters to the Press. Among the latter may be mentioned a letter signed by a number of representative persons, including the Bishops of Oxford and Winchester, the Master of Balliol, Mr. W. L. Hitchens (chairman of Messrs. Cammell Laird), and several Labour members of Parliament. The letter states that the signatories are convinced that they express the opinion of a large majority of their countrymen when they say that no more urgent task confronts the nation than the creation of an educational system which will cultivate more fully the physique, the intellect, and the character of the rising generation of English children, and that it would be little less than a national disaster if the present opportunity were allowed to pass unused. Again and again in the last ten years the nation has been warned that in allowing nearly one-half of its children to leave school before their fourteenth birthday, and more than three-quarters of those between fourteen and eighteen to escape educational supervision altogether, it is creating a moral and economic problem which no intervention at a later age can solve. The chief medical officer of the Board of Education has directed attention to the prevalence among large numbers of school children—one million is the latest figure—of ailments which undermine their vitality, which render futile the efforts of the teachers and the educational expenditure of the State, but can be remedied only by the adoption of a more comprehensive system of physical education and medical treatment. The general character of the right educational policy is not disputed. If it be said that the crisis of a great war is not the right moment to proceed with educational legislation, the answer is that if the improvement of our national system of education was desirable before the war, the war itself has made that improvement indispensable. The letter urges that it is in the public interest that at least the educational proposals of the Bill should be passed into law at a sufficiently early date to be brought into operation before the conclusion of the war. We are glad to see the statement in the *Times* of November 6 that the Government has been so much impressed by the amount of feeling aroused by its decision not to proceed any further with the Education Bill this session that the position is to be reconsidered.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 1.—Sir J. J. Thomson, president, in the chair.—Lord Rayleigh: The reflection of light from a regularly stratified medium. The remarkable coloured reflection from some crystals of chlorate of potash described by Stokes, the colours of opals and of old decomposed glass, etc., lend interest to the calculation of reflection from a regularly stratified medium, in which the alternate strata, each of constant thickness, differ in refrangibility. The higher the number of stratifications, supposed perfectly regu-

lar, the nearer is the approach to homogeneity in the light of the favoured wave-lengths. A general idea of what is to be expected may be arrived at by considering the case where a single reflection is very feeble, but when the component reflections are more vigorous, or when the number of alternations is very great, a more detailed examination is required. An important distinction reveals itself according to the relative values of the refractivity and thicknesses. In one case a sufficient multiplication of the number of strata leads to complete reflection; in the other it does not.—Sir William Abney: Two cases of congenital night-blindness. The two cases were examined spectroscopically. An interesting fact appeared that in their extinction of the different rays of the spectrum all light disappeared throughout the spectrum at the same moment that the colour vanished, and that the colour vanished to the normal eye at the same point that it did to the colour-blind. This pointed to the fact that the colourless part of the rays failed to give any sensation of light. As normal eyes see in a faint light with these colourless rays, it is to be presumed that the night-blind owe their blindness in faint lights to the absence of certain retinal processes which the normal eyes possess.—Hon. R. J. Strutt: Duration of luminosity of electric discharge in gases and vapours—further studies. (1) The behaviour of jets of luminous gas flowing away from the region of discharge at a low gaseous pressure has been investigated, using the principal permanent gases, also mercury vapour. In a transverse electrostatic field the luminosity is deflected, part of it in most cases going to the positive plate, and part to the negative. But in hydrogen, when the pressure is not very low, nearly the whole of the luminosity is deflected to the positive plate, a small part remaining undeflected. As the pressure is reduced, an increasing part of the luminosity goes to the negative plate. Similar results are observed in mercury vapour. (2) Further observations are recorded on these jets at higher pressures, arranging a spark discharge so that the gas can flow out from it through an orifice into a sustained vacuum. With hydrogen (condensed discharge) the exuded jet of luminosity, about 0 mm. long, shows the Balmer series. The discharge spectrum shows widened lines. These become narrow as the luminous gas emerges. (3) Nitrogen in the same arrangement, with an undischarged discharge, shows a jet with periodic swellings similar to those observed by Mach and Salcher and Emden when a jet of compressed air, examined by the shadow method, escapes into the open. The wave-length agrees with that to be anticipated from their experiments. (4) This nitrogen jet luminosity is not to be confused in any way with active nitrogen. The time for which it endures is of quite a different order of magnitude, and the spectrum is essentially different.—G. W. Walker: Surface reflection of earthquake waves.—Dr. H. S. Allen: Characteristic frequency and atomic number. (1) Simple relations are found to hold between the values of the product $N\nu$ for different elements (N being Moseley's atomic number and ν the characteristic frequency). (2) For twenty-five metals it is found that the product can be expressed in the form $N\nu = n\nu_A$ (n a whole number and ν_A a constant of value 21.3×10^{12} sec.⁻¹ approximately). (3) The same rule is obeyed in the case of certain non-metallic elements. (4) Similar results are found when the characteristic frequency is calculated from the elastic constants by Debye's formula. The value of n thus obtained is not in all cases the same as that deduced from the specific heats. (5) Application of the theory of probability shows that there is but a small chance of the product $N\nu$ approaching so nearly to integral multiples of a constant frequency by a mere accident. (6) It is found that the atomic num-

bers of Moseley give better agreement with the proposed relation than do the atomic ordinals of Rydberg. (7) The empirical results are discussed from the viewpoint of the quantum theory, and it is suggested that the integer n may be related to the number of electrons concerned in determining the crystalline space-lattice of the element in the solid state. (8) A relation similar in character is found to hold for certain electronic frequencies. In such cases ν_a must be replaced by $\nu_r = 3.289 \times 10^{15} \text{ sec.}^{-1}$ (Rydberg's constant). (9) This relation is considered with reference to the maximum of the photoelectric effect, the limiting frequency of this effect, ionisation potentials, and thermionic potentials.—Dr. C. Chree: Historical note on a relation between the gravitational attraction exercised and the elastic depression caused by load on the plane surface of an isotropic elastic solid.

Zoological Society, October 23.—Dr. A. Smith Woodward, vice-president, in the chair.—H. D. Badcock: Ant-like spiders from Malaya, collected by the Annandale-Robinson Expedition, 1901-2.—Miss Ruth C. Bamber: A hermaphrodite dogfish.

Mathematical Society, November 1.—Prof. H. M. Macdonald, president, in the chair.—J. H. Grace: Tetrahedra in relation to spheres and quadrics.—Prof. M. J. M. Hill: The continuation of the hypergeometric series.—Prof. W. H. Young: Restricted Fourier series and the convergence of power-series.—Prof. E. B. Stouffer: Invariants and covariants of linear homogeneous differential equations.—H. W. Turnbull: The simultaneous system of two quaternary quadratic forms.

BOOKS RECEIVED.

Principles of Quantitative Analysis. By Prof. W. C. Blasdale. Second edition. Pp. xii+402. (London: Constable and Co., Ltd.) 10s. 6d. net.

The Student's Handbook to the University and Colleges of Cambridge. Sixteenth edition, revised to June 30, 1917. Pp. vi+703. (Cambridge: At the University Press.) 6s. net.

Manuring for Higher Crop Production. By Dr. E. J. Russell. Second edition. Pp. vi+94. (Cambridge: At the University Press.) 3s. 6d. net.

The Chemistry of Linseed Oil. By Dr. J. N. Friend. Pp. vii+96. (Chemical Monographs.) (London: Gurney and Jackson.) 2s. 6d. net.

A Roumanian Diary, 1915, 1916, 1917. By Lady Kennard. Pp. vii+191. (London: W. Heinemann.) 5s. net.

The National Physical Laboratory. Report for 1916-17. Pp. 67. (Teddington: W. F. Parrott.)

The National Physical Laboratory. Collected Researches. Vol. xiii., 1916. Pp. 278+ng. (London: Harrison and Sons.)

Modern Whaling and Bear-Hunting. By W. G. Burn Murdoch. Pp. 320. (London: Secley, Service and Co., Ltd.) 21s. net.

The Distances, Absolute Magnitudes, and Spectra of 734 Stars. Arranged for Use with Ordinary Star Maps. By T. E. Heath. Pp. iv+52. (Tenby: Miss Crealock.) 2s. 6d. net.

Foods and their Relative Nourishing Value. By Prof. W. H. Thompson. Second edition. Pp. 38. (Dublin: University Press.) 4d. net.

The Pupils' Class-Book of Geography. Scotland. Pp. 96. Asia, with Special Reference to India. Pp. 128. By E. J. S. Lay. (London: Macmillan and Co., Ltd.) 7d. and 8d. respectively.

Biology. By Prof. G. N. Calkins. Second edition. Pp. viii+255. (New York: H. Holt and Co.)

The Born Fool. By J. W. Byrd. Pp. 316. (London: Chatto and Windus.) 6s. net.

NO. 2506, VOL. 100]

Probleme der Volksernahrung. By Dr. A. Lipschütz. Pp. 74. (Bern: Max Drechsel.) 2.80 francs.
Power Wiring Diagrams. By A. T. Dover. Pp. xv+208. (London: Whittaker and Co.) 6s. net.
Continuous-Current Motors and Control Apparatus. By W. P. Maycock. Pp. xvi+331+4 Appendices and Index. (London: Whittaker and Co.) 6s. net.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 8.

ROYAL SOCIETY, at 4.30.—The Galvanometric Measurement of "Emotional" Physiological Changes: Prof. A. D. Waller.—The Structure, Evolution, and Origin of the Amphibia. I. The "Orders" Rachtomi and Stereospongiyli: D. M. S. Watson.—The Enzymes concerned in the Decomposition of Glucose and Mannitol by *Bacillus coli communis*. II. Experiments of Short Duration with an Emulsion of the Organisms. III. Various Phases in the Decomposition of Glucose by an Emulsion of the Organisms: E. C. Grey.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—President's Address: C. H. Wordingham.

OPTICAL SOCIETY, at 8.—Certain Optical Stores Captured from the Enemy: Lt.-Col. A. C. Williams.

FRIDAY, NOVEMBER 9.

ROYAL ASTRONOMICAL SOCIETY, at 5.
PHYSICAL SOCIETY, at 5.—The Thermo-electric Properties of Fused Metals: C. R. Darling and A. W. Grace.—Triple Cemented Telescope Objectives: T. Smith and Miss A. B. Dale.

MONDAY, NOVEMBER 12.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.

THURSDAY, NOVEMBER 15.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: Investigation into the Imbibition Exhibited by some Shellac Derivatives: A. P. Laurie and C. Ranken.—Phenomena connected with Turbulence in the Lower Atmosphere: G. I. Taylor.—The Relation between Barometric Pressure and the Water Level in a Well at Kew Observatory: E. G. Bilham.
INSTITUTION OF MINING AND METALLURGY, at 5.30.

FRIDAY, NOVEMBER 16.

INSTITUTION OF MECHANICAL ENGINEERS, at 6.

CONTENTS.

PAGE

Universities and the Supply of Research Workers. (With Diagram.)	181
British Ornithology	183
The Nutrition of Farm Animals	184
Ulugh Beg's Catalogue of Stars By J. L. E. D.	185
Our Bookshelf	186
Letters to the Editor:—	
Tidal Energy Dissipation.—Harold Jeffreys	186
The Proposed Ministry of Health	187
Prof. Adolf von Baeyer, For. Mem. R.S. By Prof. W. H. Perkin, F.R.S.	188
Notes	190
Our Astronomical Column:—	
The Meteoric Shower of October	194
Galactic Condensation of Stars	194
The Variability of B. D. + 56° 547'	194
The <i>Journal des Observateurs</i>	194
Military Aircraft and their Armament	194
Reports on Climates. By R. C. M.	195
Evolution of the Primates	195
Hereditary Characters in Relation to Evolution. By Prof. H. S. Jennings	196
University and Educational Intelligence	198
Societies and Academies	199
Books Received	200
Diary of Societies	200

Editorial and Publishing Offices:

MACMILLAN AND CO., LTD.,
ST. MARTIN'S STREET, LONDON, W.C.2.

Advertisements and business letters to be addressed to the Publishers.

Editorial Communications to the Editor.

Telegraphic Address: PHUSIS, LONDON.

Telephone Number: GERRARD 8830.