

OXFORD.—The Committee for Geography will shortly proceed to the appointment of a reader in geography at a stipend of 300*l.* a year. The reader will also hold the post of director of the School of Geography at an additional stipend of 200*l.* a year. The appointment is for five years from October, 1916, and the holder of the post will be re-eligible. Candidates are requested to send in their applications, with such evidence of their qualifications as they may desire to submit, to the assistant registrar, University Registry, Oxford, so as to reach him not later than Wednesday, May 31. Six copies of the application, and of testimonials, should be sent, and at least one copy of any published work to which it is desired to direct the attention of the Board of Electors.

THE Board of trustees of the Ohio State University has ratified the proposal made by President W. O. Thompson for the establishment and maintenance of research professorships. According to *Science* the plan provides that men of recognised ability may be relieved from teaching to devote their entire time to scientific research.

THE Education Department of the County Council of the West Riding of Yorkshire has arranged to hold a vacation course for teachers at Bingley Training College from August 2-16 next. The aim of the course is to stimulate teachers and to give them opportunities of studying new methods of teaching various subjects. The following courses will be included among those offered: a course on education, by Prof. John Adams; the teaching of handwriting, by Miss Suddards; animal life, by Prof. W. Garstang; and plant life, by Dr. O. V. Darbishire. The syllabus, containing time-tables and full particulars, will be issued shortly, and can be obtained upon application to the Education Department (Secondary Branch), County Hall, Wakefield.

As has already been reported in these columns, the foundation-stone of the new Hindu University at Benares was laid by Lord Hardinge, Viceroy and Governor-General of India, on February 4. The issue of the *Pioneer Mail* for February 12 contains a full account of the function. In his address to the Viceroy, the Maharaja of Durbhanga said the contributions of the people of India to the University funds now amount to close upon one crore of rupees (666,700*l.*), including the capitalised value of the annual grants, sanctioned by ruling princes, to which the Government has added an annual grant of a lakh of rupees (6667*l.*) The site selected for the University covers more than 1200 acres. Twenty-four donors gave a lakh of rupees each. Lord Hardinge, in his speech, pointed out that it is the declared policy of the Government of India to do all within its power and within its means to multiply the number of universities throughout India, realising that the greatest boon Government can give to India is the diffusion of higher education through the creation of new universities. "Many, many more are needed," he continued, "but the new universities to be established at Dacca, Benares, and Bankipore, soon to be followed, I hope, by universities in Burma and the Central Provinces, may be regarded as steps taken in the right direction." The University is to be a teaching and residential, as contrasted with an affiliating and examining university. It was announced at the meeting that the Maharaja of Jodhpur had endowed a chair of technology to which Lord Hardinge's name is to be attached. In addition to a lump sum grant, the Maharaja has promised an annual grant of 24,000 rupees (1334*l.*) for this purpose.

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## SOCIETIES AND ACADEMIES.

LONDON.

**Royal Society**, March 9.—Sir J. J. Thomson, president, in the chair.—Prof. J. W. Nicholson and T. R. Merton: The distribution of intensity in broadened spectrum lines. (1) Using a neutral-tinted wedge the actual distribution of intensity in broadened spectrum lines can be accurately measured. (2) With this arrangement quantitative measurements of the hydrogen line  $H\alpha$  have been made, and quantitative observations of other lines of hydrogen, helium, and lithium. (3) The intensity-distribution of lines, broadened by condensed discharges and at high pressures, does not follow the well-known probability law known to obtain under certain specified conditions. (4) The broadening of  $H\alpha$  is symmetrical. (5) The most general characteristic of all the curves obtained is that their curvature is away from the axis perpendicular to the wave-length scale. (6) The existence of more than one component accords with the view that electrical resolution of lines is the origin of their broadening. (7) On the supposition of several components symmetrically distributed about the centre, the only general law consistent with the distribution of curvature is that of a sum of linear exponential terms, one for each component. (8) It is shown that in these circumstances discontinuities in the slope of the curves must occur. Those found in the curve for  $H\alpha$  are in quantitative accordance with those expected from available data with respect to electrical resolution. (9) Quantitative observations of  $H\beta$ ,  $H\gamma$ , and the diffuse series of helium and lithium confirm the view that electrical resolution is the principal cause of the phenomena.—Prof. H. C. Plummer: Prof. Joly's method of avoiding collision at sea. This brief note adds nothing to the general principle on which Prof. Joly's method is founded, but aims at greater simplicity, both in idea and practical detail, by introducing the relative speed of the two ships. The speed and course of an approaching ship being communicated by wireless, the relative speed is easily obtained without calculation by a combination of scales, which is, in fact, identical with Prof. Joly's collision predictor. The one ship may then be considered stationary, and the locus of the approaching ship at successive signals becomes a series of concentric circles. In the case of impending collision the rate of approach is a maximum along a radius and equal to the relative speed. Two methods are suggested for comparing the indications of the signals as received with this critical speed, one involving the use of two direct-reading scales, the other an equivalent arithmetical operation of the simplest kind.—Prof. W. G. Duffield: Apparatus for the determination of gravity at sea. The development of the form of apparatus as finally adopted is described. It depends upon balancing a column of mercury against the pressure of a constant volume of air contained in a bulb. The whole apparatus is maintained at as constant a temperature as possible. The height of the column varies inversely as the value of gravity. The apparatus was tested on a voyage to Australia and modified in Adelaide in accordance with experience gained. It was further tested during part of a return voyage under very unfavourable conditions; nevertheless, the results indicate the suitability of this type of instrument for future observations of gravity at sea.

**Geological Society**, February 23.—Dr. Alfred Harker, president, in the chair.—H. Dewey: The origin of some river-gorges in Cornwall and Devon. In North Cornwall, near Tintagel, there is an area of peculiar topography characterised by the presence of an upland plain or plateau. This plateau is dissected by deep gorges, with their walls scarred by potholes through

which the rivers flow in a series of waterfalls, cascades, and rapids. This plateau is terminated inland by degraded cliffs rising abruptly from 400 ft above sea-level, while the plain slopes gently to the recent sea-cliffs, mostly more than 300 ft. high. The plateau has been cut across rocks of different degrees of hardness, and is overlain by deposits of detritus and peat. Wherever the plain occurs, the scenery is featureless, and the land boggy and waterlogged. The widespread occurrence of this plain over Cornwall and Devon at a uniform height suggests that in its final stages it was a plain of marine erosion. There are in Cornwall and Devon two characteristic types of scenery, to which in great part these counties owe their charm. Wide featureless plains covered with heath and marshland and dominated by tors and crags, on which the drainage is sluggish and vague, alternate with deeply-incised rocky ravines where rivers flow as rapids and cascades. These two types mark successive periods of erosion. Post-Pliocene uplift gave such increased cutting-power to the rivers that they quickly incised chasms in their former valleys, employing while so doing the activity of waterfalls and rapids.

**Linnean Society**, March 2.—Prof. E. B. Poulton, president, in the chair.—Dr. J. D. F. Gilchrist: Larval and post-larval stages of *Jasus lalandii* (Milne-Edwards). Dr. Gilchrist recalls his description, in Journ. Linn. Soc., October, 1913, of the newly-hatched larva, to which he applied the term *naupliosoma*. He now recognises that this name was rather inappropriate, since it tends to obscure the reasonable presumption that the *nauplius* stage has "been passed long before in the development of the embryo." By a record of the distribution, he makes it fairly certain that the further stages of development with which he deals really belong to *Jasus lalandii*. It should, however, be mentioned that, whatever the predominance of this particular crawfish at the Cape, the Atlantic is in some parts well provided with various members of the families Scyllaridæ and Palinuridæ.—B. M. Griffiths: The August Holoepilankton of some North Worcestershire pools.—Dr. O. Stapf: The distribution of the box-tree, *Buxus sempervirens*, Linn. The author adopted Dr. Christ's views as to the character of the box as a relict of the Tertiary flora of southern Europe, and the discontinuous distribution as brought about by disintegration of an old continuous and much larger area. But he could not share his view that the isolated stations in western France are generally due to old plantations around castles and monasteries. He considered them like the English stations as relict stations.

**Mathematical Society**, March 9.—Sir Joseph Larmor, president, in the chair.—Major P. A. MacMahon: Some applications of general theorems of combinatory analysis.—Prof. H. F. Baker: Mr. Grace's theorem on six lines with a common transversal.—H. E. J. Curzon: The integrals of a certain Riccati equation connected with Halphen's transformation.—Miss Hilda P. Hudson: A certain plane sextic.—Dr. W. P. Milne: The construction of coapolar triads on a cubic curve.—J. Proudman: The dynamical equations of the tides.

#### MANCHESTER.

**Literary and Philosophical Society**, February 22.—Prof. G. Elliot Smith, vice-president, in the chair.—Prof. W. W. Haldane Gee: Bunsen and luminous flames. A small obstacle placed at the centre of a coal-gas flame (issuing from a small circular nozzle) at a critical distance above the aperture, gives rise to a musical note of high frequency. If two such flames are made to impinge, roaring or musical flames result. Burners of the Bray and Méker type possess special properties. One experiment of great interest enabled

the eddy currents produced by a flame from a triple nozzle to be studied. When the flame is adjusted—so as to be central within a wide glass tube—carbonaceous particles are precipitated from the flame, and these are whirled in an infinite variety of curves round the flame mantle. The effect is more marked when benzene is introduced into the coal-gas.—Dr. J. H. Smith: A résumé of work on the bleach-out process of colour photography. Grothus, in 1819, seems to have been the first to attempt to formulate the nature of the action of lights of different colour upon bodies, and showed that coloured bodies faded most rapidly in the "opposed" (complementary) coloured light to their own. Liesegang, in 1889, first proposed to utilise this principle in the case of the bleaching-out of aniline dyes in their complementary coloured lights for the production of coloured prints upon paper from transparent coloured pictures. Vallot, in 1895, Neuhaus and Worel, in 1902, and later Szczepanik and the author worked practically upon this process, overcoming some of its difficulties, and obtaining certain results of a somewhat crude nature. In 1907 the author brought the first bleach-out paper upon the market; and in 1911 he was successful in bringing out a new paper ("Utocolor"), by means of which good prints from autochrome plates could be obtained. The more recent work of Limmer, Gebhart, and Just was reviewed.

#### DUBLIN.

**Royal Dublin Society**, February 22.—Prof. Sydney Young in the chair.—Prof. Wm. Brown: The subsidence of torsional oscillations of nickel wires when subjected to the influence of transverse magnetic fields up to 200 c.g.s. units. A direct transverse magnetic field of 200 c.g.s. units has no effect on the damping of torsional oscillations of a nickel wire whether the wire be hard or soft, but an alternating transverse magnetic field of the same strength increases the damping by almost 10 per cent. in a soft wire and by about 4 per cent. in a hard wire. For a transverse alternating magnetic field of 65 units, it was found that when the frequency of the field was increased eight times the damping was decreased, that is, the amplitude of the seventieth vibration was increased about  $4\frac{1}{2}$  per cent.

**Royal Irish Academy**, February 28.—Rev. J. P. Mahaffy, president, in the chair.—J. J. Nolan: The mobility of the ions produced by spraying distilled water. When distilled water is passed through a sprayer the larger drops have a positive charge of uniform surface density, as shown in a previous paper. The present paper deals with the mobility of the ions carried away in the air from the sprayer. Twelve groups of ions have been found, each group possessing a distinct mobility which changes little with time. The mobilities are 0.00038, 0.0010, 0.0043, 0.013, 0.046, 0.12, 0.24, 0.53, 1.1, 1.56, 3.27, and 6.5 cm. per second in a field of 1 volt per cm. Ions of both signs occur in all the groups with the exception of the group of mobility 6.5, which has only been found with negative charges. The negative charge carried by the ions exceeds the positive, the excess being greater in the case of the more mobile ions.—J. A. McClelland and P. J. Nolan: The nature of the ions produced by bubbling air through mercury. The mobility of the ions carried away in air which has bubbled through mercury has been measured. The mobility decreases rapidly with time, and in this respect differs from the results obtained in the above paper on the spraying of water. When sufficient time has elapsed constant mobilities are reached, and groups of ions have been found corresponding to the first five groups in the above paper. When measured earlier greater mobilities are found,

but the ratios of the mobilities are practically the same as when the stable state has been reached. When the air is dried higher values are again found, and in this case also the ratios of the mobilities have the same values.

## PARIS.

**Academy of Sciences**, February 28.—M. Camille Jordan in the chair.—The President announced the death of Richard Dedekind, and gave a short account of his contributions to mathematics.—Paul Appell: Certain polygons the summits of which describe algebraic curves, and of which the sides envelop algebraic curves.—C. Guichard: Plane networks which, in an infinity of ways, may be considered as the orthogonal projection of the lines of curvature of a surface.—MM. Tarazona and Marti: Observation of the eclipse of the sun of February 3, 1916, made at Valencia (Spain). Only the first contact could be observed.—E. Goursat: The class of certain differential expressions.—T. H. Gronwall: Deformation in conformal representation under restrictive conditions.—B. Jekhowsky: The Bessel functions of several variables expressed by Bessel functions of one variable.—Gaston Julia: The reduction of positive quadratic forms.—P. Alexandroff: The power of measurable ensembles B.—Lucien Vallery: The stability of hypochlorites in very dilute solutions. Consequences from the point of view of their use for the sterilisation of water (javelisation). A study of solutions of hypochlorite containing from one to five parts per million of active chlorine. The velocity of decomposition is affected by the medium in two ways, one purely catalytic, the other chemical, depending upon the presence of substances capable of reacting with the molecule of the hypochlorite or with its decomposition products.—G. A. Le Roy: The detection of free chlorine in town water supplies. A disagreeable taste becomes perceptible when the amount of active chlorine reaches 0.05 part per million, and chemical control for solutions of such dilution presents difficulties. It is suggested that the active chlorine be concentrated by partial freezing of the water. Starting with 10 litres of water, and freezing 9.8 litres, the remaining liquid readily gives the iodide of starch reaction; 0.0005 milligram of active chlorine per litre can be detected.—Louis Gentil: The structure of the Middle Atlas (Central Morocco).—N. Arabu: Studies on the Tertiary formations of the basin of the Sea of Marmora.—M. Deprat: The existence of a fold of Palæozoic age between Yunnan and Tonkin.

## WASHINGTON, D.C.

**National Academy of Sciences**, (Proceedings, No. 2, vol. ii.).—J. A. Harris: Personal equation and steadiness of judgment in the estimation of the number of objects in moderately large samples. While there is no certain differentiation among the experimenters in personal equation, they differ distinctly in steadiness of judgment. The latter is conspicuous in contrast with the former in that it is unmistakably influenced by previous experience.—T. B. Johnson: Polypeptide-hydantoins. The formulas for a large number of polypeptide-hydantoins are set up. Some of these substances have already been synthesised and methods for synthesising others are being developed.—J. N. Rose: Recent explorations in the cactus deserts of South America. Large collections of cacti in South America have been made, including many species which have never before been collected, and some which, though collected, have been poorly described or wrongly classified.—H. N. Russell: The albedo of the planets and their satellites. A table is given of the values finally derived for the albedo of the various planets and satellites. The values are in agreement with the current views of the constitution of the bodies. The

value for the earth is intermediate between those of cloudy and cloudless plants.—R. A. Millikan: Quantum relations in photo-electric phenomena. So far as experiment has thus far gone Einstein's equation seems to be an exact statement of the energies of emission of corpuscles under the influence of light waves. Thus the correctness of the quantum theory and the reality of Planck's  $h$  are corroborated.—J. H. Ellis: The chemical activity of the ions of hydrochloric acid determined by electromotive force measurements. In this paper are presented accurate measurements of the electromotive force at 18, 25, and 35° of voltaic cells of the type  $H_2, HCl, Hg_2Cl_2 + Hg$ , with the acid-concentration varying from 0.03–4.5 normal. From the data are calculated the energy effects attending the reaction which takes place in such cells and those attending the transfer of hydrochloric acid in aqueous solution from one concentration to another. From these results are then calculated the chemical activities (or effective concentrations) of the ions of the acid. These activities are shown to decrease with increasing concentration much more rapidly than do the ion-concentrations derived in the usual way from the electrical conductance ratio.—E. G. Conklin: Effects of centrifugal force on the polarity of the eggs of *Crepidula*. It is difficult, but not absolutely impossible, to change the polarity of eggs and cleavage cells, and the persistence of polarity and the restoration of dislocated parts to normal condition is connected with a somewhat resistant framework of protoplasmic strands.—D. L. Webster: The emission quanta of characteristic X-rays. To excite any characteristic radiation it is necessary to use a potential above a critical value. The lines all increase in the same ratio for any given increase of potential. There is reason to believe that the characteristic rays are always a result of excitation of higher-frequency oscillators.—T. W. Vaughan: The results of investigations of the ecology of the Floridian and Bahaman shoal-water corals. The ability of corals to remove sediment from their surfaces, their mechanism for catching food, their carnivorous nature, their relation to light and temperature, and so on, have been studied.—C. D. Walcott: Cambrian trilobites. Data have been assembled to aid in clearing up some of the problems of formations of the Appalachian region by a careful comparison of portions of their contained faunas with those of other localities.—G. E. Hale and F. Ellerman: The minute structure of the solar atmosphere. The minute structure of the quiescent solar atmosphere resembles that of the photosphere. The results apparently support the hypothesis that the solar atmosphere consists of parallel columns of ascending and expanding gases, but such questions as the dimensions of the columns and the direction of motion and velocity are reserved for subsequent discussion.—R. W. Wood: Monochromatic photography of Jupiter and Saturn. The variation of the appearance of Saturn and Jupiter when photographed with light of different wave-lengths suggests a mist or dust in the planet's atmosphere which scatters the shorter wave-lengths.

## BOOKS RECEIVED.

Elements of Highway Engineering. By Prof. A. H. Blanchard. Pp. xii+514. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 12s. 6d. net.

Aircraft in War and Peace. By W. A. Robson. Pp. xi+176. (London: Macmillan and Co., Ltd.) 2s. 6d. net.

Individuality in Organisms. By C. M. Child. Pp.