

clear that, so far as continued education was provided under the Bill, it was undesirable that attention should not be paid during the four years of compulsory attendance to the requirements of the vocation in which the young person was engaged and by which he was to live. With respect to free secondary education, strongly advocated by certain Members, Mr. Fisher pointed out that 67 per cent. of the children in State-aided secondary schools had already been in receipt of free instruction in the elementary schools, and that to abolish all fees in the secondary schools would mean a loss to the State of an annual revenue of 1,200,000l., but he was prepared to submit a new sub-clause to clause 4 calling upon the local authorities in preparing schemes to provide means whereby no child because of poverty should be precluded from the benefits of higher education. In the organisation of advanced courses in public elementary schools, it was agreed to have regard not only to the older, but to the more intelligent children also who stay at such schools beyond the age of fourteen, and to add to clause 2 (a) (ii) of the Bill the words: "So much of the definition of the term 'elementary school' in section 3 of the Act of 1870 as requires that elementary education shall be the principal part of the education there given shall not apply to such courses of advanced instruction for older pupils." With these and other slight amendments clauses 1, 2, and 3 were added to the Bill. Clause 4, dealing with the consultation of authorities for the purposes of part iii. of the Education Act, 1902, was under consideration when the Committee adjourned. There are many formidable amendments yet to be considered, notably those relating to clause 10, on continued education, but the progress already made augurs well for the future course of the measure.

### SOCIETIES AND ACADEMIES.

#### LONDON.

**Royal Society**, May 2.—Sir J. J. Thomson, president, in the chair.—Dr. J. H. Mummery: Nerve end-cells in the dental pulp. The author has carried further his researches on the distribution of the nerves of the dental pulp. In a paper published in the Phil. Trans. for 1912, he demonstrated that the fibres from the nerve plexus in the pulp beneath the odontoblasts do not terminate at the inner margin of the dentine as described by Huber and others, but that, although they form an open plexus around the odontoblast cells, they are also distributed to the dentinal tubes and enter the dentine in company with the dentinal fibril, but make no connection with it. Recent preparations with improved methods have demonstrated that the fibres from the deep plexus in the pulp pass to definite nerve end-cells or peripheral nerve end-organs, which this method of staining has revealed at the inner margin of the odontoblasts.—H. Onslow: The nature of growths in colloidal silica solutions. The late Dr. Charlton Bastian claimed to have synthesised certain symmetrical bodies, resembling *Torulæ* and other minute organisms, from sterilised colloidal solutions which had been exposed for a long period to light. Further, he claimed that such organisms were capable of reproducing themselves. The author has repeated the experiments, using the special samples of sodium silicate reserved for and recommended by Dr. Bastian and following his directions in every detail. The greatest precautions were taken to avoid accidental contamination. The results obtained indicate that the method employed yields tubes which are absolutely sterile for all periods up to three years.

**Physical Society**, April 26.—Prof. C. H. Lees, president, in the chair.—J. Guild: Notes on the Pulfrich refractometer. The paper deals with points to be

observed in the use and design of Pulfrich refractometers. A theoretical investigation of the various errors to which measurements are liable is included.—F. Simeon: The accuracy attainable with critical-angle refractometers. The three factors controlling the determination of a refractive index by means of a critical-angle refractometer are, so far as the prism system is concerned, (i) the angle of the prism, (ii) its refractive index, and (iii) the angle of emergence of the critical ray from the second prism face. Expressions are obtained for the variation of the required refractive index with each of these factors separately, and curves are given connecting these variations with the angle of emergence from the second prism face for various prism angles.—Prof. H. Chatley: Cohesion (fourth paper). The paper is the fourth of a series dealing with the subject of cohesion. The aim of the present paper is to consider the value of molecular force as indicated by Van der Waals's gas formula (particularly at the critical state where the liquid and gaseous states merge), and to relate the results to the previous inquiry.

**Linnean Society**, May 2.—Sir David Prain, president, in the chair.—G. M. Thomson: A new fresh-water shrimp (*Caridina*) from Fiji.—Dr. Marie Stopes: *Bennettites Scottii*, sp. nov., a European petrification with foliage. A new species of *Bennettites* is described, externally very like a *Williamsonia* "fruit" as regards both shape and size. It is, however, a young vegetative trunk, probably a "sproutling." The three main points of particular interest about it are:—(1) It is the smallest trunk of *Bennettites* yet known; (2) it is the first European specimen to include well-petrified young foliage; (3) it is well preserved, and elucidates some anatomical details of leaf-structure not completely known from the American specimens.—Dr. Marie Stopes: A survey of the biological aspect of the constitution of coal. The history of the complicated substance known as coal was narrated, from its earliest microscopical investigation in 1833 by H. T. M. Whitham, and shortly afterwards by William Hutton (1798–1860). Four special substances were particularised as building up coal, and some concluding remarks were devoted to the ecological aspect of coal in its formation in geological times.

**Mathematical Society**, May 9.—Prof. Hilton, vice-president, in the chair.—E. L. Ince: The continued fractions connected with the hypergeometric equation.—W. P. Milne: Determinantal systems of copolar triads on a cubic curve.—A. Young: The electromagnetic properties of coils.

#### PARIS.

**Academy of Sciences**, April 29.—M. Ed. Perrier in the chair.—J. Boussinesq: Calculation to the second approximation of the limiting thrust exerted on a vertical wall by a *terre-plein* with free horizontal surface.—C. Richet, P. Brodin, and Fr. Saint-Girons: The influence of intravenous injections of isotonic liquids on the dilution of the blood and on the number of red-blood corpuscles which may be lost in bleeding: From experiments on dogs, the classical theory is found not to be in complete accord with fact. The immediate cause of death by bleeding is a more complex problem than has hitherto been supposed.—E. Ariès: The saturated vapour pressures of triatomic liquids. The formula derived in earlier communications is applied to the examination of the experimental data for carbon dioxide, sulphur dioxide, and nitrous oxide. There are some divergences between the calculated and experimental values, the causes of which are discussed.—J. Haag: The application of the law of Gauss to syphilis. The application of the theory of probability to 120 cases of syphilis shows that the

period of incubation obeys very exactly the law of Gauss, the average duration being thirty-four days.—**L. Roy**: The problem of reflection and refraction by plane periodic waves.—**F. B. de Lemaizan**: The resistance of the electric spark.—**P. L. Mercanton**: The magnetic state of some prehistoric pottery. The articles examined were taken from Swiss lakes (Bienne, Zurich, Pfäffiken), and from magnetic observations on nine pieces the conclusion is drawn that at the time and place of manufacture the terrestrial magnetic inclination was nearly zero.—**P. Chevenard**: The determination of the velocities of cooling necessary for the realisation of tempering in carbon steels. The results for a series of steels with carbon graded from 0.2 per cent. to 0.8 per cent. are given in the form of curves.—**C. Matignon** and **F. Meyer**: The double sulphate of soda and ammonia. Thermochemical and solubility data.—**P. de Sousa**: The epigenetic movements during the Quaternary at Algarve, Portugal.—**E. Hernandez-Pacheco**: The Archæocyatidæ of the Sierra de Cordoba (Spain).—**A. Guébard**: Remarks on the sedimentary crust.—**E. Saillard**: The balance of some constituent principles of the sugar-beet during the manufacture of sugar. The various products arising during the extraction of sugar from the sugar-beet have been analysed, and the data used to construct balance-sheets for the dry material, nitrogen, potash, soda, and phosphoric acid. The three last-named substances can be practically all recovered and returned to the soil, but about one-half of the nitrogen cannot be utilised.—**L. Devillers**: The determination of the indigestible residue *in vitro* produced by pancreatin acting upon wheat or the products of milling and baking. Figures are given for fourteen samples of wheat, flour, and bread.—**F. Guitel**: The first stages of the development of the adhesive apparatus of *Lepadogaster*.—**A. Nanta**: The initial alterations of the liver in great traumatism.

#### BOOKS RECEIVED.

The Third and Fourth Generation: An Introduction to Heredity. By E. R. Downing. Pp. xi+164. (Chicago: University of Chicago Press; London: Cambridge University Press.) 1 dollar net.

Plant Products and Chemical Fertilizers. By S. H. Collins. Pp. xvi+236. (London: Baillière, Tindall, and Cox.) 7s. 6d. net.

The Alkali Industry. By J. R. Partington. Pp. xvi+304. (London: Baillière, Tindall, and Cox.) 7s. 6d. net.

University of Chicago. Publications of the Members of the University, 1902-1916. Pp. x+518. (Chicago: University of Chicago Press; London: Cambridge University Press.)

Bibliography of the Geology and Eruptive Phenomena of the More Important Volcanoes of Southern Italy. Compiled, with the assistance of Madame A. Johnston-Lavis, by Dr. H. J. Johnston-Lavis. Second edition. Pp. xxiv+374. (London: University of London Press, Ltd.)

Yorkshire Type Ammonites. Edited by S. S. Buckman. Part xv. (London: W. Wesley and Son.) 3s. 3d. net.

The *Athenæum* Subject Index to Periodicals, 1916. Science and Technology, including Hygiene and Sport. Pp. 162. (London: The *Athenæum*.) 10s. net.

A Handbook on Antiseptics. By Drs. H. D. Dakin and E. K. Dunham. Pp. ix+129. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd.) 7s. net.

The Botany of Iceland. Edited by Drs. L. K. Rosenvinge and E. Warming. Part ii. Pp. 347 to 675. (Copenhagen: J. Frimodt; London: J. Wheldon and Co.) 5s. 6d. net.

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#### DIARY OF SOCIETIES.

**THURSDAY, MAY 16.**  
**ROYAL SOCIETY**, at 4.30.—Note on Certain Coloured Interference Bands and the Colours of Tempered Steel: A. Mallock.—General Factors in Mental Measurements: J. C. M. Garnett.—The Absorption of X-Rays in Copper and Aluminium: C. M. Williams.—The Electrical Resolution and Broadening of Helium Lines: Dr. T. R. Merton.  
**ROYAL INSTITUTION**, at 3.—The Prosecution and Punishment of Animals: Sir J. G. Frazer.  
**ROYAL SOCIETY OF ARTS**, at 4.30.—The Freedom of the Sea: John Leyland.  
**INSTITUTION OF MINING AND METALLURGY**, at 5.30.

**FRIDAY, MAY 17.**  
**ROYAL INSTITUTION**, at 5.30.—The Story of a Grass: Dr. A. B. Rendle.

**TUESDAY, MAY 21.**  
**ROYAL INSTITUTION**, at 3.—A Master of Method—Pitt-Rivers: Prof. A. Keith.

**THURSDAY, MAY 23.**  
**ROYAL INSTITUTION**, at 3.—The Abode of Snow: Its Appearance, Inhabitants, and History: Sir Francis Younghusband.  
**INSTITUTION OF ELECTRICAL ENGINEERS**, at 6.—Some Transient Phenomena in Electrical Supply Systems: Prof. E. W. Marchant.

**FRIDAY, MAY 24.**  
**ROYAL INSTITUTION**, at 5.30.—Internal Ballistics: Lt.-Col. A. G. Hadcock.  
**LINNEAN SOCIETY**, at 3.—Anniversary Meeting.

**SATURDAY, MAY 25.**  
**ROYAL INSTITUTION**, at 3.—Problems in Bird-Migration: Prof. C. J. Patten.

**TUESDAY, MAY 28.**  
**ZOOLOGICAL SOCIETY**, at 5.30.—A Case of Hermaphroditism in a Lizard, *Lacerta viridis*: Noel Taylor.—Fresh-water Fish as Food: C. Tate Regan.

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