

get 160*l.* for its biological laboratory, Rennes 320*l.* for the botanical and physical science laboratories, Lille, Clermont, and Grenoble are getting goodly sums for electrical equipment, and Paris 100*l.* for the herbarium of the Academy of Sciences.

THE Association of Teachers in Technical Institutions will hold its eighth annual conference at Liverpool during Whitsuntide, May 30–June 3. The open meetings begin on Monday, June 1, when the chairman of the Liverpool Education Committee, Councillor J. W. Alsop, will welcome the conference to Liverpool, and the president, Mr. P. Abbott, will deliver his presidential address. During the conference papers will be read by Mr. W. Hewitt, director of technical education for Liverpool, Prof. Haldane Gee, Mr. W. E. Harrison, Mr. Laurence Small, Mr. W. R. Bower, and others. Sectional meetings will be held on the afternoon of June 2, when papers of special interest to the various sections of technical education will be read. Resolutions on matters of educational and professional interest will be discussed at the various meetings.

A LIMITED number of free places at the Imperial College of Science and Technology, South Kensington, S.W., will be awarded by the London County Council for the session 1914–15. The free places will be awarded on consideration of the past records of the candidates, the recommendations of their teachers, the course of study which they intend to follow, and generally upon their fitness for advanced study in science as applied to industry. Candidates will not be required to undergo a written examination. It is possible that the free places may be extended to two or more years. Parents (or guardians) of candidates must be resident within the administrative county of London, except in the case of self-supporting candidates above twenty-one years of age on July 31, 1914, who must themselves be resident within the county. Application forms (T. 2/268) may be obtained from the Education Officer, L.C.C. Education Offices, Victoria Embankment, W.C., and must be returned not later than Saturday, May 23.

IN addition to much other matter of interest and importance, the recently published Report of the Board of Education for the year 1912–13 (Cd. 7341), contains particulars as to the main provision for full-time education in connection with the industries of the country. This has been provided in the past either by means of advanced courses known as technical institution courses at the larger technical schools, or by means of day technical classes, which, as a rule, take younger pupils and give more elementary instruction. There are twenty-six institutions giving technical institution courses, the total number of separate courses in these institutions being eighty-one in 1911–12. But of these twenty-two were courses in preparation for matriculation. Fifty-four were courses in engineering, chemistry, and subjects connected with the building, mining, textile, and leather trades. Five were purely scientific courses. The number of students taking full courses was 1246, of whom 528 were in their first year, 414 in their second year, 245 in their third year, and fifty-nine in later years of their courses. The number of day technical classes recognised in 1911–12 was in all 324, and these were held in 111 institutions. The students in attendance numbered 12,041. One hundred and fifty-four of the courses were full-time day schools, and these will in future receive aid from the State to a degree more commensurate with their importance. The report may well point out that the provision for full-time education in applied science is regrettably small in bulk compared with the industrial development of the country.

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## SOCIETIES AND ACADEMIES.

LONDON.

**Royal Society**, May 14.—Sir William Crookes, president, in the chair.—Dr. A. D. Waller: The various inclinations of the electrical axis of the human heart. Part I*a.*—The normal heart.—Effects of respiration. Continuation of previous observations (Phil. Trans., 1889, p. 169) in which the electrical effects of the human heart were first demonstrated, and the distinction made between favourable and unfavourable leads dependent upon the obliquity of the cardiac axis, and of subsequent observations (Proc. R.S., B, vol. lxxxvi., p. 507, 1913) to determine the angular value of the inclination of the electrical axis.—Dr. D. H. Scott and Prof. E. C. Jeffrey: Fossil plants showing structure from the base of the Waverley Shale of Kentucky. The specimens were collected by Prof. C. R. Eastman and Mr. Moritz Fischer, near Junction City, Boyle County, Kentucky. The nodule layer containing the plants is described by Prof. Eastman as lying at the base of the Waverley (Lower Carboniferous) and immediately above the Genesee Black Shale of Upper Devonian age. The anatomical structure is, on the whole, well preserved.—F. Kidd: The controlling influence of carbon dioxide in the maturation, dormancy, and germination of seeds. Part ii. The inhibitory effect of carbon dioxide on the germination of seeds previously described is dealt with in relation to temperature and oxygen supply. In relation to temperature the result obtained is unusual, the inhibitory action being more pronounced at low temperatures than at high. At 3° C. complete inhibition was obtained with 4 per cent. CO<sub>2</sub>; at 17° C. as much as 24° C. had to be employed to obtain the same result. Varying partial pressures of oxygen also effect the inhibitory action of carbon dioxide, but to a less degree than temperature. Thus with 5 per cent. oxygen, 15 per cent. CO<sub>2</sub> produced inhibition; with 20 per cent. oxygen, 27 per cent. CO<sub>2</sub> was necessary. The author emphasises the fact that the adjustments of the moist seed by which it is enabled to continue dormant in the presence of oxygen and water, rather than those of the dry seed, are likely to have formed the central problem of seed life in nature. A low temperature and a decreased oxygen supply are often the natural conditions of a seed's environment in the soil. Correlating the results obtained in this and in a former paper, the author strongly emphasises the controlling influence of carbon dioxide in the biology of seeds. It appears that the normal resting stage of a seed is primarily a phase of narcosis.—D. Thomson and J. G. Thomson: The cultivation of human tumour tissue *in vitro*. Small portions of tissue from two human tumours, (a) intracystic papilloma of the ovary, and (b) carcinomatous lymphatic gland, have been cultivated successfully in a medium composed of fowl blood plasma+extract of embryonic chick. This proves that human tissue can be grown *in vitro* in a medium obtained entirely from a bird. This is contrary to what was previously believed, since it was considered that the tissue of a certain animal could only grow in a medium composed of the blood plasma of the same species of animal.—H. G. Thornton and G. Smith: The nutritive conditions determining the growth of certain fresh-water and soil protista. Experiments made on the growth of *Euglena viridis* in artificial media showed that, in addition to those inorganic constituents necessary for the growth of a green plant, which were supplied by Miguel's formula for growing diatoms, a certain quantity of organic material, e.g. infusion of hay, was necessary. In order to determine the constituent in this organic material which stimulated growth, various pure sub-

stances, such as carbohydrates, tartaric acid, saccharin, allantoin, peptone, and various amido-acids, were used in dilute solutions. Of these, only very weak solutions of amido-acids favoured a really strong growth, the most favourable substances being tyrosin and phenyl-alanine, which are very slightly soluble in water. Experiments with soil flagellates, especially *Prowazekia terricola* (Martin), showed that they could be cultivated in many solutions in which bacteria flourished, the flagellates feeding on several different kinds of bacteria. Samples of various types of soil and water were tested for the presence of bacterial-feeding flagellates, and these were found in all the samples, being most abundant in highly manured soil. The wide distribution and abundance of these soil flagellates, and their very rapid growth in the presence of bacteria, suggests that they are of importance in the economy of the soil.

**Zoological Society**, May 5.—Dr. Henry Woodward, vice-president, in the chair.—Surgeon G. Murray **Levick**: Manners and customs of Adélie penguins (*Pygoscelis adeliae*). The penguins were observed at the Cape Adare rookery while the author was with Scott's Antarctic Expedition. Their mating habits, the making of their "nests," hatching of the eggs, and rearing of the young were described.—R. C. **Lewis**: Two new species of tapeworms from the stomach and small intestine of a wallaby from Hermit Island, Monte Bello Islands. The parasites belong to the genus *Cittotænia*, having two full sets of genital glands in each proglottis.—**Oldfield Thomas**: A remarkable case of affinity between animals inhabiting Guiana, West Africa, and the Malay Archipelago. The case referred to was that of the pygmy squirrels (*Nannosciurinae*), known to the natives of West Africa and the Malay Archipelago, and of which Mr. Thomas was now able to state that the Guianan *Sciurus pusillus* was also a member. It was sufficiently distinct to need generic separation (*Sciurillus*, gen. nov., was suggested as a name for it), but was unquestionably assignable to the *Nannosciurinae*, and not to the *Sciurinae*, to which all the other American, all the European, and all the Asiatic continental squirrels belonged.—H. B. **Preston**: Diagnoses of new general and species of *Zonitidæ* from equatorial Africa. The material on which the paper is based was recently collected from many localities in British East Africa, Uganda, and the Belgian Congo, by Messrs. A. Blayney Percival, Robin Kemp, and C. W. Woodhouse, and descriptions are given of seventy-six new species, two new varieties, and eight new genera of *Zonitidæ*, to which latter a number of hitherto described forms are also referred.

**Mathematical Society**, May 14.—Prof. A. E. H. Love, president, in the chair.—Prof. W. H. **Young** and Mrs. **Young**: The reduction of sets of intervals.—Prof. H. M. **Macdonald**: Diffraction by a straight edge.—J. **Proudman**: Diffraction of tidal waves on flat rotating sheets of water.—H. F. **Moulton**: Quadratic forms and factorisation of numbers.—F. S. **Macaulay**: The algebraic theory of modular systems.

#### MANCHESTER.

**Literary and Philosophical**, May 12.—Mr. F. Nicholson, president, in the chair.—F. R. **Lankshear**: The chemical significance of absorption spectra and a new quantitative method of measuring them. The author reviewed the history of the study of the relation between chemical constitution and absorption spectra, and the various theories as to the cause of absorption bands. He pointed out that for further progress to be achieved quantitative methods were necessary.—Dr. J. R. **Ashworth**: Note on the intrinsic field of a magnet.

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An experiment on the electromotive force between magnetised and unmagnetised iron in a solution, from which an argument was drawn in favour of the view that in the interior of a magnet there is an enormously strong field acting on the molecular magnets.

#### DUBLIN.

**Royal Irish Academy**, May 11.—Rev. J. P. Mahaffy, president, in the chair.—J. G. **Leatham**: Doublet distributions in potential theory. The paper discusses the formulation of the problem of irrotational liquid motion as a double-sheet problem. In connection with the hydrodynamical application it examines some aspects of doublets and doublet distributions, and the manner in which these and their fields fit into Kelvin's theory of inversion. A surface concentration of tangential doublets is also considered, and an account is given of the convergence or semi-convergence of the potential and force integrals associated with it. J. R. D. **Holtby**: Some human bones from an ancient burial ground in Dublin. The paper dealt with a collection of human bones discovered about a year ago buried deeply under the basement of the City Hall. These were considered to represent inhabitants of Dublin about the twelfth to fourteenth centuries. Apart from the worn condition of the teeth, found in almost all ancient remains, the chief interest lay in the form of the bones of the lower limbs and in the impressions on them. These were such as to suggest full and frequent flexion at the hip, knee and ankle joints, such as would occur in squatting.

#### PARIS.

**Academy of Sciences**, May 11.—M. P. Appell in the chair.—Ch. **Lallemand**: The question of the litre. For scientific purposes the author considers the definition of the litre as the volume of a kilogram of water at 4° C., and 76 cm. pressure should remain. The correction to a cubic decimetre is +27 millionths (0.027 gram).—Mme. **Ramart-Lucas** and A. **Haller**: Syntheses by means of sodium amide. The action of the epihalohydrins on the dialkylacetophenones. Oxypropylene-dimethylacetophenone and its derivatives. The dialkylacetophenones treated with sodium amide and epihalohydrins give substitution products in which the halogen is replaced in a normal manner, whilst with acetophenone itself only tarry reaction products are obtained.—E. **Jungfleisch** and Ph. **Landrieu**: Researches on the acid salts of the dibasic acids. Oxalates. From the experiments detailed the conclusion is drawn that acid potassium oxalate should be represented as  $(K_2C_2O_4 \cdot H_2C_2O_4)$  and not as  $KH_2C_2O_4$ . The results are analogous with those previously obtained for the acid camphorates.—Charles **Richert**: General anaphylaxy. Phosphorus poisoning and chloroform. It has been shown in a preceding note that a dog chloroformed for the first time never subsequently shows leucocytosis, but that a month later the same dog, although in perfect health, if submitted a second time to chloroform, always subsequently shows leucocytosis. It is now shown that an animal, after treatment with non-toxic doses of a phosphide, and then a month later submitted to chloroform, presents the same phenomenon. This entails a modification of the generally accepted view of the specific nature of anaphylaxy.—A. **Calmette** and V. **Grysez**: A new experimental demonstration of the existence of a generalised lymphatic stage preceding localisations in tuberculous infection. It is shown that whether the tubercle bacilli enter by the eye, throat, alimentary canal, skin, or lungs, before local lesions appear, the bacilli can be proved to be present in the tracheo-bronchial, submaxillary, and mesenteric ganglia, in the spleen and blood.—H. **Parenty**: A



regulator for the flow of water in streams and reservoirs with constant level.—J. W. **Nicholson**: The atomic weights of the elements of nebulae. A discussion of the results recently published by MM. Bourget, Fabry, and Buisson on the spectra of nebulae.—A. **Buhl**: The geodesic torsion of closed contours.—N. E. **Nörlund**: Series of faculties and the methods of summation of Cesarò and Borel.—Léopold **Fejér**: The number of changes of sign of a function in an interval and its moments.—Léon **Brillouin**: The diffusion of light by a homogeneous transparent body.—André **Léauté**: The mathematical theory of the working of electric lines formed of two different trunks.—J. de **Kowalski**: The oscillating spark as an economical source of ultra-violet light.—Alexandre **Dufour**: A cathodic oscillograph.—René **Constantin**: Fluctuations of concentration in a colloidal emulsion.—André **Helbronner** and Gustave **Bernstein**: The vulcanisation of solutions of india-rubber by ultra-violet light.—Echsner de **Coninck** and M. **Gérard**: The determination of the atomic weight of nickel. The figure 58.57 was obtained as a mean of five determinations of the amount of nickel obtained by the reduction of the hydrated oxalate in hydrogen at 270° C.—M. **Picon**: The preparation of normal pentene. Remarks on the melting and boiling points of the first terms of the true normal acetylene hydrocarbons. This hydrocarbon has been prepared by the interaction of normal propyl iodide and an ammoniacal solution of monosodium acetylene at -20° C. Its physical constants are given.—Georges **Dupont**: The synthesis of the acetylene  $\gamma$ -diketones. Good yields are obtained by the oxidation of the acetylene  $\gamma$ -glycols by chromic acid in acetic solution. Three examples of the reaction are given.—André **Brochet**: The catalytic hydrogenation of liquids under the influence of the common metals at moderate temperatures and pressures.—Charles **Tanret**: The plurality of the starches.—R. **Souèges**: New observations on the embryogeny of the Cruciferae.—Paul de **Beauchamp**: The evolution and affinities of the genus *Dermocystidium*.—MM. **Variot** and **Fliniaux**: Tables of the comparative growth of infants raised at the breast or by the bottle during the first year of life. Contrary to current ideas, there is a very small difference between the size and weight of children raised at the breast or by the bottle, if the food in the latter case is properly made up.—Louis **Roule**: The influence exercised on the migration of salmon (*Salmo salar*) by the proportion of dissolved oxygen in the streams. On the coast of Brittany it has been noticed that the salmon select certain rivers in preference to others and for no obvious reason. Determinations of the proportions of dissolved oxygen in the river waters shows that the salmon select those in which this proportion is highest.—Rémy **Perrier** and Henri **Fisher**: The existence of spermatophores in some Opisthobranchs.—Ch. **Gravier**: The Madrepores collected by the second French Antarctic Expedition (1908-10).—A. **Malaquin** and A. **Moitié**: Experimental observations and researches on the evolutive cycle of *Aphis euonymi*, destructive to the beetroot.—R. **Fosse**: The simultaneous presence of urea and urease in the same plant.—Em. **Bourquelot** and Alex. **Ludwig**: The biochemical synthesis of  $\beta$ -anisylglucoside.—L. **Lematte**: The estimation of the monoamino-acids in the blood. The albumenoids and ammonia are precipitated by phosphotungstic acid, neutralised with soda and the excess of the phosphotungstic acid precipitated by calcium chloride, and excess of the latter by oxalate. The solution then contains the amino-acids, and can be determined by the formal method.—Louis **Mengaud**: The tectonic of the neighbourhood of Infiesto, Arriondas and Rivadesella (Asturia).—M. **Dalloni**: The Neocomian in the west of Algeria.

## BOOKS RECEIVED.

- Plague and Pestilence in Literature and Art. By Dr. R. Crawford. 1p. viii+222+31 Plates. (Oxford: Clarendon Press.) 12s. 6d. net.
- Ministerio de Fomento. Boletín del Cuerpo de Ingenieros de Minas del Perú. No. 80. Estadística Minera, 1912. By C. P. Jimenez. Pp. 125. (Lima.)
- Report of the Agricultural Research Institute and College, Pusa, 1912-13. Pp. 3+119. (Calcutta.) 8d.
- The Forty-Second Annual Report of the Board of Directors of the Zoological Society of Philadelphia. Pp. 51. (Philadelphia.)
- Sammlung Vieweg. Heft 1, Die Lichtelektrischen Erscheinungen. By Drs. R. Pohl and R. Pringsheim. Pp. v+114. Heft 4, Die Lichtbrechung in Gasen als Physikalisches und Chemisches Problem. By Dr. St. Loria. Pp. vi+92. Heft 5, Die Radioaktivität von Boden und Quellen. By Prof. A. Gockel. Pp. v+108. (Braunschweig: F. Vieweg und Sohn.) Each 3 marks.
- Sammlung naturwissenschaftlicher Praktika. Band iv. By Prof. O. Emmerling. Pp. vii+200. (Berlin: Gebrüder Borntraeger.) 7.20 marks.
- Lehrbuch der Anthropologie in systematischer Darstellung. By Prof. R. Martin. Pp. xvi+1181+Taf. iii. (Jena: G. Fischer.) 35 marks.
- The West India Committee Map of the West Indies. (London: G. Philip and Son, Ltd.) Mounted, 10s. 6d.
- The University of Colorado Studies. Vol. xi. No. 1, Fishes of Colorado. By Dr. M. M. Ellis. Pp. 136+xii plates. (Boulder, Colorado.) 50 cents.
- The Modern Method of Photographing Furniture. Pp. 16. (London: Kodak, Ltd.) 3d.
- Union of South Africa. Province of the Cape of Good Hope. Marine Biological Report, No. 1, for the Year Ended December 31, 1912, and for the Half-Year ending June 30, 1913. Pp. iii+70+ii+plates iii. (Cape Town: Cape Times, Ltd.)
- Canada. Department of Mines. Mines Branch. Researches on Cobalt and Cobalt Alloys, conducted at Queen's University, Kingston, Ontario, for the Mines Branch of the Department of Mines. Part i. Preparation of Metallic Cobalt by Reduction of the Oxide. By Dr. H. T. Kalmus and others. Pp. x+36+plates viii. (Ottawa.)
- Beiträge zur Geschichte der Meteorologie. By G. Hellmann. Nr. 1-5. Pp. 147. (Berlin: Behrend and Co.) 5 marks.
- Constructive Text-Book of Practical Mathematics. By H. W. Marsh. Vol. iv., Technical Trigonometry. Pp. x+232. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 6s. 6d. net.
- The Theory of Numbers. By Prof. R. D. Carmichael. Pp. 94. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 4s. 6d. net.
- The Wilds of Maoriland. By Dr. J. M. Bell. Pp. xiii+253+plates. (London: Macmillan and Co., Ltd.) 15s.
- The Schools and the Nation. By Dr. G. Kerschensteiner. Translated by C. K. Ogden. Pp. xxiv+351+plates. (London: Macmillan and Co., Ltd.) 6s. net.
- Hereditary Genius. By F. Galton. Reprint. Pp. xxviii+379. (London: Macmillan and Co., Ltd.)
- The Quaternary Ice Age. By W. B. Wright. Pp. xxiv+464+xxiii plates. (London: Macmillan and Co., Ltd.) 17s. net.
- Marine Engineering. By Engineer-Captain A. E. Tompkins. Fourth edition. Pp. viii+812. (London: Macmillan and Co., Ltd.) 15s. net.
- The Childhood of the World. By E. Clodd. New edition. Pp. xiii+240. (London: Macmillan and Co., Ltd.) 4s. 6d. net.