

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 10, 1908.—“Potential Gradient in Glow Discharges from a Point to a Plane.” By J. W. **Bispham**. Communicated by Sir J. J. Thomson, F.R.S.

Three types of discharge were examined; for very small currents (type A) the glow was limited to the immediate neighbourhood of the point. For larger currents (type B) the luminous glow spread out in a conical form from point to plate, and the current, as indicated by a telephone in circuit, became intermittent. The oscillations of current amplitude could be augmented and decreased in frequency by capacity and inductance, and striæ then began to appear. The striæ were absolutely steady to the eye, in spite of the intermittent nature of the current. When the current was still further increased the flow became continuous, and the glow (type C) was limited to the neighbourhood of the axis of discharge. In this condition the point appeared to be exerting no peculiar effect—the discharge was simply that between two small electrodes.

An exploring electrode was inserted between the point and the plane, and by means of flotation on mercury it could be made to take up any position on the axis relative to the point and plane. The electrode took up the potential of the gas, and in this way potential curves were obtained and the electric force at various points calculated from them.

Electric-force curves were obtained for the A type which indicated that it only possessed a limited range of stability, not being obtained at all for pressures less than 11.3 mm. (point negative) and 3 mm. (point positive) in discharges in hydrogen. Current increase led to the production of the B type of discharge. For the B type of discharge it was observed that the kathode dark space was abnormally large, and also that the kathode glow was a doublet consisting of two bright layers separated by a layer of very low luminosity.

Apparent reversals of field were observed near the electrodes, but it was found that these apparent reversals varied with the capacity of the electro-scope used to measure the potential, and they were interpreted to indicate local excesses of positive and negative electrification rather than reversals of field. The distortion of the potential curve was increased by increasing the capacity of the electro-scope. No distortion was observed in the case of the C type of discharge, and the capacity of the electro-scope did not affect the readings. Evidently the distortion of the curve was to be associated with the intermittent character of the discharge in type B.

It was concluded (for type B) that the Crookes dark space was positively electrified, while negative ions were in excess at a point further away from the kathode. Similarly, when striæ were obtained the anode side of a stria was positively electrified, while the kathode side was negatively electrified, as indicated by the potential curves. In the C type of discharge a constant and normal kathode fall was obtained for wide ranges of pressure and current variation, and the curves were of the same type as has been obtained by Prof. H. A. Wilson for discharges between small plane electrodes. They afforded testimony as to the efficient working of the explorer. In this type of discharge, also, the kathode dark space was observed to be unusually large, and the negative glow resembled rather a large stria embedded in a pale blue halo. Some of the curves obtained for the point glow (A type of discharge) indicated that the discharge proceeded in two stages, a discharge from the point to the neighbouring gas, succeeded by a discharge from this gas to the plate.

Royal Microscopical Society, January 20.—Anniversary meeting.—Lord Avebury, F.R.S., president, in the chair.—Presidential address, entitled “On Seeds, with Special Reference to British Plants”: Lord Avebury. In this the president more particularly dealt with the seeds of gymnosperms and monocotyledons, in continuation of the address of the previous year, in which the seeds of dicotyledons were considered.

Physical Society, January 22.—Dr. C. Chree, F.R.S., president, in the chair.—Effective resistance and inductance of a concentric main, and methods of computing the Ber and Bei and allied functions: Dr. A. Russell. The following

simple formula for the effective resistance R , per centimetre length, of the inner conductor of a concentric main for high-frequency currents is obtained:—

$$R = (\rho m / 2\pi a) (0.7071 + 1/2ma + 0.265/m^2a^2 - 0.35/m^4a^4),$$

where ρ is the volume resistivity of the conductor, a its radius, $m^2 = 8\pi^2\mu f/\rho$, μ the permeability of the conductor, and f the frequency of the alternating current. This formula may be used in wireless telegraphy for calculating the resistance of a conductor when other conductors carrying high-frequency currents are not too close. For values of ma greater than 6 the maximum inaccuracy of the formula is less than 1 in 10,000. In obtaining the solution, exact formulæ are obtained for the density of the current at all points on the inner and outer conductors.—Note on the luminous efficiency of a black body: Dr. C. V. **Drysdale**. The importance of efficient methods of light production renders it of interest to ascertain the possibilities of a black body as a light radiator at various temperatures, and the author has attempted to obtain these from the radiation formula of Wien. The energy radiated between any two wave-lengths is written down, and the total radiation calculated. This, in conjunction with Kurlbaum's determination of the radiation constant, and Lummer and Pringsheim's results, gives rise to the formulæ given in the paper. A table and curves calculated from these formulæ have been worked out by Mr. A. F. Burgess, and show the relation of the total and luminous radiation and luminous efficiency for various temperatures. The comparison of the luminous energy so calculated with the intensity of light radiation found by Prof. Féry leads to a mechanical equivalent of light of about 0.075 watt per candle, which is a fairly probable figure. The results show the enormous extent to which the luminous efficiency is dependent upon the temperature, and how extremely low it is at ordinary temperatures. At 1500° C. the efficiency is only of the order of 1 per cent. or less, while at 2000° C. it is about 3 per cent. The highest efficiency is obtained at a temperature of about 6500° C., and is then only between 40 per cent. and 50 per cent. This strongly points to the necessity for working in the direction of selective radiation or luminescence.—The use of the potentiometer on alternate current circuits: Dr. C. V. **Drysdale**. The great difficulty in alternate current measurement lies in the shortness of the range of the instruments available, and there is therefore a great need for some instrument which, like the direct potentiometer, should be capable of measuring P.D.s. and currents of any range with accuracy. By interposing an ammeter on the dynamometer principle in the main circuit of a potentiometer and deriving the current from the secondary of a phase-shifting transformer, it is possible to check the instrument with direct current against the standard cell in the ordinary way, and then to reproduce the same current in the potentiometer circuit and to bring it into coincidence of phase with the P.D. to be measured. Experiments have been made with this device by Mr. A. C. Jolley and the author, first as to the accuracy of current measurement using an ordinary low-resistance standard, and have been found to give very good agreement with a Kelvin balance. Other tests have been made to obtain the vector difference of potential across a resistance coil and a choking coil connected in series, and the triangle of voltages so formed was found to be very nearly closed. The tests so far made seem to indicate that an alternate current P.D. of 0.1 volt can be measured to an accuracy of 0.2 per cent. or closer. The author has also designed a universal potentiometer on this principle which serves both for direct- and alternate-current measurements, and for testing P.D., current, phase, power, inductance, capacity, &c.

Royal Anthropological Institute, January 26.—Annual general meeting.—Prof. W. Ridgeway, president, in the chair.—Anniversary address, the relation of anthropology to classical studies: Prof. **Ridgeway**. The results that had followed from the use of the anthropological method in the study of the classics were pointed out. Subjects which had long been obscure or had given rise to wild speculations, in the light of anthropology took upon themselves a clear meaning. For example, Aristotle's account of the origins of Greek society, an account which had for long

perplexed scholars, can be explained by comparing it with institutions still surviving amongst primitive peoples; but it is only of recent years that any such comparison has been made, or such an explanation given. It is not only in the domain of sociology or religion that such a comparative method is of service. The art of the Greeks, for example, can be shown to have been at one time in a stage comparable to that of the modern savage, from which it has directly developed. Again, a knowledge of anthropology will be of great service to an intelligent understanding of classical literature. The attacks which have been made on classical studies, and especially on the teaching of Greek, are in great measure due to the classical scholars themselves, who by their pedantry and indifference to scientific method have caused the reaction which has set in against these studies.

Mineralogical Society, January 26.—Dr. A. E. H. Tutton, F.R.S., vice-president, in the chair.—The identity of poonahite with mesolite: Dr. H. L. Bowman. Small colourless prisms, associated with stilbite and pale green apophyllite from Poonah, which appear to be identical with the mineral described by H. J. Brooke in 1831 as poonahite, are shown by analysis to be mesolite, having a composition corresponding to a mixture of two molecules of scolecite with one of natrolite. The optical characters are similar to those recently observed by Görgay in mesolite from the Færøe Islands.—Cross-planes in twin-crystals: Dr. J. W. Evans. A twin-plane is composed of two equivalent planes, one from each component crystal, and every line in it is composed of two equivalent lines. A cross-plane is also composed of two equivalent planes, but there are only two, four, or six lines (at right angles in pairs) composed of equivalent lines. A plane of composition is always a twin-plane or a cross-plane. In the former molecular distances are the same in all directions in the plane, in the latter in two, four, or six directions only.—Comparison of the refractive indices of adjoining crystals in a rock slice which have their directions of vibration oblique to one another: Dr. J. W. Evans. The Nicols are placed with their directions of vibration parallel and bisecting the angle θ between the directions of the vibrations the refractive indices of which are to be compared. The light received from these directions will (apart from interference) be proportional to $\cos^2 \theta/2$, and that from those at right angles to them $\sin^2 \theta/2$, so that the former will bear to the latter the ratio $\cot^2 \theta/2$. If θ be less than 35° this will be greater than ten, and the light from the directions at right angles may be neglected both in respect of its direct effects on the Becke phenomena and its indirect action in producing interference.—Note on the spontaneous crystallisation of solutions as spherulites: J. Chevalier. Experiments on solutions of potash-alum, sodium, ammonium and lithium sulphates, &c., made at the suggestion of Prof. Miers in the Oxford Mineralogical Laboratory, show that spherulites and spherocrystals are characteristic of the spontaneous crystallisation of many solutions in thin drops. When other crystals grow first, it is probably because they have been introduced, the drop in that case appearing to be metastable. The spherulites mark the passage of the solution to the labile state.—A method for studying the optical properties of crystals: the late Dr. H. C. Sorby. The author gives complete details of his work on the determination of refractive indices in thin plates, of which preliminary accounts have been published in the first two volumes of the *Mineralogical Magazine*. The method he describes in the case of doubly refractive minerals is identical in principle (though devised quite independently) with that given by the Duc de Chaulnes for singly refractive substances, but is worked out in far greater detail.—Some additional localities for idocrase in Cornwall: G. Barrow and H. H. Thomas. During the mapping of the metamorphic area round the Bodmin Moor granite, further occurrences of idocrase have been found in the altered limestones. Well-shaped crystals of the mineral, up to 6 mm. in length, are fairly common in drusy cavities. They are perfectly uniaxial, but show in thin sections considerable variation in the double refraction, especially in the outer layers of the crystals. The idocrase is associated with pale pink to pinkish-brown garnet (often in regular intergrowth with the idocrase),

pale green diopside, and epidote approximating to clinzoisite in its low extinction and birefringence.—Detrital andalusite in Tertiary and Post-Tertiary sands: H. H. Thomas. Occurrences of detrital andalusite are described in sands from various localities in West Wales. In no sedimentary rock of greater antiquity than the Pliocene has detrital andalusite been found. In the sands of West Wales the mineral occurs as slightly elongated, somewhat angular grains, often showing very intense pleochroism from blood-red to pale greenish-blue. It is associated in these sands with pink garnet, greenish-brown augite, cyanite, zircon, rutile, tabular anatase, staurolite, brown and more rarely blue tourmaline, green hornblende, bright green epidote, cordierite, iron ores, and in some cases glaucophane.—The energy of twin-crystals: H. Hilton. The author determines in a simple case the conditions according to which a twin-crystal may be a more stable form, or, in other words, may have less surface energy than a simple crystal of the same volume.

Geological Society, January 27.—Prof. W. J. Sollas, F.R.S., president, in the chair.—The Conway succession: Dr. Gertrude L. Elles. In this area the author found a complete succession of strata, from Llandellian up to Salopian date. A table of the divisions proposed is given. The beds are described in ascending order, lists of fossils being given from the more important exposures. There is no break in the sequence between the Ordovician and the Silurian rocks in the district. A detailed comparison is established between the rocks of this area and those of South Wales, the Rhayader and Tarannon districts, Lakeland, the south of Scotland, and Pomeroy. The Conway Mountain volcanic series appears to be equivalent to the Borrowdale volcanic rocks of the Lake District, and the Cadnant Slates and Bodeidda Mudstones equivalent to the Upper Dicranograptus Shales, Trinucleus beds, and Sholeshook Limestone of South Wales, the Sleddale and Roman Fell groups of Lakeland, and the Upper Glenkiln and Lower Hartfell of the south of Scotland. The Deganwy Mudstones are paralleled with the Redhill beds and the Ashgill Shales. Close comparison is possible between the graptolitic zones of the Gyffin Shales and corresponding beds at Rhayader, Tarannon, in the Lake District, and the south of Scotland.—The depth and succession of the Bovey deposits: A. J. Jukes-Browne. The total thickness of the Tertiary beds in the Bovey basin has never yet been ascertained. Some years ago a boring, which reached a depth of 526 feet from the surface, was put down. Particulars concerning the beds traversed by this boring have led to a discussion of the succession of the Bovey deposits, so far as they have been explored. A generalised description of the strata seen in the Heathfield pit, and penetrated by the boring from the bottom of that excavation, is given. The conclusion arrived at by Pengelly in 1861 with regard to the relative age of the beds exposed in the "old coal-pit" south-east of Bovey Tracey, and those proved in a boring to the east of it, is confirmed. The total thickness of the "Eocene" beds is estimated to be about 613 feet. The Bovey basin itself is regarded as a tectonic basin or post-Eocene pericline, and not as a lake-basin. Heer's view of the manner in which the lignites were formed is dissented from, and the identification of some of the plants discussed, and it is concluded that the lignites, which form the mass of the lower beds, represent the growth and decay of successive swamp-forests. Assuming these lower beds to be of Eocene age, and contemporaneous with the Bournemouth beds of the Hampshire basin, it is pointed out that nothing has yet been proved with regard to the higher beds, which may be of Bartonian or even of Oligocene age.

MANCHESTER.

Literary and Philosophical Society, January 26.—Prof. H. B. Dixon, F.R.S., president, in the chair.—The dowels of some Egyptian coffins of the twelfth dynasty: T. G. B. Osborn. An examination was made of various wooden coffins of the twelfth dynasty in the Manchester Museum, using microscopic methods with the view of determining the timber employed in their construction. The wood used in making the body of the coffins was found to be sycamore (*Ficus sycomorus*), while the dowels or wooden pins, with

which they were joined, were of acacia, a harder and tougher wood.—The diatomaceous deposit of the Lower Bann Valley, N. Ireland, and prehistoric implements found therein: J. W. **Jackson**. The diatom deposit occupies a considerable area on both sides of the river Bann, and varies in thickness from 6 feet at Culbane to 18 inches near Lough Beg. At Toome and the Ferry near Lough Beg the clay is cut out in brick form, dried, milled, and put up in sacks for export. The prepared material, known as "Kieselgühr," is used in about fifty manufactures as varied as "polishing powder," "filtering material," "insulating medium," and "tooth and face powders." The prehistoric implements found in working the clay were collected by the late Mr. R. D. Darbishire and Mr. Bell, of Belfast. They comprise large numbers of worked flint flakes, viz. knives, borers, and scrapers, a few flint celts and arrow-heads, a number of implements made of coarse clay-slate, and several others. Other objects described were grindstones, found near Culbane; clay-slate whetstones, one being of peculiar interest from bearing on its face a number of rune-like characters, possibly inscribed thereon to convey a message; and a large saddle-quern, weighing 62 lb., also found at Culbane. Some Oghamic scribings from other parts were referred to. The tools probably range from the Neolithic to the Bronze age.

DUBLIN.

Royal Irish Academy, January 25.—Dr. F. A. Tarleton, president, in the chair.—The Irish horse and its early history: Dr. R. F. **Scharff**. That the modern Irish horse shows remarkable traces of an eastern strain is well known, and has been alluded to by many writers. This is currently believed to be due to human introduction of Spanish horses possessing eastern characteristics. Prof. Ridgeway contended that a superior class of horses resembling the Libyan race had been sent to Ireland even since pre-Christian times. The author exhibited Irish horse remains from crannogs, bogs, marls, and caves, and showed that all these were quite as Arab-like as any modern Irish horse, even more so. He expressed the view that, as some of these bones belonged to wild horses, the eastern features in the modern races were not altogether the result of artificial introduction, but due to inheritance from the original wild stock of the country.—A supplementary list of the spiders of Ireland: Denis R. **Pack-Beresford**. The list contains the record of fifty-eight species of spiders taken in Ireland since the publication of Prof. Carpenter's "List of the Spiders of Ireland" in 1898. Only one species—*Lophocarenum stramineum*, Menge—has not yet occurred in Great Britain, though it has been taken in two localities in the south of Ireland. A single specimen of the rare *Eugnatha striata*, L. Koch, is recorded from Sligo, and *Gongyliidiellum paganum*, Sim., *Lophomma statorum*, Sim., and *Wideria melanocephala*, Camb., have been taken in Co. Carlow, having only previously been found in single localities in England. An exotic species—*Triaeris stenaspis*, Sim.—a native of Venezuela, has been taken in the Botanic Gardens, Glasnevin, in the hot-houses. A second list contains a few corrections in nomenclature of species in Prof. Carpenter's list, and a third gives all the records available at present of new localities for some of the rarer species inhabiting Ireland.—Contributions towards a monograph of the British and Irish Oligochæta: R. **Southern**. Ten new species were described, and twenty-one additions to the fauna of the British Isles were recorded. The total number of species and subspecies now known to occur in the British Isles is 135. A consideration of the distribution of the Irish earthworms leads to the conclusion that the Lusitanian species, at least, are part of a pre-Glacial fauna. This is opposed to the "glacial" theory advanced by Prof. Michaelsen to explain the present distribution of the Lumbricidæ.

PARIS.

Academy of Sciences, February 1.—M. Bouchard in the chair.—The diffusion of saline manures in the soil: A. **Muntz** and H. **Gaudechon**. A patch of soil containing a salt such as potassium chloride or nitrate attracts moisture from the surrounding earth, giving a damp patch. This explains why it is not advisable to use such manures

at the time the seeds are planted, since if the seed is in a saline patch it is killed by the strong solution, and outside such a patch the soil is rendered too dry for germination. Even in moist soils diffusion of the salt horizontally takes place with extreme slowness.—A fructification of a Lycopodium found in the Trias: P. **Fliche**.—Results of micrometric measurements made at the Observatory of Lyons during the eclipse of the sun of June 28, 1908: J. **Merlin**.—The comparative activity of the Leonid and Geminid swarms of November 14, 1907: Maurice **Farman** and Em. **Touchet**.—New researches on the selective absorption and diffusion of light in interstellar space: G. A. **Tikhoff**. Photographs of the Pleiades were made through four screens allowing the passage of the ultra-violet, indigo-violet, yellow-green, and orange rays respectively. The proofs thus obtained showed very clearly that, with a few exceptions, the difference of brightness of the brilliant and feeble stars of the Pleiades increases in an unexpected manner in passing from the orange rays to the ultra-violet. The general results are in accordance with the predictions of Prof. Turner in a recent note on the diminution of light in its passage through interstellar space, based on the supposition of the scattering of light by particles disseminated through space.—Families of Lamé composed of Dupin cyclids: A. **Demoulin**.—Some remarks on geodesic lines, with reference to a recent note by M. Drach: M. **Hadamard**.—The integrals of an algebraical differential equation of the first order: Pierre **Boutroux**.—The application of a generalised theorem of Jacobi to the problem of S. Lie-Mayer: W. **Stekloff**.—The approximate representation of continuous functions by a multiple integral: M. **Fréchet**.—The diminution of phosphorescence at low temperatures: J. **de Kowalski**. Various derivatives of benzene cooled to the temperature of liquid air were exposed to the rays of a mercury arc lamp. The phosphorescence was then observed through different screens, and the time during which the light was visible noted. It was found that the diminution of intensity was more rapid with the long wave-lengths than with the short wave-lengths.—Some new reactions of dioxacetone: G. **Denigès**. A solution containing dioxacetone, sulphuric acid, and potassium bromide gives definite colour reactions with gallic and salicylic acids and other organic compounds.—The action of air and other oxidising agents on coals: O. **Boudouard**. In contact with air, coals absorb oxygen, especially at high temperatures. Coking coals, oxidised at 100° C., lose their power of coking, and after such treatment contain humic acid.—The formation of hydrocyanic acid in the action of nitric acid on phenols and quinones: A. **Seyewetz** and L. **Poizat**. Hydrocyanic acid is formed by the action of a boiling solution of nitric acid (20 per cent.) on numerous organic compounds, especially those containing a phenolic or quinonic group. This is due to the presence of nitrous acid, since if urea or aniline be present no hydrocyanic acid is formed, and a theory based on this fact is suggested.—The action of nitrosobenzene on the secondary amines: P. **Freundler** and M. **Juillard**.—Some reactions of the 9:10-dihydride of anthracene and of anthranol: R. **Padova**. A condensation product with benzophenone chloride is described.—The combustion of gases without flame and on the conditions of lighting by incandescence: Jean **Meunier**.—The extension of the notion of solubility to colloids: M. **Duclaux**. The ordinary definition of solubility is inapplicable to colloids. If a colloid solution is placed in a vessel permeable to the solvent, the latter will escape through the walls, and the concentration of the colloid will increase up to a certain limit, which defines the solubility at the temperature of the experiment. The classification of colloids is considered from this point of view.—The action of acids on peroxydiastase: Gabriel **Bertrand** and Mlle. M. **Rozenband**.—The maltase of maize: R. **Huerre**. Different species of maize contain maltases differing in their temperatures of maximum activity, and also in the range of temperature over which hydrolysis of starch takes place.—The use of ferrous arseniate against the parasitic insects of plants: MM. **Vermorel** and **Dantony**. This insecticide possesses the advantages of adhering well to the plants, strong insecticidal powers, little or no damage to the plant, and less

dangerous to man than other arsenical compounds previously proposed.—Concerning the anatomy of the human thymus: René **Cruchet**. The results recently published by MM. Henri Rieffel and Jacques Le Mée confirm the results published by the author seven years ago.—New cytological researches on the aseptic autolysis of the liver: L. **Launoy**.—Researches on the contagion of tuberculosis by air: M. **Le Noir** and Jean **Camus**. Experiments made with the air of a hospital ward filled with tuberculous patients showed that while no bacilli could be detected in the air, the dust was infected.—The duration of the hypostensive effects resulting from high-frequency currents: E. **Doumer**. The good effects are in general durable. In cases where there was a tendency to relapse, a very short course of the original treatment was sufficient again to lower the blood pressure.—The immediate and ultimate results of arterio-venous suture: Albert **Frouin**.—The various types of stolon in Syllidians, especially a new species (*Syllis cirropunctata*): Aug. **Michel**.—The evolutive cycles of a Scyphistome: Edgard **Hérouard**.—The existence of coal at Gironcourt-sur-Vraine (Vosges): René **Nicklès**.

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 11.

ROYAL SOCIETY, at 4.30.—The Nerves of the Atrio-ventricular Bundle: J. Gordon Wilson.—An Experimental Estimation of the Theory of Ancestral Contributions in Heredity: A. D. Darbishire.—On the Determination of a Coefficient by which the Rate of Diffusion of Stain and other Substances into Living Cells can be measured, and by which Bacteria and other Cells may be Differentiated: H. C. Ross.—The Origin and Destiny of Cholesterol in the Animal Organism. Part III., The Absorption of Cholesterol from the Food and its Appearance in the Blood: C. Dorée and J. A. Gardner.—On the Origin and Destiny of Cholesterol in the Animal Organism. Part IV., The Cholesterol Contents of Eggs and Chicks: G. W. Ellis and J. A. Gardner.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Use of Large Gas Engines for Generating Power: L. Andrews and R. Porter.

MATHEMATICAL SOCIETY, at 5.30.—On the Relation between Pfaff's Problem and the Calculus of Variations: Prof. A. C. Dixon.—On Implicit Functions and their Differentials: Dr. W. H. Young.—On a Certain Family of Cubic Surfaces: W. H. Salmon.—Some Fundamental Properties of Lebesgue Integrals in a Two-dimensional Domain: Dr. E. W. Hobson.—Modular Invariants of a General System of Linear Forms: Prof. L. E. Dickson.—The Conformal Transformations of a Space of Four Dimensions and the Generalisation of the Lorentz Einstein Principle: H. Bateman and E. Cunningham.—On Indeterminate Forms: Dr. W. H. Young.

FRIDAY, FEBRUARY 12.

ROYAL INSTITUTION, at 9.—The Electrical Properties of Flame: Prof. H. A. Wilson, F.R.S.

PHYSICAL SOCIETY, at 8.—Annual General Meeting.—Presidential Address.

MALACOLOGICAL SOCIETY, at 8.—Annual General Meeting.—Presidential Address: Darwinism and Malacology: B. E. Woodward.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Design and Construction of Docks: Sir Whately Eliot.

MONDAY, FEBRUARY 15.

ROYAL SOCIETY OF ARTS, at 8.—Modern Methods of Artificial Illumination: Leon Gaster.

VICTORIA INSTITUTE, at 4.30.—Discoveries in Babylonia and Neighbouring Lands: Dr. T. G. Pinches.

TUESDAY, FEBRUARY 16.

ROYAL INSTITUTION, at 3.—The Architectural and Sculptural Antiquities of India: Prof. A. A. Macdonell.

ZOOLOGICAL SOCIETY, at 8.30.—The Fauna of the Cocos-Keeling Atoll: F. Wood-Jones.—Contributions to the Anatomy of certain Ungulates, including Tapirus, Hyrax, and Antilocapra: F. E. Beddard, F.R.S.—Le Rhinocéros Blanc du Soudan: Prof. E. L. Trouessart.

ROYAL STATISTICAL SOCIETY, at 5.—Forestry in Some of its Economic Aspects: Prof. W. S. Merville.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Design of Marine Steam-Turbines: S. J. Reed.

ROYAL SOCIETY OF ARTS, at 8.—The Commercial Relations of France and Great Britain: Yves Guyot.

WEDNESDAY, FEBRUARY 17.

ROYAL MICROSCOPICAL SOCIETY, at 8.—On a German Silver Powell Portable Microscope, made in 1850: A. A. C. E. Merlin: The "Red Snow" Plant, *Sphaerella nivalis*: G. S. West.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Report on the Phenological Observations for 1908: E. Mawley.—The Cold Spell at the End of December, 1908: W. Marriott.

NO. 2050, VOL. 79]

THURSDAY, FEBRUARY 18.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Osmotic Pressures of Calcium Ferrocyanide Solutions, Part II., Weak Solutions: Earl of Berkeley, F.R.S., E. G. J. Hartley and J. Stephenson.—On the Spontaneous Crystallisation of Monochloroacetic Acid and its Mixtures with Naphthalene: Prof. H. A. Miers, F.R.S., and Miss F. Isaac.—An Apparatus for Measurements of the Defining Power of Objectives: J. de G. Hunter.—On Best Conditions for Photographic Enlargement of Small Solid Objects: A. Mallock, F.R.S.

ROYAL INSTITUTION, at 3.—Problems of Geographical Distribution in Mexico: Dr. Hans Gadow, F.R.S.

LINNEAN SOCIETY, at 8.—Discussion on Alternation of Generations: opened by Dr. W. H. Lang.

FRIDAY, FEBRUARY 19.

ROYAL INSTITUTION, at 9.—Recent Advances in Means of Saving Life in Coal Mines: Sir Henry Cunyngame, K.C.B.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Annual General Meeting.—*Further discussion*: The Filtration and Purification of Water for Public Supply: John Don.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Standardisation in Engineering Practice: Dr. W. C. Unwin, F.R.S.

CONTENTS.

PAGE

| | |
|--|-----|
| A New Encyclopædia of Agriculture. By Dr. E. J. Russell | 421 |
| The Campaign against Tuberculosis. By R. T. H. Tradition and Monumental Remains | 422 |
| Vaccination and Opsonic Action | 423 |
| Science out of School. By G. F. D. | 424 |
| Physical Acoustics | 425 |
| Our Book Shelf:— | |
| Wheeler: "The Zonal-belt Hypothesis. A New Explanation of the Cause of the Ice Ages."—G. A. J. C. | 426 |
| West and West: "A Monograph of the British Desmidiaceæ" | 426 |
| McConnell: "Crops, their Characteristics and their Cultivation" | 427 |
| South: "The Moths of the British Isles."—W. F. K. | 427 |
| Munro: "Les Stations lacustres d'Europe aux Ages de la Pierre et du Bronze" | 427 |
| Stroobant: "Les Progrès récents de l'Astronomie."—W. E. Rolston | 427 |
| Letters to the Editor:— | |
| Seismograms of the Earthquake of January 23. (<i>With Diagram.</i>)—Dr. R. T. Glazebrook, F.R.S. | 428 |
| The Italian Earthquake.—Rev. Dr. A. Irving | 428 |
| The Isothermal Layer of the Atmosphere.—R. F. Hughes | 429 |
| The Size of the Leather Turtle.—Dr. F. A. Lucas | 429 |
| Moral Superiority among Birds.—Laura D. H. Dukes | 429 |
| Women and the Fellowship of the Chemical Society | 429 |
| Periodicity in the Sun and the Red Variable Stars | 431 |
| The International Congress of Chemistry | 432 |
| The Hutton Memorial Medal and Research Fund. (<i>Illustrated.</i>) | 432 |
| W. H. Hudleston, F.R.S. By H. B. W. | 433 |
| Notes | 433 |
| Our Astronomical Column: | |
| Water-vapour Lines in the Sun-spot Spectrum | 438 |
| The Spectrum and Form of Comet Morehouse | 439 |
| Parallax of 23 H Camelopardalis | 439 |
| The Stars of the <i>c</i> and <i>ac</i> Subdivisions in the Maury Spectral Classification | 439 |
| The Stars surrounding 59 Cygni | 439 |
| Errors of Double-Star Measures | 439 |
| Electrification of Railways | 439 |
| The Telegraphic Transmission of Writing. (<i>Illustrated.</i>) | 441 |
| Some Entomological Papers | 442 |
| The Charges on Ions. By Prof. John S. Townsend, F.R.S. | 442 |
| Meteorological Charts of the Indian Ocean | 443 |
| The Filtration and Purification of Water for Public Supply. (<i>With Diagrams.</i>) | 444 |
| University and Educational Intelligence | 445 |
| Societies and Academies | 447 |
| Diary of Societies | 450 |