

three years, will be awarded in connection with the competitive examinations for scholarships, studentships, etc., to be held by the Board of Education in May, 1915, in naval architecture, pure mathematics, applied mechanics (materials and structures), and either applied mechanics (machines and hydraulics), or heat engines. Applications must reach the secretary of the Institution of Naval Architects on or before January 15.

At the last meeting of the governors of the South-Eastern Agricultural College, Wye, the principal, Mr. M. J. R. Dunstan, reported that 110 students and thirteen members of the teaching staff, besides college servants, farm and garden employees, had joined the colours. The new college buildings have been completed at a cost of 12,500*l.*, towards which the Board of Agriculture has given 6000*l.*, whilst two grants, each of 500*l.*, have been made by a generous anonymous benefactor towards the completion of the research equipment, and these gifts have been met by equivalent grants from the Board of Agriculture. The probable financial position of the college, owing to the reduction in the number of students, was considered, and it was decided to bring the matter before the Government educational and agricultural departments before taking any definite steps to curtail the teaching or research work. A vacuum drying plant for experimenting on the drying of fruit and vegetables has been installed by means of a grant from the Board of Agriculture, and it is hoped that assistance may be forthcoming to continue the investigations into the economical feeding of dairy cows of which a third report has just been issued. Results which may prove to be of considerable practical value have been obtained from the hop-breeding experimental work.

THE report of the Commissioner of Education of the United States Bureau of Education for the year ended on June 30, 1913, has been received from Washington. It consists of two bulky volumes running to 931 and 700 pages respectively, and every department of American education is dealt with exhaustively. For the academic year with which the report deals, the bureau received reports from 596 universities, colleges, and technological schools in the United States. Ninety-four of these institutions are controlled by States or municipalities, and 502 are administered by private corporations. The number of collegiate and resident graduate students in these institutions of higher education was during the year 128,644 men and 73,587 women, as compared with 125,750 and 72,703 in the preceding year. These numbers show on analysis an increased attendance of 2.35 per cent. of college students in graduate and undergraduate courses, and a decrease of 11 per cent. in the number of preparatory students. The Commissioner points out in his introduction that in most instances high-school work can be done better and at less cost in the regular high schools than in the preparatory classes of colleges. The decrease in the number of students in the preparatory classes of colleges is due to some extent also to the more liberal practice of the colleges in accepting for admission work in subjects other than those heretofore required.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 3.—Sir William Crookes, president, in the chair.—M. de Lange: The thermophone—a new form of telephone.—Dr. G. S. Walpole: Hermann's phenomenon. At the boundary between two solutions of unequal specific conductivity a change of reaction is developed if a difference of potential be

maintained between them. Alkali is liberated if the current passes from the better conducting solution to that not conducting so well; acid, if the current passes in the opposite direction. The amounts may be calculated from the potential gradients in the solutions on each side of the boundary, the time for which the difference of potential is maintained, the resistance constant of the vessel employed, the dissociation constant of water, and the known migration velocities of hydrogen and hydroxyl ions.

Zoological Society, November 24.—Prof. E. A. Minchin, vice-president, in the chair.—D. M. S. Watson: (1) Description of a new reptile from the Permian of the Cape Province, South Africa. Mr. Watson regards this as derived from a Cotylosaurian ancestor and as perhaps related to *Aræoscelis* and the modern lizards. A new genus is founded for the reception of the so-called *Proterosaurus huxleyi*. (2) The origin of the Chelonina. A number of reasons is given for supposing that they may be descended from some such form as *Eunotosaurus africanus*, Seeley. (3) The skulls of *Bauria*, *Microgomphodon*, and *Sesamodon*. The relation of the group with the Cynognathids is discussed, and a new skull of *Lycosuchus*, in which both the prevomers and vomer are present, is described.—F. A. Potts: Polychæta from the N.E. Pacific: the Chætopteridæ. With an account of the phenomenon of asexual reproduction in *Phyllochætopterus* and the description of two new species of Chætopteridæ from the Atlantic. The new species of *Phyllochætopterus* was found in branched tubes, each usually containing several individuals. The origin of these colonies each from a single individual is suggested by the frequent occurrence of worms in various stages of regeneration. An examination of these shows that autotomy first occurs in the middle region of the animal's body, and a complete animal is regenerated from each of the two parts. This phenomenon appears to be characteristic also of another new species of this genus from Plymouth, which lives in small colonies in branched tubes. Several points in the morphology of the Chætopteridæ are also discussed.—E. Heron-Allen and A. Earland: Evidence of purpose and intelligence on the part of Foraminifera.

EDINBURGH.

Royal Society, November 16.—Prof. F. O. Bower, vice-president, in the chair.—Dr. D. Ellis: Fossil micro-organisms from the Jurassic and Cretaceous rocks of Great Britain. The paper contained a study of fossil moulds from four localities—the Frodingham Ironstone of Lincolnshire, the Secondary rocks in the Island of Raasay (N.W. Scotland), the Dunliath ferruginous Limestone, and the Gault, near Folkestone. These supplied in order a fossil mould belonging to the *Phycomycetæ*, with abundant examples of hyphæ, sporangia, and spores; a fossil mould provisionally named *Palæomyces* α ; a fossil *Actinomyces*; and three members of *Bacteria*, two *Bacilli*, and one *Micrococcus*. Evidence was given that these were genuine micro-organisms, and reasons were discussed why the organism in its lifetime had a chemiotactic affinity for iron.—J. M'Lean Thompson: The anatomy and affinity of *Deperaria moorei*. The paper dealt with the anatomical features of the axis, leaf, and sorus. Comparison with *Deperaria prolifera* showed an advanced type of leaf trace, the expansive lamina being possessed of a few pinæ and a reticulate venation—suggesting an adaptation for life in moist shade. The sori were of normally marginal origin, but occasionally truly superficial sori appeared on the upper leaf surface in *D. moorei*. This in no way invalidated the conclusion that it belonged to the series *Marginales*. The consensus of characters justified the rejection of

an alliance with *Athyrium* or *Aspidium*, but rather assigned the plant to a place in the Davalioid series of forms.—Dr. T. Muir: Properties of the determinant of an orthogonal substitution.

PARIS.

Academy of Sciences, November 23.—M. Ed. Perrier in the chair.—A. Chauveau: Physiological weakness and tuberculosis in armies in the field. The debility caused by exposure to the hardships of a campaign in no way favours the introduction of the tubercle bacillus into the body. But, once the body is attacked by the organism, the reduced power of resistance to the ravages of the bacillus caused by privation and insanitary conditions may have a marked effect on the rapidity of development of the disease.—E. L. Bouvier: The carcinological fauna of Maurice Island. A description of some specimens collected by M. Carié during the last four years.—Haton de la Goupillière: A property of arithmetical progressions.—M. Gonnessiat: Observation of the transit of Mercury across the sun, November 6-7, at the Algiers Observatory. The transit was observed under excellent atmospheric conditions. The times of the four contacts are given and compared with the calculated data.—Henri Chrétien: The transit of Mercury across the sun of November 7, 1914. Details of observations made at Nice.—Comas Solá: Photographic observations of a small planet, apparently new. The photographs were obtained on November 15 at the Fabra Observatory, Barcelona.—C. Le Morvan: Photographic positions of comet 1913f (Delavan) obtained with the photographic equatorial at the Paris Observatory. Positions are given for September 5 and 6, October 7, 8, and 9.—Charles Rabut: The La Balme bridge.—André Kling and H. Copaux: The preserved meat of the Paris camp. A reply to a recent criticism of M. Balland.—Marcel Rostaing: A type of military undergarment.

NEW SOUTH WALES.

Linnean Society, September 30.—Mr. W. S. Dun, president, in the chair.—Dr. C. Hall: The evolution of the Eucalypts in relation to the cotyledons and seedlings. In regard to the form of the embryo in the Eucalypts, the cotyledons in the *E. corymbosa* group closely resemble those of *Angophora*, and are entire and reniform. With reference to the cotyledon-leaves of *Eucalyptus*, these may be divided into two great classes, entire and emarginate; and each of these into groups, according to size and shape. A study of the cotyledons supports the view that the *E. corymbosa* group is the most primitive type, while the Stringybarks have cotyledons of similar form. In response to the xerophytic conditions of Australia, the Eucalypts have reduced the size of their cotyledons—first, by a general reduction in size, while retaining the entire, reniform shape; secondly, by the introduction of emargination, which, at last, becomes so extreme that Y-shaped cotyledons come to prevail in many of the dry-country species. The first pairs of leaves tend rapidly to assume the typical form of the juvenile foliage of the species, except in the *Corymbos*, where, for a few pairs, the peltate form is adopted. Seedlings of about 150 species are figured.—Dr. R. Greig-Smith: Note on the bacteriotoxic action of water. When *B. prodigiosus* is used as a test-bacterium, and seeded into filtered tap-water, it generally increases. In boiled water, the rate of multiplication is lessened. Under the same conditions, *B. typhi* always decreases, and, in boiled water, the diminution is increased to such an extent that from three to six cells, out of 1000 added, remain after twenty hours.—Dr. R. Greig-Smith: Note on the destruction of paraffin by *B. prodigiosus* and soil-organisms.

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When *B. prodigiosus* is grown in the presence of paraffin, it attacks the hydrocarbon. Losses varying from 5 per cent. to 14 per cent. were obtained. Mixed soil-organisms, under the same conditions, destroyed from 11 per cent. to 49 per cent.

CAPE TOWN.

Royal Society of South Africa, October 21.—Dr. L. Péringuey, president, in the chair.—J. B. Pole-Evans: Some new South African aloes. The paper describes six new aloes from the Transvaal.—Th. Wassenaar: Optical illusions.—E. J. Goddard and C. S. Grobbelaar: A new genus of fresh-water Oligochætes (of uncertain position).—J. S. v. d. Lingen: The space-lattice of liquid crystals. The theory of the identity of molecules which cause the different forms of crystals of the same substance was discussed briefly. Experiments on the magnetic nature of certain liquid crystals were then described. The principal axis of the molecules lies parallel to the lines of magnetic force when the molecules are not influenced by other forces. As regards the optical properties of liquid crystals, the pseudo-isotropic layers behave like uniaxial crystals cut perpendicular to the axis. Vorlaender's experiments on such layers in convergent light show the well-known rings and crosses of uniaxial crystals. He believes that the pseudo-isotropic layers have space-lattices. When Röntgen rays are passed through such layers no interference phenomenon is obtained, hence there is no space-lattice. This indicates that: (1) the molecule itself is a small crystal possessing magnetic axes; (2) a change in the structure of the molecule itself causes a change in the form of the crystals of the same substance.

BOOKS RECEIVED.

- Transactions and Proceedings of the Botanical Society of Edinburgh. Vol. xxvi. Pt. 3. Session 1913-14. Pp. xxxiii+299. (Edinburgh: Botanical Society.)
- Canada. Department of Mines. Mines Branch. Magnetite Occurrences near Calabogie, Renfrew County, Ontario. By E. Lindeman. Pp. 16. Moose Mountain Iron-Bearing District, Ontario. By E. Lindeman. Pp. 14+8 maps. (Ottawa: Government Printing Bureau.)
- Fighting in Flanders. By E. A. Powell. Pp. xix+227. (London: W. Heinemann.) 3s. 6d. net.
- Boilers, Economisers, and Superheaters: their Heating Power and Efficiency. By Prof. R. H. Smith. Pp. viii+128. (London: Crosby Lockwood and Son.) 7s. 6d. net.
- The City of Dancing Dervishes and other Sketches of Studies from the Near East. By H. C. Lukach. Pp. xi+257. (London: Macmillan and Co., Ltd.) 7s. 6d. net.
- Through the Grand Canyon from Wyoming to Mexico. By E. L. Kolb. Pp. xix+344. (London: Macmillan and Co., Ltd.) 8s. 6d. net.
- Text-Book of Embryology. Edited by W. Heape. Vol. i., Invertebrata. By Prof. E. W. MacBride. Pp. xxxii+692. (London: Macmillan and Co., Ltd.) 25s. net.
- The Excavations at Babylon. By R. Koldewey. Translated by A. S. Johns. Pp. xix+335. (London: Macmillan and Co., Ltd.) 21s. net.
- Macmillan's Geographical Exercise Books. II.—Europe. With Questions. By B. C. Wallis. Pp. 48. (London: Macmillan and Co., Ltd.) 6d.
- Bricks and Artificial Stones of Non-Plastic Materials: their Manufacture and Uses. By A. B. Searle. Pp. vi+149. (London: J. and A. Churchill.) 8s. 6d. net.