

THE Registrar of the Institute of Chemistry has been informed by the Board of Education that "instructions have been given by the National Service Department to defer, for the present, the calling up of any student of chemistry attending a teaching institution recognised by the Board of Education or the Scotch Education Department who has not been or is not placed in Grade I. and produces a certificate from the principal of the institution that he has passed his matriculation or corresponding examination, and is taking a full course of study in science, including chemistry. The Board further understands that calling-up notices (including any already issued) may, if necessary, be suspended for fourteen days for production of this certificate."

A DETAILED description of the curriculum and equipment of the Institute of Applied Electrotechnics and Mechanics at the University of Toulouse is given in *Le Génie Civil* for April 27. The institute provides a thorough course of training in electrical engineering and applied mechanics, which lasts three (and in some cases four) years. The laboratories, which are equipped in an up-to-date manner, provide both for teaching and research. Special attention is given to hydraulic and internal-combustion engineering. Separate sections are devoted to technical measurements on electrical machines and accessories, static electricity and magnetic measurements, photometry, wireless telegraphy, etc. A special water-tower and auxiliary plant is installed for experiments on water pressure and flow—an innovation that will prove of great value in view of the proposed extension of hydro-electric power in different parts of France.

A DELEGATION of ten distinguished professors from universities of Italy is visiting eight of our universities, namely, Oxford, London (and the Imperial College), Cambridge, Manchester, Leeds, Sheffield, Edinburgh, and Glasgow. The members of the delegation are:—Prof. Volterra, senator, professor of mathematics in the University of Rome; Prof. Archangeli, professor of commercial law in the University of Parma; Prof. L. Bianchi, deputy, professor of psychiatry in the University of Naples; Signor V. Bianchi, deputy, specialist in nervous diseases; Prof. Columba, Rector of the University of Palermo, professor of ancient history; Prof. Credaro, late Minister of Public Instruction, deputy, professor of philosophy in the University of Rome; Prof. Galante, professor of canon law in the University of Bologna; Prof. Giacosa, professor of bio-chemistry and physiology in the University of Turin; Prof. Lori, Rector of the University of Padua, professor of electro-technics, president of the Società per il Progresso delle Scienze; and Prof. Nasini, professor of chemistry in the University of Pisa. Oxford was visited last week, and the visit to London began at University College on Tuesday, when the Vice-Chancellor entertained the delegation at dinner. On Wednesday the Imperial College was visited, and the party lunched with the Lord Mayor at the Mansion House. To-day (Thursday) will be occupied with visits to King's College and Bedford College and a dinner given by the Royal Society of Literature.

THE General Education Board, founded by Mr. John D. Rockefeller "to promote education within the United States," will shortly issue its complete annual report for the financial year 1916-17. The grants for that year included the following:—Universities and colleges for whites, for endowment, 237,000*l.*; colleges and schools for whites for current expenses, 2000*l.*; medical education, 270,000*l.*; the education of negroes, 68,607*l.*; professors of secondary education, 6993*l.*; farm demonstration work in Maine (including boys'

and girls' clubs), 4300*l.*; farm demonstration work in New Hampshire (including boys' and girls' clubs), 3000*l.*; educational investigation and research, 10,200*l.*; consolidated rural schools, 2000*l.*; experimental school, 9350*l.*; the total being 628,453*l.* Since its foundation the board has granted to colleges and universities alone the total of 2,724,152*l.*, while those institutions themselves have raised simultaneously 10,026,674*l.* The board's gifts have assisted in increasing the resources of 112 colleges and universities situated in practically every State in the Union. Since its organisation in 1902 the General Education Board has appropriated for all purposes 4,271,500*l.* An important action of the board in the past year has dealt with the establishment of the medical department of the University of Chicago. The General Education Board and the Rockefeller Foundation together contributed 400,000*l.* towards a total of 1,060,000*l.*, which was necessary in order to bring together in a single university medical school institutions and resources valued at almost 3,000,000*l.*

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society**, May 9.—Sir J. J. Thomson, president, in the chair.—Major P. A. MacMahon and H. B. C. Darling: Contribution to the theory of attraction when the force varies as any power of the distance.—Sir George Greenhill: Electromagnetic integrals. Starting with Maxwell's *M*, mutual inductance of two coaxial circular currents, a straightforward integration will lead to the analytical expressions arising in the theory of the ampere-balance current-weigher, described in *Phil. Trans.*, 1907, by Ayrton-Mather-Smith, and the complicated dissections are not necessary, employed by Viriamu Jones, Minchin, and other writers. The elliptic integrals which occur are then reduced to a simple standard form, capable of use with Legendre's tables of the elliptic function; and the quadric transformation is explained geometrically, required to reconcile the conflicting notation of previous treatment. A re-drawing is submitted of Maxwell's figure XVIII of the curves of constant *M*, employing the co-ordinates of the confocal conics on Weir's chart. The same co-ordinates are applied to a state of uniplanar liquid motion, where they appear appropriate, as well as to Euler's problem of the orbit under two centres of force.—Dr. T. R. Merton and Prof. J. W. Nicholson: Intensity relations in the spectrum of helium. The paper contains the results of an experimental investigation of the variations in distribution of intensity among the lines of the helium spectrum under various conditions of excitation. The intensities have been examined quantitatively, according to the method described in previous memoirs, at various assigned positions in the cathode dark space and beyond, so that the variations can be determined as definite functions of cathode distance. It is found that the relative intensities of lines in the diffuse series of helium and parhelium remain essentially the same at all distances, but that striking variations occur in other types of series. The results are discussed (1) from the point of view of selective transfer of energy in any one series; (2) in relation to type of series—diffuse, sharp, or principal; and (3) in relation to the relative behaviour of the doublet and single-line spectra. The spectra of mixed gases—hydrogen and helium—have also been studied in the same way, and it has become apparent that the phenomena presented by the presence of a spectroscopic trace of one of the gases are essentially different in character from those presented when the gases are mixed in comparable amounts. The low-pressure spectrum of

helium has been investigated quantitatively, and the results have been discussed with special reference to the reproduction in the laboratory of the abnormal intensity relations found in the spectra of the nebulae. It is shown that the nebular spectrum of helium would be obtained very closely by a combination of the conditions belonging to the condensed discharge and to the low-pressure spectrum.—Dr. S. **Chapman**: The outline of a theory of magnetic storms. The average characteristics of magnetic storms are separated into two parts, depending respectively upon time measured from the commencement of the storm and upon local time. In the former the horizontal force is the element chiefly affected, a brief initial increase being followed by a much larger decrease, extending over several hours. Afterwards, during a period of days, the force slowly returns to its normal value. The local-time changes, after the ordinary diurnal magnetic variations have been removed, are approximately simple sine or cosine waves in all three elements. Their mutual relations in phase, and the dependence of their amplitudes upon latitude, are determined for twelve observatories from the mean of forty storms. The two sets of variations are interpreted in terms of electric current systems circulating in the upper atmosphere (with corresponding earth currents). These, again, are referred to the inductive action of a system of atmospheric motions. These motions are primarily vertical, though the unequal distribution of vertical velocity introduces horizontal movements also. The atmospheric motions are explained as the result of the precipitation of electric particles from the sun into the earth's atmosphere. A depression of the absorbing layer (which becomes ionised) is first produced. This is succeeded by a general upward expansion, due to the mutual repulsion of the particles (which are mainly of one sign of charge) which are entangled in the layer. The stratum in which these actions occur is considered to be above that in which the ordinary diurnal magnetic variations are produced, and the ionisation in the latter layer is attributed to the action of ultra-violet light from the sun.

**Zoological Society**, May 7.—Prof. E. W. MacBride, vice-president, in the chair.—Dr. B. **Petronievics**: Comparison between the lower jaws of the cynodont reptiles *Gomphognathus* and *Cynognathus*.—Miss D. M. A. **Bate**: A new genus of extinct Muscardine rodent from the Balearic Islands.

**Royal Meteorological Society**, May 15.—Sir Napier Shaw, president, in the chair.—C. E. P. **Brooks**: Continentality and temperature (second paper). The first part of this paper deals with the variation with latitude of the coefficients which give the influence of land on temperature. Land east, land west, and ice are considered separately, and it is found that in the tropics the coefficients are uniformly small. In the temperate regions in winter the effect of land to the east is also small, but land to the west has a well-marked effect in lowering temperature; this effect increases towards the poles. In summer, land both east and west increases temperature. In the second part the temperatures of land and water hemispheres are calculated. The distribution of land and sea at the beginning of the Great Ice age is then reconstructed from geological data, and on applying the formulæ calculated in the first part to this changed distribution, it is found that the temperature must have been lower than the present in different districts by various amounts up to 20° C. in January and 15° C. in July. These changes agree very closely with those required by geologists and palæontologists, and it is further proved that the Glacial period was a necessary consequence of the geographical changes. Finally, a theory of climatic evolution is outlined in

accordance with these ideas and the theory of isostasy.

—J. E. **Clark** and H. B. **Adames**: Report on the phenological observations in the British Isles during 1917. The persistent winter, scarcely broken over four and a half months from early December, dominated seasonal conditions. The chief practical result of the cold was indirect, the heavy destruction of bird-life favouring tree-blight and caterpillars, the ova of which were preserved by the unbroken cold. In many parts the latter stripped fruit trees and ruined garden greens. So, too, the antler-caterpillar plague in Derbyshire was ascribed mainly to the scarcity of rooks. On the other hand, berries and other fruits suffered little from birds. Other summer broods than garden white grubs were also favoured, especially *Vanessidæ*, including such rarer forms as the Common and White Admiral. From late July into September the splendid harvest prospects were much marred by rain, wind, and lack of sun. Final results were better than 1916, although grain crops fell some 5 per cent. below the ten-year average in England, rising, however, above elsewhere. As to roots, a warm, dry November more than made up for the cold, wet October; whilst potatoes gave a record crop with 8,600,000 tons off 1,364,000 acres, compared with 5,468,000 tons off 1,134,400 acres in 1916. Tree-fruits, too, gave excellent returns, the August gales proving prejudicial to apples only. Finally, November gave a splendid send-off for the coming year in the exceptionally favoured winter earing of the grain crops. This, as the president, Sir Napier Shaw, has shown, may be counted as half the battle in the prospects for successful harvesting. Table v. of the report gives the yearly floral means for the five chief districts from 1891. That year alone was later than 1917, namely, 9.6 days against 7.6 days after the mean flowering date, May 17.4. Birds and insects in table vi. confirm the lateness of 1917, averaging six days and twelve days behind; whilst table vii., of twenty-four migrants, shows nearly ten days' lag behind a twenty-year mean, 1877-96.

PARIS.

**Academy of Sciences**, May 6.—M. P. Painlevé in the chair.—P. **Termier**: Contributions to the knowledge of the tectonic of Asturias; Peñas de Careses; the Careses-Fresnedo anticlinal zone.—Th. **Schloesing**, jun.: Ammonium nitrate as manure. In default of the opportunity of working on the agricultural scale, pot experiments are described, using equal weights of nitrogen as ammonium nitrate and ammonium sulphate, together with a blank experiment without ammonium salt. With maize, the nitrate gave slightly greater yields than with the sulphate. Some suggestions as to the best method of carrying out field experiments are added.—C. **Richet** and L. **Flament**: Urinary secretion troubles after great traumatism. In seriously wounded cases there is a marked diminution in the urinary secretion and in the production of urea. The urea in eleven cases of mortally wounded fell to 30 per cent. of the normal, whereas in fifteen cases, seriously but not mortally wounded, the urea was 44 per cent. of the normal.—J. **Péres**: Certain developments in series.—T. **Lalesco**: The application of integral equations to the theory of linear differential equations.—M. T. **Béritch**: An intuitive method for the detection of ordinary maxima and minima.—J. **Andrade**: Some point transformations, and the circle of similitude of two cycles.—R. **Bricard**: Movement with two parameters round a fixed point.—L. **Guillet**: The influence of cadmium on the properties of the copper-zinc alloys. With 60/40 or 70/30 brasses cadmium commences to affect the mechanical properties only when the percentage is 1 per cent. or more. Since commercial zinc rarely contains sufficient



cadmium to give 1 per cent. in the brasses made with it, the influence of cadmium has not much industrial importance.—G. Lincio: The stibnite and pyrites layer at Su Suergiu, Villasalto, Sardinia.—S. Stefanesco: A new method for the study of the phylogeny of mastodons, stegodons, and elephants.—H. Perrotin: The propagation of heat in the lower layers of the atmosphere.—P. Lesage: Contributions to the study of the germination of the spores of mosses.—E. Bordage: Observations on the nuclei of the trophocytes arising from the transformation of striated muscular tissue in insects.—P. Remlinger: The action of ether on rabies virus. The brain of a rabbit infected with the virus, after 120 hours' immersion in ether loses its pathogenic power. The brain readily forms an emulsion with physiological water after this treatment with ether, and this emulsion can be injected in large doses into animals without any danger. The immunity against rabies thus conferred appears to be lasting.

### BOOKS RECEIVED.

An Enquiry into the Analytical Mechanism of the Internal Ear. By Sir T. Wrightson. With an Appendix on the Anatomy of the Parts Concerned, by Dr. A. Keith. Pp. xi+254+plates ix. (London: Macmillan and Co., Ltd.) 12s. 6d. net.

Tidal Lands: A Study of Shore Problems. By A. E. Carey and Prof. F. W. Oliver. Pp. xiv+284. (London: Blackie and Son, Ltd.) 12s. 6d. net.

Applied Optics: The Computation of Optical Systems. Being the "Handbuch der angewandten Optik" of Dr. A. Steinheil and Dr. E. Voit. Translated and edited by J. W. French. Vol. i. Pp. xvii+170. (London: Blackie and Son, Ltd.) 12s. 6d. net.

Astrographic Catalogue. Hyderabad Section. 1900-0. Vol. i, Measures of Rectangular Co-ordinates and Diameters of 63,436 Star-Images on Plates with Centres in Dec. -170. Pp. xliii+223. (Edinburgh: Neill and Co., Ltd.) 12 rupees or 16s. net.

Plant Physiology. By Prof. V. I. Palladin. Authorised English translation. Edited by Prof. B. E. Livingston. Pp. xxv+320. (Philadelphia: P. Blakiston's Son and Co.)

Flora of the Presidency of Madras. By J. S. Gamble. Part ii. (London: Adlard and Son and West, Newman, Ltd.) 8s. net.

The Neurotic Constitution. By Dr. A. Adler. Translated by Drs. B. Glueck and J. E. Lind. Pp. xxiii+456. (London: Kegan Paul and Co., Ltd.) 16s. net.

Library of Congress. Report of the Librarian of Congress and Report of the Superintendent of the Library Buildings and Grounds for the Fiscal Year ending June 30, 1917. Pp. 223. (Washington: Government Printing Office.)

A Text-Book of Inorganic Chemistry. Edited by Dr. J. Newton Friend. Vol. v., Carbon and its Allies. By Dr. R. M. Caven. Pp. xxi+468. (London: C. Griffin and Co., Ltd.) 15s. net.

Guide to the Insects of Connecticut. Part iii., The Hymenoptera or Wasp-like Insects of Connecticut. Pp. 824. (Hartford, Conn.)

Glossary and Notes on Vertebrate Palæontology. By Rev. S. A. Pelly. Pp. ix+113. (London: Methuen and Co., Ltd.) 5s. net.

British Medicine in the War, 1914-1917. Pp. x+138. (London: British Medical Association.) 2s. 6d.

L'Evolution des Plantes. By Prof. N. Bernard. Pp. xxxii+314. (Paris: F. Alcan.) 3.50 francs.

Sir William Ramsay, K.C.B., F.R.S.: Memorials of his Life and Work. By Sir W. A. Tilden. Pp. xvi+311. (London: Macmillan and Co., Ltd.) 15s. net.

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### DIARY OF SOCIETIES.

THURSDAY, MAY 23.

ROYAL INSTITUTION, at 3.—The Abode of Snow; Its Appearance, Inhabitants, and History: Sir Francis Younghusband.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—Some Transient Phenomena in Electrical Supply Systems: Prof. E. W. Marchant.

FRIDAY, MAY 24.

ROYAL INSTITUTION, at 5.30.—Internal Ballistics: Lt.-Col. A. G. Hadcock.

LINNEAN SOCIETY, at 3.—Anniversary Meeting.

SATURDAY, MAY 25.

ROYAL INSTITUTION, at 3.—Problems in Bird-Migration: Prof. C. J. Patten.

MONDAY, MAY 27.

ARISTOTELIAN SOCIETY, at 8.—The "Modes" of Spinoza and the "Monads" of Leibniz: Prof. G. Dawes Hicks.

ROYAL GEOGRAPHICAL SOCIETY, at 5.30.—Anniversary Meeting.

TUESDAY, MAY 28.

ZOOLOGICAL SOCIETY, at 5.30.—A Case of Hermaphroditism in a Lizard, *Lacerta viridis*: Noel Taylor.—Fresh-water Fish as Food: G. Tate Regan.

INSTITUTION OF PETROLEUM TECHNOLOGISTS, at 8.—The Application of Electrical Power to Oilfield Requirements: J. Wilfred Burford.

WEDNESDAY, MAY 29.

ROYAL SOCIETY OF ARTS, at 4.30.—Organic Chemistry in Relation to Industry: Dr. M. O. Forster.

THURSDAY, MAY 30.

ROYAL INSTITUTION, at 3.—The Abode of Snow; its Appearance, Inhabitants, and History: Sir F. Younghusband.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—Annual General Meeting.

ROYAL SOCIETY OF ARTS, at 4.30.—The Cotton-mill Industry of India: Hon. Sir Dinshaw E. Wacha.

SATURDAY, JUNE 1.

ROYAL INSTITUTION, at 3.—Problems in Bird-migration: Prof. C. J. Patten.

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