Societies and Academies.

LONDON.

Association of Economic Biologists, October 14.—Sir David Prain, president, in the chair.—Dr. W. **Brown**: The physiology of the infection process. The lecturer gave an account of recent work carried out in the Imperial College of Science on the physiology of parasitism, dealing chiefly with the fungus *Botrytis cinerea*. Evidence was brought forward showing that the actual penetration of the host-tissue took place by mechanical means. The most careful examination, both by chemical and cytological methods, failed to show evidence of a cutin-dissolving enzyme. The mechanical theory of penetration was further supported by the fact that fungi could penetrate membranes, such as gold-leaf, paraffin-wax, etc., on which they could not possibly exert any chemical action whatsoever. The well-known "action in advance" subsequent to penetration was shown to be due to a toxic enzyme, the properties of which had been studied in detail. Previous to penetration the fungus exerted no action on the host. On the other hand, a passive exosmosis of substances took place from the host into the infection drop, this leading in some cases to stimulation, in others to inhibition, of fungal germination. The question of the existence of tropic stimuli as a factor in infection was discussed, and attention was directed to the necessity of investigating the nutritional requirements of particular fungi, in connection with which numerous problems had arisen in recent work.

Zoological Society, October 18.—Sir S. F. Harmer, vice-president, in the chair.—Prof. G. Elliot **Smith**: The habits of Tarsius.—S. **Hirst**: Some new parasitic mites.—Prof. J. P. **McMurrich**: Note on the systematic position and distribution of the Actinian, *Sagartia luciae*.

MANCHESTER.

Literary and Philosophical Society, October 14.—Mr. T. A. Coward, president, in the chair.—Dr. I. **Langmuir**: Molecular structure. The modern conception of the atom is that of a nucleus surrounded by electrons, and all the chemical and physical properties of the atom are due, in a large measure, to the number of these electrons and their arrangement around the nucleus. The author indicated three postulates, and explained in certain cases how these postulates accorded with the simple and well-known properties of the atoms considered. He was able to show wherein lay the fundamental difference between organic chemical compounds and inorganic compounds; and he explained how the electrical conductivity of certain substances in the molten state or in solution could be accounted for and why some elements are gaseous and others solid under ordinary conditions.

October 18.—Mr. T. A. Coward, president, in the chair.—Prof. T. H. **Pear**: The visualisation of numbers in space: some comments upon Galton's theory of number-forms. The ability to picture numbers mentally during calculation is not infrequently combined with a tendency to see them arranged in a definite pattern, each number occupying a fixed position relative to the subject's line of sight. Such number-forms are by no means rare; 7 per cent. of a large number of university students were found to possess them. The spatial relations of the numbers are so definite and fixed that tri-dimensional wire models representing them exactly can be made. Two such models, made by members of the society, were exhibited. Most possessors of number-forms do not regard their gift as unusual, and are sometimes surprised to discover that calculation is possible without them. The lecturer discussed a number of aspects of the subject, of which Sir Francis Galton's original description in the "Inquiries into Human Faculty" can now be supplemented or corrected. While Galton believed that number-forms were hereditary, the lecturer held that Galton's evidence was inadequate, and he produced evidence to show that environmental factors could produce resemblances between number-forms amongst unrelated persons as great as, or greater than, those found by Galton to occur in the same family. Moreover, the common appearance in number-forms of the clock-face, the statistical frequency with which the turns occur at 10 and 12, and the occasional representation of the negative values support the view that they are acquired.

PARIS.

Academy of Sciences, October 17.—M. Georges Lemoine in the chair.—A. **Blondel**: A vectorial equation, in complex notation, of the alternator with two reactions. Its applications.—C. **Camichel**: Hydraulic states of flow. An experimental study of the conditions of steady and turbulent flow of water in tubes.—C. **Le Morvan**: Photographic and systematic map of the moon. Remarks on the second part of the map of the moon, comprising the surface visible at the phases between opposition and new moon.—M. **Baudouin**: The material representation on stone of the constellation of the Great Bear, belonging to the polished stone period. A detailed account of five undoubted cases representative of the constellation Ursa Major on bones of the neolithic period.—J. **Guillaume**: Observations of the sun made at the Observatory of Lyons during the second quarter of 1921. Observations were possible on 88 days during the quarter: the results are given in tables showing the number of sunspots, their distribution in latitude, and the distribution of the faculæ in latitude.—M. **Brillouin**: Bohr's atom. The Lagrange circum-nuclear function.—K. **Ogura**: The curvature of light rays in the field of gravitation.—C. E. **Brazier**: The resistance of the air to the movement of spheres, and the rate of ascent of pilot balloons. From the experimental data of Cave and Dines, Rouch, and La Porte, the values of K, the coefficient of resistance, are calculated corresponding to increasing values of N (Reynolds's number).—A. **Dauvillier**: Contribution to the study of the electronic structure of the heavy atoms and their spectral lines.—M. **Dejean**: The demagnetising field of cylindrical bars of mild steel. Curves are given showing the relations between the intensity of magnetisation and strength of field for a series of bars of the same steel, varying in length from 5 mm. to 1200 mm. The demagnetising influence of the poles is illustrated by a second series of curves derived from the first set.—G. **Claude**: The manufacture of hydrogen by the partial liquefaction of water gas. Experiments in the preparation of hydrogen suitable for ammonia synthesis from water gas, commenced in 1908, were abandoned on account of the difficulties encountered. The work has been taken up again and the difficulties surmounted. The gas is allowed to do external work on expansion, and the lubrication troubles caused by the low temperatures were prevented by the addition of 5 per cent. of nitrogen to the hydrogen. A diagram of the apparatus is given. A plant is now working at Montereau treating 500 cb.m. of water gas per hour, and giving 230 cb.m. of hydrogen containing 1·5 per cent. of carbon monoxide. The energy required can be cheaply furnished by the utilisation of one quarter of the liquefied

carbon monoxide in a gas engine.—H. **Copaux** : A rapid method for the estimation of phosphoric acid. —A. **Mailhe** : Petrol prepared from rape oil. Rape oil was treated at 550–650° C. with a copper–aluminium catalyst, and the lighter liquid fractions hydrogenated over nickel. The petrol contained large proportions of aromatic and naphthenic hydrocarbons.—P. **Bugnon** : The theory of syncotylia and the case of *Streptopus amplexifolius*. The notion of the phyllode applied to the interpretation of the cotyledon of the Monocotyledons.—L. **Léger** and S. **Stankovitch** : Artificial impregnation and development of *Aspro asper*.—L. **Blaringhem** : The production of the "marbled varieties" of the bean, *Vicia Faba*. An account of the results of experiments in crossing *Vicia Faba*, variety *pliniana*, with the variety *equina*.—R. **Courrier** : The determinism of the secondary sexual characters in the Arthropods. In agreement with previous observations on vertebrates, the seminal elements do not determine the secondary sexual characters in Arthropods. These are probably determined by a hormone produced by an organ physiologically independent of the seminal gland.—Mlle. M. **Gauthier** : Coccidia of *Cottus gobio*.—L. **Fournier** and L. **Guénot** : The treatment of syphilis by bismuth. An account of the treatment of 110 cases of syphilis by tartro-bis-muthate of potassium and sodium : the favourable results fully confirm those of R. Sazerac and Levaditi, and prove the powerful therapeutic effects of bismuth against syphilis in various forms.

BRUSSELS.

Royal Academy of Belgium, July 2.—M. Cesàro in the chair.—G. **Cesàro** : An elementary demonstration of the form of the caustic by reflection, and of the formula giving the refractive index of a prism as a function of the minimum angle of deviation.—G. **Cesàro** : The form of the crystals deposited by a thin layer of crystal-forming liquid on a plain sheet of glass.—C. **Servais** : Orthological reciprocal tetrahedra. —J. **Neuberg** : The orthogonal projection of a tetrahedron on a plane and on a surface of the fourth order. —F. **Swarts** : Some fatty fluorides.—A. **de Hemptinne** : Reduction of metallic oxides by the silent electric discharge (fourth communication).—E. **van Aubel** : A relation between the absolute melting points, boiling points, and critical temperatures of bodies.—E. **Henriot** and R. **Crombes** : Variation of the refractive index with temperature. Numerical comparison of the different formulæ proposed.

August 6.—G. Cesàro in the chair.—C. **Servais** : The quadrics of revolution.—A. **Demoulin** : Encircled surfaces.—V. **Willem** : Synchronism of the respiratory movements and the cardiac pulsations of fishes.—H. **Rouche** : Parafluorometanitrobenzoic acid.

October 8.—G. Cesàro in the chair.—P. **Stroobant** : Observations of Saturn made in 1921 at the time of disappearance of the ring.—J. **Verschaffelt** : The graphical construction of capillary menisci.—J. **Verschaffelt** : The determination, by graphical construction, of the capillary rise of a liquid between two co-axial cylinders.—J. **Neuberg** : A problem on articulated quadrilaterals.—A. **de Hemptinne** : The reduction of metallic oxides by the silent electric discharge.—L. **Godeaux** : A linear congruence of skew cubics.—M. **Keelhoff** : Airy's formula.

WASHINGTON, D.C.

National Academy of Sciences, Proceedings, vol. 6, No. 10. October, 1920.—A survey of research problems in geophysics prepared by chairmen of sections of the American Geophysical Union. This detailed research survey has the following major sub-divisions : W. **Bowie** : Present status of geodesy and some of the problems of this branch of geophysics ; H. F. **Reid** : The problems of seismology ; C. F. **Marvin** : The status and problems of meteorology ; L. A. **Bauer** : Some of the chief problems in terrestrial magnetism and electricity ; G. W. **Littlehales** : The problems and functions of the Section of Physical Oceanography of the American Geophysical Union ; H. S. **Washington** : The problems of volcanology ; R. B. **Sosman** : An outline of geophysical-chemical problems.—W. D. **Harkins** : The ionisation of strong electrolytes. Discussion of the various meanings attached to the word "ionise."—A. G. **Webster** : A condition for Helmholtz's equation similar to Lamé's. —W. **Duane**, H. **Fricke**, and W. **Stenström** : The absorption of X-rays by chemical elements of high atomic numbers. The critical absorption wave-lengths of the K series of most of the available chemical elements from tungsten to uranium were measured. The values of the wave-lengths are uniformly larger than those obtained by photographic methods, by an amount between 1 and 2 per cent.—E. H. **Hall** : The Thomson effect and thermal conduction in metals. A continuation of previous papers on thermal conduction. Data are given for eighteen metals, and compared with the theory.—J. **Lipka** : Motion on a surface for any positional field of force. The complete geometric characteristic properties of the system of trajectories are determined.

Books Received.

Geography for Senior Classes. By E. Marsden and T. Alford Smith. Pp. x+521+14 coloured maps. (London : Macmillan and Co., Ltd.) 7s. 6d.

Islands Far Away : Fijian Pictures with Pen and Brush. By Agnes G. King. Second edition. Pp. xxxii+256. (London : Sifton, Praed and Co., Ltd.) 18s. net.

Catalogue of Scientific Papers. Compiled by the Royal Society of London. Fourth series (1884–1900). Vol. 17, Marc–P. Pp. v+1053. (Cambridge : At the University Press.) 9l. net.

Relativity and Gravitation. Edited by J. Malcolm Bird. Pp. xiv+345. (London : Methuen and Co., Ltd.) 8s. 6d. net.

Atomic Theories. By F. H. Loring. Pp. ix+218. (London : Methuen and Co., Ltd.) 12s. 6d. net.

Guide Pratique de Sylviculture. By Dr. F. Fankhauser. Troisième édition française, by M. Petitmermet. Pp. 348. (Lausanne, Genève, and Paris : Payot et Cie.)

Bartholomew's General Map of Europe, showing Boundaries of States according to Treaties. 35 in. by 23 in. (Edinburgh : J. Bartholomew and Son, Ltd.) 1s. net.

Le Parasitisme et la Symbiose. By Prof. M. Caullery. (Encyclopédie scientifique : Bibliothèque de Biologie générale.) Pp. xiii+400+xii. (Paris : G. Doin.) 14 francs net.

Plane Geometry for Schools. By T. A. Beckett and F. E. Robinson. Part 1. Pp. viii+239+v. (London : Rivingtons.) 5s.

Hellenism and Christianity. By E. Bevan. Pp. 275. (London : G. Allen and Unwin, Ltd.) 12s. 6d. net.

Department of Scientific and Industrial Research. The Geological Survey of Great Britain and the Museum of Practical Geology : Report of the Geological Survey Board with the Report of the Director for the Year 1920. Pp. 25. (London : H.M. Stationery Office.) 1s. net.