

Times, included 100*l.* from the Drapers' Company and 500*l.* from the Clothworkers' Company.

THE presidency of Johns Hopkins University, Baltimore, which has been vacant since the resignation of Dr. Ira Remsen in 1912, has been filled by the appointment of Dr. Frank J. Goodnow, recently professor of administrative law at Columbia University, New York. In choosing an expert in this subject to succeed a chemist, Johns Hopkins has precisely followed the example of Harvard a few years ago, when Prof. A. Lawrence Lowell took the place of Dr. C. W. Eliot.

THE Local Lectures Summer Meeting will be held this year at the University of Cambridge on July 31–August 24. The new University examination halls and lecture-rooms will be used. The inaugural lecture will be delivered at 8 p.m. on July 31 by Sir J. J. Thomson. The lectures will be grouped round the general subject, "Some Aspects of Modern Life," and among the courses announced we notice one by Dr. L. Doncaster on heredity in animals and man. Forms of entry and further information about the meetings will be supplied by the Rev. Dr. Cranage, Syndicate Buildings, Cambridge.

LAST year Messrs. Harrods, Ltd., established a scheme of scholarships providing the holders with a year's training at their stores in commercial English, handwriting, arithmetic, French or Spanish, shorthand, typewriting, business routine, and salesmanship, with free meals. The scholarships are awarded on the nomination of shareholders; the nominees must be between the ages of fifteen and eighteen years, have had a fair education, and be able to pass a medical examination. They will secure a commercial education in which practice and theory will be combined; for the mornings are given to class instruction, and the afternoons to work in the departments, the holder of a scholarship being attached to a different department each month. This arrangement has worked admirably during the past year. Fifty scholarships will be available in September next, and the test examination for the nominees will be held in June or July. Messrs. Harrods' enterprise in establishing this system of training young people in the principles and practice of business-building is to be commended, and we believe it will achieve notable success.

AN article in the *Westminster Gazette* of March 3, by the Berlin correspondent of our contemporary, reveals a growing demand in Germany for more universities. It is alleged that existing universities are overcrowded owing chiefly to the invasion of foreign and of women students, and the more general need of university education for officials. The number of such institutions is smaller than it was a century ago. Cologne, Trier, Duisburg, Helmstedt, Wittenberg, Frankfurt-on-Oder, Mainz, Erfurt, Altdorf, and Ingolstadt have all been university towns. Since the empire was founded the number of students has increased fourfold. In 1880 there were 30,000 students; in 1905, 42,000; and last year more than 60,000. There are 5300 foreign and 3500 women students, and about 4000 non-student auditors. The agitation for new universities came to a head last year when Hamburg, Frankfurt-on-Main, Dresden, Posen, Cologne, and some smaller towns proposed to establish universities. The impulse in some cases was the desire of existing special and technical high schools to expand into universities with full university status, but with a reduced number of faculties. The advocates of new universities complain that the universities have recognised with ill-will the increasing specialisation of

science; and that specialisation is now hopelessly ahead of them. Some reformers want not only specialisation within universities, but specialisation of the institutions themselves. Each university, while keeping its faculties and its general culture system, should aim at a predominant position in a particular branch of science; and should be specially well supplied with professorial chairs, seminaries, libraries, and collections bearing on its speciality.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 5.—Sir William Crookes, president, in the chair.—**Harold Wager**: The action of light on chlorophyll. When chlorophyll is decomposed by light, at least two distinct substances are formed, one of which is an aldehyde or mixture of aldehydes, and the other an active oxidising agent, capable of bringing about the liberation of iodine from potassium iodide. The decomposition of chlorophyll appears to be due directly to the action of light and is not an after effect of the photo-synthesis of carbon dioxide and water. It takes place only in the presence of oxygen, and it appears to be a case of photo-oxidation, for oxygen is used up so completely in the process that chlorophyll can be used instead of pyrogallol and caustic potash to determine the amount of oxygen in a given amount of air: In the absence of oxygen no bleaching takes place. Carbon dioxide is not necessary to the photo-decomposition of chlorophyll and is not used up in the process, even when present in considerable quantities.—**C. H. Warner**: Formaldehyde as an oxidation product of chlorophyll extracts.—**Franklin Kidd**: The controlling influence of carbon dioxide in the maturation, dormancy, and germination of seeds. Experiments are described showing that germination of seeds can be completely inhibited by carbon dioxide in the atmosphere (20–30 per cent., varying with the temperatures used). This inhibition is not accompanied by injury. The seeds germinate at once after removal from inhibitory CO₂ pressures. Experiments in the field showed that this action of CO₂ may actually occur in nature. If a quantity of green plant material is buried deep in the ground, seeds planted in the soil over this decaying material are inhibited in their germination by the CO₂ produced beneath them. This is of agricultural significance, and the fact that in the case of mustard seeds suspension of vitality continues, even after the external CO₂ has been removed, suggests an explanation of the common occurrence of dormant seeds of this plant in fields, and possibly of other natural cases of delayed germination.—**J. Hammond** and **F. H. A. Marshall**: The functional correlation between the ovaries, uterus, and mammary glands in the rabbit; with observations on the oestrous cycle.—**Dr. J. F. Gaskell**: The chromaffine system of annelids and the relation of this system to the contractile vascular system in the leech, *Hirudo medicinalis*. The possession of a chromaffine system, consisting of cells which take a yellow stain with chrome salts, is a common property of almost all members of the vertebrate kingdom. The presence of this reaction is coincident with the secretion of the pressor substance, adrenalin, and is probably dependent upon it. Even in the lowest vertebrate, *Petromyzon*, the system is well developed, being diffusely though segmentally arranged throughout the body. Chromaffine cells have also been observed in certain annelids by Sommet and Poll, reaching their highest development in the Hirudinea; the reaction is given by six nerve cells in each segmental ganglion. The conclusion is drawn

that the contractile vascular system of vertebrates and its regulators, the chromaffine system and the sympathetic system, originally arose together in the annelid group.

Institution of Mining and Metallurgy, February 19.—Mr. Bedford McNeill, president, in the chair.—H. W. **Hutchin**: The assay of tin ores. The work recorded in this paper is the result of a prolonged use and study by the author of the well-known Beringer assay of tin ores, and the essential modification introduced consists in the use of lime as a diluent in place of zinc oxide, thus forming calcium stannate, which is more readily soluble in warm hydrochloric acid than is zinc stannate. Temperature influences the speed of the reaction, and the author's detailed experiments showed that the lime modification method was appreciably quicker than the zinc oxide method at "tin furnace" temperatures. Experiments made with diluents other than those already mentioned, as, for instance, barium carbonate and magnesia, showed the general superiority of lime, except in cases where only a small proportion of siliceous mineral is present, in which event zinc oxide shows a superiority to lime. The tests made were varied by differentiating between "tin furnace" and Bunsen burner temperatures, and the author's final opinion is in favour of a large Techlu burner used in conjunction with an asbestos boss, as giving the best conditions for ignition.—E. A. **Wraight** and P. Litherland **Teed**: The assay of tin ores and concentrates: the Pearce Low method. The authors have carried out an exhaustive series of tests with regard to the accuracy of this particular method of assaying tin, the results of which are embodied in their joint paper. As a result they arrived at the following conclusions. The degree of fineness of the ore must be at least 100 mesh, otherwise a representative sample cannot be obtained; nickel crucibles are superior to iron ones, and for tailings fusion in an iron crucible should be avoided; the amount of hydrochloric acid should be about 125 c.c.; the bulk of the solution before reduction should be about 400 c.c.; the temperature of the tin solution at titration should not be more than 70° F.; the strength of the standard solution should not generally be more than 11 grams of iodine and 20 grams of potassium iodide per litre, or less than one-third of that strength; before titration the calcite should have entirely dissolved; titanium, tungsten, and bismuth must be removed, and copper and iron should in special circumstances also be removed before titration; and nickel should always be used for reduction. With the observance of these precautions, the authors are of the opinion that the error should not exceed 2 lb. of black tin a ton with rich ores, and less with poor ores.—W. P. **Dreaper**: Formation of mineral deposits: precipitation and stratification in the absence of gels. This paper is a record of experiments made to determine whether the presence of gels is necessary to induce stratification, and for this purpose precipitation was conducted in capillary tubes, thereby avoiding certain disturbing influences. Under these conditions the author has been able to obtain stratification effects in the absence of secondary gels added to one of the reacting solutions. The substances experimented with comprised lead chloride, lead ferrocyanide, lead sulphate, barium sulphate, barium carbonate, and lead sulphide, and the results seem to show that stratification may be independent of the presence of gels.—T. R. **Archbold**: A device for filling ore sacks. This is a description of a simple device introduced in an out-of-the-way district for filling sacks with ore. A drum is divided into six compartments, and used in conjunction with a hopper, in such a manner that the revolutions of

the drum serve to fill the compartments with a fixed amount of ore and deliver it into the sacks, six sacks being dealt with in each complete revolution.—E. O. **Marks**: A mining model. A description of a model constructed of iron, copper, and brass wire to show the direction and the extent of the workings of a mine. For convenience the block of ground is divided into unit sections of 1000 ft. cube, reduced in the model to a scale of 100 ft. to the inch, and the skeleton cubes representing these units are successively fitted with brass and copper wires showing the direction and length of shafts, levels, crosscuts, etc. The advantage of a model of this type, apart from its graphic character, lies in the ease of extension as the mine undergoes development.

Zoological Society, March 3.—Prof. E. W. MacBride, vice-president, in the chair.—C. Tate **Regan**: Fresh-water fishes from Dutch New Guinea collected by the British Ornithologists' Union and Wollaston Expeditions. *Symbranchus bengalensis* was obtained for the first time in New Guinea. The collections included examples of two species of Melanotæniine Atherinids.—H. Wallis **Kew**: The nests of Pseudoscorpiones: with historical notes on the spinning-organs and observations on the building and spinning of the nests. The paper described the nests in which these animals enclose themselves for moulting, for brood purposes, and in some cases for hibernation. They are closed cells of spun tissue, with or without a covering of earthy or vegetable matters. The tissue is of innumerable threads crossed and coalesced irregularly, without interspaces, and almost like silk-paper. With regard to the spinning-apparatus, confusion has existed; but the author's observations on living animals place it beyond doubt that the cephalothoracic glands are the organs concerned. Contrary to previous statements, the "combs" of the chelicerae have nothing to do with the silk. The manner in which the nests are built and spun was described in detail.—H. R. **Hogg**: A collection of spiders. The collection was made by Mr. P. D. Montague, supplemented by a few specimens sent by Mr. T. H. Haynes from the Montebello Islands off Onslow, on the north-west coast of Australia. These islands, from geological evidence, were part of the old coast-lines, though now about ninety miles away. Although the larger specimens are mostly widely spread and possibly more or less recent importations, the smaller are nearly all new species, showing evidence of a much longer separation from their congeneric relations on the mainland. Out of seventeen species ten are new, as well as a new genus and two new varieties.—D. M. S. **Watson**: The skull of a Pariasaurian reptile and the relationships of that type. The skull of *Pariasaurus* is completely described, with the exception of the bony labyrinth of the ear. It is compared with all the members of the order Cotylosauria, which are well enough known to make a comparison of any value, and shown to differ in the very important characters of the brain-case from all of them, representing an entirely distinct branch.—F. J. **Meggitt**: A tapeworm parasitic in the stickleback (*Gasterosteus aculeatus*).—Dr. W. **Nicoll**: Trematode parasites obtained from animals that died in the society's gardens during 1911–12.

PARIS.

Academy of Sciences, March 2.—P. Appell in the chair.—F. **Wallerant**: The polymorphism of camphor. Crystals of camphor deposited at the ordinary temperature from an alcoholic solution are rhombohedral. Fused camphor may take three crystalline forms, so that camphor is at least quadrimorphous.—C. **Moureu** and A. **Lepape**: The helium from fire-damp and the

radio-activity of coal. Fire-damp from Anzin has been previously shown by the authors to contain 0.04 per cent. of helium, and as the amount of crude gas evolved a day is estimated at 30,000 cubic metres, this corresponds to 12 cubic metres of helium a day. The amounts of radium and thorium in the ash of the coal have been determined, in this and other coals yielding fire-damp containing helium, and do not correspond to such large proportions of helium. The larger part of the gas is not derived from the radio-active material of the coal, and must be regarded as fossil helium.—**André Blondel**: The effect and production of the higher harmonics in the transport of electrical energy at high potentials.—**P. Sabatier** and **A. Mailhe**: The ester oxides of carvacrol. A study of the direct dehydration of carvacrol by the action of thorium oxide upon the vapour at temperatures between 400° and 500° C.—**M. Gambier**: Algebraic curves of constant torsion, real and not unicursal.—**F. Jager**: The application of the method of Fredholm to the tides of a basin limited by vertical walls.—**E. Mazurkiewicz** and **W. Sierpinski**: An ensemble superposable with each of its two parts.—**A. Pchéborski**: A generalisation of a problem of Tchébischeff and of Zolotareff.—**C. Gutton**: The specific inductive capacity of liquids. According to Voigt's hypothesis, the force which acts on an electron deviated from its equilibrium position in an electric field should not be exactly proportional to the deviation, and hence the specific inductive capacity ought to depend on the intensity of the field. In measurements made with toluene the deviations observed in the specific inductive capacity were of the same order as the experimental error. A slight diminution with increase of field was noticed with bromonaphthalene, 4.72 to 4.69.—**Maurice de Broglie**: The spectra of the Röntgen rays. Rays emitted by antikathodes of copper, iron and gold.—**J. de Kowalski**: An explosive luminous phenomenon in rarefied nitrogen. The author confirms the observations of Strutt that nitrogen free from the smallest trace of oxygen is transformed into active nitrogen in a discharge in electrodeless tubes. A curious explosive phenomenon is described which is attributed to a temporary combination between the active nitrogen and traces of mercury vapour unavoidably present to form mercury nitride, the latter decomposing spontaneously.—**H. Labrouste**: A molecular transformation of thin layers on water.—**F. Baud**, **F. Ducelliez**, and **L. Gay**: A calorimetric study of the system water-monomethylamine.—**H. Gault**: A new method of preparation of tricarballylic acid. Oxalocitric lactone cannot be distilled under reduced pressure without decomposition. The liquid obtained by distillation is not, as was supposed by Wislicenus and Beckh, the unchanged lactone, but proves to be ethyl $\alpha\alpha\beta\gamma$ -propane-tetracarboxylate. With dilute mineral acids a quantitative yield of crystalline tricarballylic acid is obtained.—**Enrique Hauser**: A new method for the detection and determination of gaseous hydrocarbons dissolved in mineral waters. After adding potash to the water it is shaken with air and the latter analysed.—**M. Piettre** and **A. Vila**: Observations on fibrinogen and the oxalated plasma.—**W. Kopaczewski**: The influence of acids on the activity of dialysed maltase. The observed effects cannot be explained exclusively by the concentration of the acid ions.—**Mlle. Jeanne Weill**: The amount of fatty acids and cholesterol in the tissues of cold-blooded animals.—**Paul Fallot**: The tectonic of the sierra of Majorca.—**Emile Belot**: An attempt at a physical theory of the formation of the oceans and primitive continents.—**F. Malméjac**: The importance of the estimation of chlorides for the control and evaluation of drinking water.—**A. Boutaric**: The thermal state of the atmosphere.

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BOOKS RECEIVED.

- Om Forandringer i Ringkobing Fjords Fauna. By A. C. Johansen. Pp. 144. (Kobenhavn: Bianco Lunos Bogtrykkeri.)
- Wissenschaftliche Ergebnisse der Deutschen Zentral-Afrika-Expedition, 1907-8. Band v. Zoologie iii. Lief. 1. Orthoptera. By J. A. G. Rehn. Pp. 223. (Leipzig: Klinkhardt und Biermann.) 8.40 marks.
- Albin Haller. Biographie, Bibliographie Analytique des Écrits. By E. Lebon. Pp. 120. (Paris: Gauthier-Villars; Masson et Cie.) 7 francs
- Cours de Physique. By Prof. E. Rothe. Première Partie. Généralités—Unités—Similitude—Mesures. Pp. vi+183. (Paris: Gauthier-Villars.) 6.50 francs.
- Theorie Mathématique de l'Echelle Musicale. By A. Vaucher. Pp. 68. (Paris: Gauthier-Villars.) 2.25 Francs.
- The Fleet Annual and Naval Year Book, 1914. Compiled by L. Yexley. Pp. 135. (London: The Fleet, Ltd.) 1s. net.
- Progress of Education in India, 1907-12. By H. Sharp. Vol. i. Pp. xvii+284+xxxii. (Calcutta: Superintendent Government Printing, India.) 6s.
- The Pigments and Mediums of the Old Masters. By Prof. A. P. Laurie. Pp. xiv+192+xxxiv plates. (London: Macmillan and Co., Ltd.) 8s. 6d. net.
- Intermetallic Compounds. By Dr. C. H. Desch. Pp. vi+116. (London: Longmans and Co.) 3s. net.
- Die Theorie der Strahlung und der Quanten. Edited by A. Eucken. Pp. xii+405. (Halle a. S.: W. Knapp.) 15.60 marks.
- Industrial Chemistry for Engineering Students. By Prof. H. K. Benson. Pp. xiv+431. (London: Macmillan and Co., Ltd.) 8s. net.
- The Mineral Resources of the Philippine Islands for the Year 1912. Pp. 76+vii plates. (Manila: Bureau of Science.)
- Careers for University Men. By H. A. Roberts. Pp. 22. (Cambridge: Bowes and Bowes; London: Macmillan and Co., Ltd.) 6d. net.
- The Principles of War Historically Illustrated. By Major-General E. A. Altham. Vol. i. Pp. xv+436, and 5 maps to illustrate the volume. (London: Macmillan and Co., Ltd.) 10s. 6d. net.
- Anthropology as a Practical Science. By Sir R. C. Temple. Pp. 96. (London: G. Bell and Sons, Ltd.) 1s. net.
- Die Stoffwanderung in ablehenden Blättern. By Dr. N. Swart. Pp. 118+v plates. (Jena: G. Fischer.) 6 marks.
- Kristallberechnung und Kristallzeichnung. By Dr. B. Gossner. Pp. vi+128 (Leipzig und Berlin: W. Engelmann.) 8 marks.
- Muscular Work. By F. G. Benedict and E. P. Cathcart. Pp. vi+176. (Washington: Carnegie Institution.)
- Piebald Rats and Selection. By W. E. Castle and J. C. Phillips. Pp. 54+3 plates. (Washington: Carnegie Institution.)
- Carnegie Institution of Washington. Year Book. No. 12, 1913. Pp. xvi+336. (Washington: Carnegie Institution.)

DIARY OF SOCIETIES.

THURSDAY, MARCH 12.

ROYAL SOCIETY, at 4.30.—Note on a Functional Equation Employed by Sir George Stokes: Sir James Stirling.—The Mercury Green Line $\lambda=5461$ as Resolved by Glass and Quartz Lummer Plates and on its Zeeman Components: Prof. J. C. McLellan and A. R. McLeod.—The Electrical Condition of a Gold Surface During the Absorption of Gases and their Catalytic Combustion: H. Hartley.—The Diffusion of Electrons through a Slit: J. H. Mackie.—The Rate of Solution of Hydrogen by Palladium: Dr. A. Holt.—The Dispersion of a Light Pulse by a Prism: Dr. R. A. Houston.