

Mr. W. E. Dixon has been appointed university lecturer in pharmacology.

The office of superintendent of the museum of zoology will be vacant on January 15, 1909, by the resignation of Dr. Harmer. The stipend at present attached to the office is 200l. per annum. Applications should be sent to the chairman of the special board for biology and geology (Prof. Langley, The Museums) on or before January 21, 1909.

LONDON.—Prof. A. Sedgwick, F.R.S., professor of zoology and comparative anatomy in the University of Cambridge, has accepted the professorship of zoology at the Imperial College of Science and Technology, South Kensington.

At a meeting on December 2 the Senate decided unanimously in favour of the appointment of a Royal Commission to consider the relations between the University and the Imperial College. It will be remembered that Mr. McKenna undertook to recommend the appointment of a Royal Commission if he received representations on the subject from the Senate of the University.

MR. LEWIS F. DAY will give an address at the Sir John Cass Technical Institute at the distribution of prizes and certificates on Wednesday, December 16. There will be an exhibition of students' work and apparatus in the laboratories, workshops, and other rooms.

MR. S. A. SAUNDER, secretary to the Royal Astronomical Society and a past-president of the British Astronomical Association, has been appointed to the Gresham lectureship on astronomy at Gresham College, London, rendered vacant by the resignation of the Rev. E. Ledger.

It is officially announced that letters patent have passed the Great Seal of Ireland constituting and founding a university, having its seat in Dublin, under the name of the National University of Ireland, and a university, having its seat in Belfast, under the name of the Queen's University of Belfast.

SPEAKING at Abergavenny on December 4, Sir Edward Strachey, M.P., commented upon the recently issued report of the Departmental Committee which inquired into the provision of education in England and Wales for affording scientific and technical instruction in agriculture. Sir Edward Strachey asked, Why should there not be in this country a great State agricultural farm equipped with everything necessary for experiments and research and for the education of teachers in agriculture? There might well be in every county or group of counties an agricultural county farm subsidised by the State and, to a certain extent, from the rates. These farm institutions should be, he said, for assisting farmers and demonstrating the value of science applied to agriculture. There should be, too, a centre for experiments wherever local experiment is necessary and for demonstration where desirable; but the best form of demonstration, he pointed out, is on various farms under different conditions of soils and climates. Sir Edward Strachey added that his suggestions were those of one who is a farmer, but that it is the duty of the President of the Board of Agriculture to formulate a scheme of national agricultural education somewhat on the Irish lines.

THE report of the departmental committee on agricultural education is under consideration in detail by a committee of the Farmers' Club. A memorandum dealing with its several provisions is being prepared, and the committee has expressed agreement with the views stated in the report in the following resolutions:—(1) That the funds at present available for agricultural education are wholly inadequate, and considerably increased funds should be provided, the main source of which must be the national Exchequer. Such funds should be employed by the Board of Agriculture, first, to aid existing and projected institutions in respect of their staff and general equipment, and, secondly, to aid local authorities in making provision for the agricultural work conducted by them. (2) That since complete cooperation between the Board of Agriculture and Education is essential, if the field of education is to be adequately covered and overlapping avoided the committee

is of opinion that agricultural instruction, when provided by universities, university colleges, agricultural colleges, farm institutes, and winter schools, or by means of special classes or courses of lectures in agriculture and kindred subjects (e.g. dairying, horticulture), should be under the direction of the Board of Agriculture, while all instruction in agricultural subjects forming part of courses in primary, secondary, or such evening schools as are in definite continuation of the education given in primary schools, should be under the Board of Education.

## SOCIETIES AND ACADEMIES.

LONDON.

**Royal Society, November 5.**—"On the Generation of a Luminous Glow in an Exhausted Receiver moving near an Electrostatic Field, and the Action of a Magnetic Field on the Glow so produced, the Residual Gases being Oxygen, Hydrogen, Neon, and Air." Part iii. By F. J. **Jervis-Smith**, F.R.S.

A silica bulb, as used in the experiments described in Proc. Roy. Soc., A, vol. lxxxii., p. 214, was rotated in a magnetic and also in an electrostatic field, the residual gas being oxygen. The inductor was charged until the bulb glowed; then it was slowly discharged through damped thread, until the glow disappeared; on establishing the magnetic field the brilliant glow was restored. The magnetic effect was less marked when air was the residual gas. When glass was employed instead of silica the glow was greatly reduced. The glow effects in widely differing gases were compared. Sir William Ramsay kindly prepared for the author of the paper a bulb in which the residual gas was neon. The neon glow-bulb when treated exactly in the same way as the oxygen glow-bulb gave but little glow, of a reddish tint. The glow was but feebly affected by the magnetic field. A silica glow-bulb, residual gas air, was rotated, as in the previous experiments; the inductor was charged to 800 volts, and placed at such a distance from the bulb that it did not show any glow. On establishing a magnetic field, in which the bulb rotated, it glowed brightly.

When hydrogen was the residual gas, in a glass bulb the position of maximum glow was shifted through 90° from the position of maximum glow when oxygen was the residual gas.

The effect of a magnetic field on the generation of electricity was examined. A silica glow-bulb in contact with a camel-hair brush was rotated between the poles of an electromagnet. The pressure of the brush was so adjusted that no glow was visible; when the magnetic field was established the bulb glowed brightly, and ceased the instant the magnetic field was shut off. The experiment could be easily repeated with certainty.

In another experiment the brush, after being in contact with the bulb, was removed. The bulb glowed the instant the magnetic field was restored. The experiments illustrate the profound change which takes place in the behaviour of a moving static induction of electricity when the bulb in which it occurs is in a magnetic field, and show how the action of the magnetic field on the electric motion in the residual gas is modified by the nature of the gas employed.

**Royal Microscopical Society, November 18.**—Mr. Conrad Beck, vice-president, in the chair.—A new growing cell for critical observations under the highest powers: A. A. C. E. **Merlin**.—*Studeria*, a remarkable new genus of Alcyonarians: Prof. J. A. **Thomson**.—The present status of micrometry: Dr. M. D. **Ewell**.

**Entomological Society, November 18.**—Mr. H. Rowland-Brown, vice-president, in the chair.—Descriptions of microlepidoptera from Bolivia and Peru: E. **Meyrick**.

CAMBRIDGE.

**Philosophical Society, November 23.**—Prof. Sedgwick president, in the chair.—The relationship between human and bovine tuberculosis: Prof. **Woodhead**. The author gave an account of some observations on 127 cases of tuberculosis in children. He found that the disease seldom occurred in children who died under one year of age, only

four out of 100 affected with mesenteric tuberculosis coming into this category; between the ages of two and 5½ years, however, sixty-two such cases occurred. This led him to look to the milk of tuberculous cows as a source of infection, as children below the age of twelve months seldom receive much milk except that from the mother—especially amongst the poorer classes—whilst from one to 5½ years milk usually forms some part, at any rate, of a very mixed diet. He mentioned the work of other observers, who have come to the conclusion that bovine tuberculosis may be the source of infection of children, especially of the alimentary canal. There could, of course, be no doubt that there were two (or more) types of tuberculosis, marked differences of virulence, of growth, &c., being observed, but he was satisfied that these differences were not specific, and that sometime or other we should be able to find links connecting the extremes.—The transmission of *Trypanosoma lewisi* by fleas and lice: Prof. **Nuttall**. The author described experiments which demonstrated that *Ceratophyllus fasciatus* and *Haematopinus spinulosus* are capable of transmitting *Trypanosoma lewisi*. In one experiment three fleas, transferred from a diseased to a healthy rat, gave a positive result. On the other hand, thirty to sixty lice were required for the transmission of the trypanosome. No signs of any development of the trypanosomes were observed in the bodies of the lice.—The presence of anticoagulin in the salivary glands of *Argas persicus*: Prof. **Nuttall**. Experiments conducted with Mr. C. Strickland have shown that the salivary glands and intestine of *Argas persicus* contain an anticoagulin which is inactivated by exposure to a temperature of 80° C. for ten minutes. The organs of the tick do not contain haemolysins.—The mode of action of specific substances: W. E. **Dixon** and P. **Hamill**. Evidence was brought to show that drugs having a specific action on a definite tissue do not bring about that effect by chemical combination with protoplasm or with a constituent of the living cell. It was concluded that the mode of action of Galenic drugs was different from that of the hormones.—The action of specific substances in toxæmia: W. E. **Dixon** and W. H. **Harvey**. In this paper it was shown that certain toxins, such as that of diphtheria, cause death by vasomotor failure. It was found that in animals affected with such a toxæmia death can be greatly delayed by the injection of normal saline solution. The action of drugs becomes progressively less according to the degree of toxæmia; those drugs which act on the central nervous system are the first to lose their effect, and those which act on muscle-fibre retain their characteristic effect longest.—Therapeutic inoculation for generalised bacterial infections: L. **Noon**. Opsonic observations show that rabbits and guinea-pigs, with an experimental peritonitis due to the B.-pseudotuberculosis, do not react to the infection for the first five days or more. An inoculation of killed bacilli under the skin of a normal rabbit produces a good opsonic reaction within forty-eight hours. A similar inoculation in a rabbit already diseased calls forth a still more prompt reaction.—The examination of living leucocytes *in vitro*: C. **Ponder**. The satisfactory examination of leucocytes attended with many difficulties. A method described and demonstrated, whereby, with the aid of a new form of blood chamber, the leucocytes are allowed to escape from a clot of fresh blood, and as they adhere to the surface of a glass slide the clot can be washed away; the leucocytes can be kept alive some time, and their movements and other physical properties observed.—The mode of growth of bacteria: Dr. **Graham-Smith**.—The radiation of various spectral lines of neon, helium, and sodium in a magnetic field: J. E. **Purvis**. Photographic observations were made with Prof. Liveing's 21-foot Rowland grating, and eye observations with an echelon spectroscope in the case of neon. The strengths of the magnetic fields varied from 24,000 to 26,100 units. The general results were:—(1) the measured shifts of the lines of neon towards the red end of the spectrum; (2) the values of the divided constituents of the neon lines compared with those of Lohmann; (3) the difficulty in distinguishing the various constituents of the neon lines in the more complex phenomena observed by Lohmann with an echelon spectroscope; (4) the values of the separated constituents of various neon lines, of those of the sodium

lines 5896 and 5890, and of the helium line 5875.6 were compared with those of Lohmann, Runge and Paschen, and Rayleigh.—Note on migration constants of dilute solutions of hydrochloric acid: C. **Chittock**. Measurements have been made of the migration constants of aqueous solutions of hydrochloric acid of varying concentration, by a method similar to that which was employed by Whetham and Paine (Proc. Roy. Soc., vol. lxxxi., A, p. 58) for solutions of sulphuric acid, with the object of throwing light on the cause of the abnormally low conductivity of dilute solutions of acids. The experiments show a considerable increase in the migration constant as the concentration is diminished. The bearing of these results on the question of the conductivity of acid solutions is discussed.—The effect of pressure on the ionisation produced by Röntgen rays in different gases and vapours: J. A. **Crowther**. The effect of pressure on the ionisation produced by Röntgen rays in different gases and vapours has been investigated for the cases of air, carbon dioxide, ethyl chloride, ethyl bromide, and methyl iodide, for pressures varying from atmospheric down to 1 mm. of mercury. In all cases (except for ethyl bromide at the higher pressures, where the effect of the penetrating secondary radiation already investigated was appreciable), the ionisation-pressure curve was found to be sensibly a straight line, even at the lowest pressures reached, and with the electrodes only 5 mm. apart. There was not in any case any indication of the presence of a perceptible amount of soft secondary radiation from the gas, the ionisation being apparently due, in the main, to the direct action of the primary rays.—The variation of the relative ionisation produced by Röntgen rays in different gases with the hardness of the rays: J. A. **Crowther**. Values have been obtained for the relative ionisation produced by Röntgen rays in various gases and vapours compared with air, for varying degrees of hardness of the primary rays. The results give no evidence of any approximation to a density law even for the hardest rays employed. For hydrogen and ethyl bromide the relative ionisation increases with the hardness of the rays; carbon dioxide, methyl acetate, and methyl iodide show a decrease.—Waves in a stream of viscous liquid W. J. **Harrison**.

## DUBLIN.

**Royal Dublin Society, November 24.**—Prof. Sydney Young, F.R.S., in the chair.—A new British bird, *Locustella certhiola*, and two birds, *Emberiza pusilla* and *Acrocephalus streperus*, new to Ireland, all killed striking Rockabill Lighthouse: R. M. **Barrington**. The author read a short paper on these birds, stating that Pallas's grasshopper warbler (*L. certhiola*), an eastern Asiatic species, is new to the British Isles, and that this is the second record of its occurrence in Europe. The little bunting (*E. pusilla*) and the reed warbler (*A. streperus*) are both new to the Irish avifauna.—Vitality, and the transmission of water through the wood of plants: Prof. H. H. **Dixon**. In this paper a comparative method is described for investigating the rôle played by vitality in the transmission of water. The results indicate that no sensible force is exerted by the cells of the wood on the transpiration current. The author also described some experiments and observations going to show that the fading of leaves on killed branches is due to stoppage of the conducting tracts and poisoning of the leaf-cells. With reference to the cohesion theory of the ascent of sap, the author pointed out that Berthelot's experiment, demonstrating the tensile strength of water as at least equivalent to 50 atmospheres, was made with water saturated with air, and not, as usually stated, with water deprived of air.—The origin of the Dexter-Kerry breed of cattle: Prof. J. **Wilson**. The author showed that the prevalent theory (first published in 1845 by Prof. Low in his "Domesticated Animals") that Dexter cattle were originated by a land agent called Dexter is untenable. The author then traced the migration of cattle first from the Continent to Britain, and then from Britain to Ireland, and showed that there were four possible breeds by which the native black cattle of Ireland were crossed and by which the Dexter breed might have been produced, viz. the Longhorns, the Shorthorns, the Herefords, and the Devons; but the first three of these

four breeds are ruled out, probably by time and geographical position, and certainly by size and colour. Had the Dexter been produced by any of these breeds it would have been larger, and it would also have carried some of their colour markings. The Devons, or at any rate red English cattle from the south-western counties, are thus left as the only possible progenitors of the Dexter, and the Mendelian explanation of the variations occurring when Dexters are bred with Dexters and Kerries confirms this view.

**Royal Irish Academy, November 9.**—Mr. J. Ribton Garstin, vice-president, in the chair.—The gravitation stress of the æther: Prof. F. Purser. The author has endeavoured to solve the problem, first started by Maxwell, of accounting for the electrostatic or gravitation field by strains and corresponding stresses in the dielectric, or æther. Maxwell left this problem in an unsatisfactory condition, assigning, indeed, a condition of stress, but leaving the necessary corresponding strains unsatisfied. Subsequently it was shown that these strains were impossible in the case of a homogeneous isotropic æther in the gravitation problem, and the same would hold in the electrical. The author endeavours to extend this impossibility to a general Greenian ætropic æther. It appears, therefore, necessary to start, as in other elastic problems, not from the state of stress, but from a state of strain, arranging this so as to give suitable stress conditions. This method is adopted by the writer (1) in discussing the gravitation stress due to the gravitation of matter confined to a certain sphere. This is approximately the problem of the æther stress due to the earth, a problem discussed by Maxwell. The results arrived at agree with Maxwell in giving a uniform pressure at the surface of the sphere. While, however, this pressure is with him independent of the constants of the æther, in the solution at present offered this pressure depends on the ratio  $\lambda/\mu$  for the æther. If, then, we suppose the æther very nearly incompressible, i.e.  $\mu/\lambda$  very small, we shall attain a comparatively small pressure in place of the 4000 tons per square inch of Maxwell. (2) The case of electricity on the surface of conductors in an electrostatic field is then considered. The stress in the dielectric now obtained is in general quite different from Maxwell's, notably where the point in the dielectric considered is at a great distance from the conductors compared with their linear dimensions and mutual distances. It agrees, however, with the Maxwellian stress in the fundamental requisites of (a) yielding no stress on a dielectric cell not containing a nucleus of free electricity; (b) giving the requisite electromotive force when it does contain such nucleus; (c) giving the requisite normal stress at the surface of conductors.

## PARIS.

**Academy of Sciences, November 30.**—M. Bouchard in the chair.—Characters of the upper layer of the gaseous atmosphere of the sun: M. Deslandres. The results of a further study of the calcium line  $K_3$  under a high dispersion are given, and deductions made regarding the circulation of the upper portions of the sun's atmosphere.—The metamorphosis of hydrocyanic glucosides during germination: L. Guignard. The seeds of *Phaseolus lunatus* were allowed to germinate both in daylight and in the dark, and the amounts of hydrocyanic acid obtainable from the seeds and the seedlings measured. From the experimental results the conclusion is drawn that if hydrocyanic acid is formed during germination by the action of the enzyme on the phaseolunatin, it disappears as soon as it is formed, entering into new combinations.—The total sugar of the blood: R. Lépine and M. Boulud. The virtual sugar of the blood is obtained by treating the blood clot with hydrofluoric acid. This acid possesses the advantage of causing less secondary action than the acids generally used for hydrolysis.—The perpetual secretary announced the death of M. Fliche, correspondent for the section of rural economy.—Study of the photographs of the Morehouse comet, 1908c, obtained at the Observatory of Juvisy: MM. Baidet and Quénnisset. Ninety-six photographs of this comet have been taken between September 17 and November 6, two of which are reproduced in the present paper.—Conjugate networks with equal invariants: M. Tzitzéica.—The cyclid of Lie:

A. Demoulin.—A method of M. Darboux: Leopold Féjer.—A class of linear differential equations of infinite order: T. Lalesco.—The Brownian motion and Einstein's formula: M. Chaudesaignes. Making use of spherical grains of gutta of known diameter, Einstein's formula has been fully confirmed as regards the influence of the radius, the time, and the viscosity.—The chlorides and oxychlorides of thorium: Ed. Chauvenet. The anhydrous chloride,  $\text{ThCl}_4$ , is more readily formed by the action of phosgene upon the oxide  $\text{ThO}_2$  at a red heat. The hydrated chloride, even in acid solution, is readily converted into an oxychloride.—The action of antimony trichloride upon cobalt and on its alloys with antimony: F. Ducelliez. The antimonide  $\text{CoSb}$  is the only compound formed in this reaction.—The combinations of silicon and uranium. Uranium bisilicide,  $\text{Si}_2\text{U}$ : Ed. Defacqz. This substance is prepared by firing a mixture of aluminium, sulphur, silica, and uranium oxide. The silicide  $\text{Si}_2\text{U}$  is analogous to the silicides of tungsten and molybdenum already described.—The composition of the colloidal hydroxyferric chlorides, studied by filtration through collodion membranes: L. Michel.—A method of producing ethylene hydrocarbons, starting with esters: Albert Colson. Ethyl benzoate is split up into benzoic acid and ethylene when heated in sealed tubes to  $310^\circ\text{C}$ . or higher temperatures. Other benzoic esters give the corresponding olefines under the same conditions, and the esters of fatty and mineral acids behave similarly.—The addition of hydrogen to triphenylmethane: tricyclohexylmethane: Marcel Godchot. The Sabatier and Senderens reaction applied to triphenylmethane gives tricyclohexylmethane, the physical and chemical properties of which are given.—Observations on a note of M. L. Paris on the reproduction of the blue coloration of the Oriental sapphire: A. Verneuil. It is contended that the method of M. Paris does not give the true Oriental sapphire, and that this gem has not yet been reproduced artificially.—Gabbro and the iron ore of Joubrechikine Kamen (north Ural): Louis Duparc.—The comparison of the effects of serums with complex mineral contents and with saline water on the phenomena of excretion and nutrition: C. Fleig.—Normal chlorotropism in Bernhardus: Romuald Minkiewicz.—Sudden disturbances of sight associated with cerebral trouble: Pierre Bonnier.—The identification of the imprint of a blood-stained hand on a sheet: V. Baithazard. Reproductions of the blood stain and of the ordinary imprint of the hand of the suspected murderer are given. In spite of the difficulties caused by the texture of the sheet, the two imprints can be completely identified.—*Leucocytosoon piroplasmoides*, from epizootic lymphangitis of the horse: A. Thiroux and A. Teppaz.—The therapeutic value of hordenine sulphate: J. Sabrazès and G. Guérive. An account of the results obtained in the application of this base to the treatment of infantile diarrhoea, intestinal tuberculosis, muco-enteritis, enterocolitis, typhoid fever, and dyspepsia.—The biology of the bradyopods: A. Menegaux.—Contribution to the geological history of the Neckar and the Main: Gabriel Eisenmenger and Mlle. J. Duprat.—Recent excavations carried out in the valley of the Somme: M. Commont.—The distribution of the levels and facies of the meso-mulitic in the Alps: Jean Boussac.—The discovery of *Elephas antiquus* at the island of Delos: L. Cayeux.—The density of sea-water at various points in the English Channel: A. Letalle.

## NEW SOUTH WALES.

**Linnean Society, October 28.**—Mr. A. H. S. Lucas, president, in the chair.—Contribution to a further knowledge of Australian Oligochæta, part i.: E. J. Goddard. A new genus of fresh-water Oligochæta referable to the family Phreodrilidæ, represented by two species, is described. Individuals of both species are found associated with the large fresh-water crayfish, *Astacopsis serratus*. Shaw, one set dwelling among the eggs of the parasite, *Temnocephala*, the other set occurring in the grooves of the carapace. The conditions of habitat, the small number of known species, in conjunction with their geographical distribution, suggest that the Phreodrilidæ are the remnants of an old Antarctic stock, the modern representatives of which are now to be found under conditions

comparable with those of the stalked crinoids of the deep sea.—Some remarkable Australian Corduliinae (Neuroptera: Odonata), with descriptions of new species: R. J. Tillyard. The paper deals with new or little-known Corduliinae from northern Queensland. Three new genera are proposed:—Austrophya, allied to Cordulophya; Pseudocordulia, closely allied to Gomphomacromia; and Austrocordulia, allied to Syncordulia and the European Oxygastra. Five new species and the hitherto unknown male of the beautiful *Macromia tillyardi*, Martin, are described.—Notes on the geology of the north-west coast of Tasmania, from the River Tamar to Circular Head: T. Stephens. It seems probable that the basaltic sheets rising from the coast had their origin in fissure-eruptions along anticlinal axes, intervening folds being subsequently hollowed out by the erosion of rivers or by glaciers slowly moving northward along the lines of the present river valleys. With the exception of the fossils of the Tertiary beds near Table Cape, and the fossil wood from a breccia west of the River Leven, no evidence of any trace of organic remains in the rocks of the north-west coast has yet been placed on record.—Description of a new fruit-fly of the genus *Dacus* from New South Wales: D. W. Coquillett.

## DIARY OF SOCIETIES.

### THURSDAY, DECEMBER 10.

ROYAL SOCIETY, at 4.30.—Reciprocal Innervation of Antagonistic Muscles. XIIth Note: Proprioceptive Reflexes. XIIIth Note: On the Antagonism between Reflex Inhibition and Reflex Excitation: Prof. C. S. Sherrington, F.R.S.—Electrolytes and Colloids. The Physical State of Gluten: Prof. T. B. Wood and W. B. Hardy, F.R.S.—On the Specific Heats of Air and CO<sub>2</sub> at Atmospheric Pressure by the Continuous Electric Method at 20° and 100° C.: W. F. G. Swann.—Potential Gradient in Glow Discharges from a Point to a Plane: J. W. Bispham.—The Extension of Cracks in an Isotropic Material: A. Mallock, F.R.S.—Results of Magnetic Observations at Stations on the Coasts of the British Isles, 1907: Commander L. Chetwynd, R.N.—The Rotation of the Electric Arc in a Radial Magnetic Field: J. Nicol.—On Anomalies in the Intensity in Diffracted Spectra: Dr. H. C. Pocklington, F.R.S.—The Isothermal Layer of the Atmosphere and Atmospheric Radiation: E. Gold.—A Comparison of the Radium Emanation Spectra obtained by Different Observers: T. Royds.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Output and Economy Limits of Dynamo Electric Machinery: J. C. Macfarlane and H. Burge.—*Probable Paper*: Commercial Electric Heating: J. Roberts.

ROYAL SOCIETY OF ARTS, at 4.30.—The Birds of India: Douglas Dewar.

MATHEMATICAL SOCIETY, at 5.30.—On the Propagation of Sound Waves Vertically in the Atmosphere: Prof. H. Lamb.—(1) On Sir William Rowan Hamilton's Fluctuating Functions; (2) On the Representation of a Function by Series of Bessel's Functions: Dr. E. W. Hobson.—Theory of Cauchy's Principal Values (Fourth Paper): G. H. Hardy.—Solution of a Problem of Mersenne's: Dr. T. Stuart.—Note on a Continued Fraction Equivalent to the Remainder after *n* Terms of Taylor's Series: Prof. L. J. Rogers.—Solid Angles and Potentials of Plane Discs: Balak Ram.—The Solution of the Homogeneous Linear Difference Equation of the Second Order: G. N. Watson.—On Differentials: Dr. W. H. Young.

### FRIDAY, DECEMBER 11.

ROYAL ASTRONOMICAL SOCIETY, at 5.—An Improved Telescope Triple Object Glass: J. W. Gifford.—On the Determination of the Apparent Diameter of a Fixed Star: Major P. A. MacMahon.—Note on Spectral Class and Stellar Colour: Julia Bell.—Analysis of the Colours and Magnitudes of 3650 Stars between the North Pole and 25° South Declination: W. S. Franks.—A New "Cave Nebula" in Cepheus: Max Wolf.—On Some Points with Regard to the Light Fluctuations of Variable Stars: Karl Pearson.

PHYSICAL SOCIETY, at 7.—Exhibition of Electrical, Optical, and other Physical Apparatus.

MALACOLOGICAL SOCIETY, at 8.—On *Carelia pilsbryi*, n.sp.: E. R. Sykes.—The Radulae of British Helicids, Pt. II.: Rev. E. W. Bowell.—New Species of Plectopylis: G. K. Gude.—A Preliminary List of Recent Middlesex Mollusca: J. E. Cowper and A. Loydell.—The Application of the Names Gomphina, Marcia, Hemitapes and Katelsya: A. J. Jukes-Browne.

### MONDAY, DECEMBER 14.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Fifty Years of Nile Exploration and Some of its Results (The Jubilee of Speke's Discovery of the Victoria Nyanza): Sir William E. Garstin, G.C.M.G.

ROYAL SOCIETY OF ARTS, at 8.—Twenty Years' Progress in Explosives: Oscar Guttman.

INSTITUTE OF ACTUARIES, at 5.—On a New Method of Constructing and of Graduating Mortality and other Tables: G. King.

### TUESDAY, DECEMBER 15.

ZOOLOGICAL SOCIETY, at 8.30.—A Hunting-trip to Thian-Shan, illustrated by Lantern-slides: F. Gillett.—Some Notes on the Muscular and Visceral Anatomy of the Batrachian Genus *Hemisus*, with Notes on the Lymph Hearts of this and other Genera: F. E. Beddard.—Description of a New Species of *Lacerta* from Persia: G. A. Boulenger, F.R.S.—Remarks on some Wart-hog Skulls in the British Museum: Dr. Einar Lönnberg.—On two Chinese Serow Skulls: R. Lydekker, F.R.S.—Warning Coloration in the Musteline Carnivora: R. I. Pocock.—On a New River-crab of the Genus *Gecarcinus*, from New Guinea: Dr. W. T. Calman.—The Duke of Bedford's Exploration of Eastern Asia. XI., On Mammals from the Provinces of Shan-si and Shen-si, Northern China: Oldfield Thomas, F.R.S.

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FARADAY SOCIETY, at 8.—The Redetermination of the Electrolytic Potentials of Silver and Thallium: Dr. F. J. Brisell.—The Heats of Combustion of Aluminium, Calcium, and Magnesium: F. E. Weston and H. R. Ellis.—The Formation of Graphite by the Interaction of Magnesium Powder and Carbonates: H. Russell Ellis.—Colloidal Barium Sulphate: Dr. E. Feilmann.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Further Discussion*: The Rotherhithe Tunnel: E. H. Tabor.

ROYAL STATISTICAL SOCIETY, at 5.

### WEDNESDAY, DECEMBER 16.

GEOLOGICAL SOCIETY, at 8.

ROYAL SOCIETY OF ARTS, at 8.—London Milk Supply from a Farmer's Point of View: Primrose McConnell.

ROYAL MICROSCOPICAL SOCIETY, at 8.—(1) A Workshop Microscope for the Examining of Opaque Objects; (2) A Simple Method of Illuminating Opaque Objects: J. E. Stead, F.R.S. on Mounting Rotifers and Protista in Canada Balsam: Rev. E. Tozer.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Some Forms of Scientific Kites: E. S. Bruce.—(1) The Registering Balloon Ascents of July 27–August 1, 1908; (2) Balloon Observations at Ditcham, July 27–August 2, 1908: C. J. P. Cave.

### THURSDAY, DECEMBER 17.

LINNEAN SOCIETY, at 8.—The Anomura of the Red Sea: W. Riddell.—Forms of Flowers in *Valeriana dioica*: R. P. Gregory.—Études sur les Cirripèdes du Cambridge Museum: Prof. A. Gruvel.—Rhynchota from the *Sealark* Expedition: W. L. Distant.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Electric Discharge and the Production of Nitric Acid: W. Cramp and B. Hoyle.

### FRIDAY, DECEMBER 18.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Type-casting and Composing Machinery: L. A. Legros.

INSTITUTION OF CIVIL ENGINEERS, at 8.—High-power Water-turbines on Moderate Falls: R. Wolfenden.

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