

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—An exhibition of 50*l.* a year tenable for two years is offered each year by the governing body of Emmanuel College to a research student commencing residence at Cambridge as a member of Emmanuel College in October. Applications, accompanied by two certificates of good character, should be sent to the master of Emmanuel not later than September 24.

The next combined examination for fifty-six entrance scholarships and a large number of exhibitions at Pembroke, Gonville and Caius, Jesus, Christ's, St. John's, and Emmanuel Colleges will be held on Tuesday, December 2, and following days, commencing at 9 a.m. on Tuesday, December 2. Mathematics, classics, natural sciences, and history will be the subjects of examination at all the above-mentioned colleges. Most of the colleges allow candidates who intend to study mechanical sciences to compete for scholarships and exhibitions by taking the papers set in mathematics or natural sciences. A candidate for a scholarship or exhibition at any of the six colleges must not be more than nineteen years of age on October 1, 1913. Forms of application for admission to the examination at the respective colleges may be obtained from the masters of the several colleges, from any of whom further information respecting the scholarships and exhibitions and other matters connected with the colleges may be obtained. The forms of application must be sent in on or before Saturday, November 22.

Mr. W. Dawson has been appointed reader in forestry in the University until September 30, 1917.

OXFORD.—Additional buildings are about to be provided for research and teaching purposes in connection with the School of Forestry. The expense will be met partly out of the funds at the disposal of the Delegates for Forestry, and partly by a grant of 1000*l.* from the Development Fund controlled by the Treasury. The Council of the Surveyors' Institution has contributed 210*l.* towards the cost of a research laboratory on the diseases of trees.

Convocation has authorised the curators of the University Chest to receive the sum of 6000*l.* from the trustees of the University Endowment Fund, to be applied to the building and equipment of the new laboratory of engineering science, as soon as the allotted site shall have been legally secured to the University.

DR. J. ARGYLL CAMPBELL, junior assistant to Prof. Schäfer, in the University of Edinburgh, has been appointed professor of physiology in the University of Singapore.

THE fortieth annual dinner of the old students of the Royal School of Mines will be held on Monday, June 9, at the Café Monico, Piccadilly Circus. Mr. Frank Merricks will be in the chair. Tickets may be obtained from the hon. secretary, Mr. T. A. Rickard, 820 Salisbury House, E.C.

THE St. George's Gallery, New Bond Street, was the scene last week of an interesting exhibition of photographs of the Holy Land. These photographs were the work of Miss Sophie Nicholls, who travelled in Palestine in 1910-11 as a Frances Mary Buss travelling scholar. The scenic and panoramic views force upon the mind the aridity of the land, the apparent unchangeable character of the works of man in the towns or villages which are tucked, as it were, into crannies of the bleak hill slopes. A

set of twelve of the most typical views has been compiled for the use of schools and colleges, and an explanatory book containing topographical maps showing the position of the camera and its range of view is in preparation. Particulars of these publications may be obtained from Messrs. J. A. Sinclair and Co., Ltd., 54 Haymarket, S.W.

THE Board of Education has issued (Cd. 6795) its regulations for the training of teachers for elementary schools, to come into force on August 1 next. Substantial changes will then be made with regard to the curriculum and examinations of students who will follow the ordinary two years' course of the training college. The majority of students entering the training colleges now have had four years' education in a secondary school, whereas, when the old regulations for training colleges were drawn up, the general education of their students on entry was often very meagre. The changes are in the direction of diminishing the time devoted to general education by the training-college student and increasing that given to what are called "professional" subjects. More prominence, too, is to be given to practical work in teaching while at college. It has been found necessary to add to the equipment of the primary-school teacher a knowledge of hygiene and physical training, and both these subjects are classed as professional. Elementary science is rightly considered a subject of general education. Physics, chemistry, botany, rural science, and housecraft are called "additional," or "subjects which are not ordinarily needed by elementary-school teachers, but which may in certain cases be included in the training-college curriculum, either because they would be useful for teachers in schools of a special type, or because the student may desire to study them with a view to improving his own general education."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 8.—Sir Archibald Geikie, K.C.B., President, in the chair.—A. D. Waller: The various inclinations of the electrical axis of the human heart. This paper is in substance the direct continuation of a communication made to the society in 1889 (Phil. Trans., p. 169), in which it was shown (1) that the electrical effects accompanying the beat of the human heart can be demonstrated and studied by "leading off" from the mouth and from the extremities; and (2) that in consequence of the oblique situation of the heart in the thorax these "leads" are to be classified as favourable and unfavourable or strong and weak. Of the six possible leads from the four extremities, three are strong (transverse, axial, right lateral) and three are weak (inferior, equatorial, left lateral). Of the four possible leads from the mouth and one extremity, one is weak (right superior) and three are strong (left superior, right and left inferior). The electrical equator is an imaginary line of zero potential across the chest from left shoulder to right side. The electrical current axis is from right shoulder to left side, at right angles to the equator.—Surgeon-General Sir D. Bruce, Majors D. Harvey and A. E. Hamerton, and Lady Bruce: Trypanosome diseases of domestic animals in Nyasaland. III., *Trypanosoma pecorum*.—T. Goodey: The Encystation of *Colpoda cucullus* from its resting cysts and the nature and properties of the cyst membranes. The ectocyst ruptures and sets free the transparent endocyst. Both ectocyst and endocyst are composed of carbohydrate substances and are resistant to acids, weak alkalis,

and many other reagents; failing to give any reaction with iodine in potassium iodide solution. The endocyst is composed of a new carbohydrate for which the name *Cystose* is proposed. During encystation the endocyst wall is digested by a powerful enzyme secreted by the enclosed organism, and by this means the latter is enabled to escape. The name *Cystase* is proposed for this enzyme.—C. Shearer, W. De Morgan, and H. M. Fuchs: The experimental hybridisation of Echinoids.

CAMBRIDGE.

Philosophical Society, April 28.—Dr. Shipley, president, in the chair.—A. H. Evans: Notes on additions to the flora of Cambridgeshire. The author stated that the combined efforts of the staff of the botany school, research students, and undergraduates had resulted in a large addition to the list of species given in his "Short Flora of Cambridgeshire" (Proc. Camb. Phil. Soc., xvi., part 3), while others of great interest had been discovered in new localities or rediscovered in their former stations. Of these perhaps the most interesting was the rare *Prunella laciniata*, but lately known to have occurred in England, while Mr. Moss had found with it what appeared to be undoubted hybrids with *P. vulgaris*.—H. Hamshaw Thomas: Some new and rare Jurassic plants from Yorkshire. In this communication *Eretmophyllum*, a new genus of plants allied to the Ginkgoales, is described. It is founded on leaves which possess the nervation, secretory tracts, and stomatal structure characteristic of Ginkgo leaves, while in their linear or oblanceolate shape they rather resemble those of Podozamites.—C. E. Moss: Some plants new to the British Isles. Rev. M. J. Le Goc: Observations on *Hirneola auricula-judae*, Berk. (Jew's ear). The author deals in his paper with the biology of *Hirneola auricula-judae*, Berk., "Jew's ear," with special reference to pure cultures in various media, to the fructifications obtained in these cultures, and to the action of the hyphæ on the tissues of the host.—Prof. A. C. Dixon: (1) The greatest value of a determinant the constituents of which are limited. (2) Expressions for the remainders when θ , θ' , $\sin k\theta$, $\cos k\theta$ are expanded in ascending powers of θ .

May 5.—Prof. Nuttall in the chair.—Prof. Nuttall: Observations on ticks: (a) parthenogenesis, (b) variation due to nutrition. The occurrence of parthenogenesis in ticks was recently observed by Aragão, in Brazil, in a new species of *Amblyomma* (*A. agamum*), the males of which have not as yet been discovered. Three complete generations of this tick have been raised experimentally and thousands of females were brought to maturity in the absence of males. This constitutes the first record of parthenogenesis in ticks. Prof. Nuttall described how he had succeeded in obtaining a parthenogenetic offspring from *Rhipicephalus bursa*, a species (prevalent on sheep in countries bordering the Mediterranean) in which both sexes occur in fairly equal numbers upon the host. Larval ticks issued in limited numbers from the eggs laid by unfertilised females. Experiments were further recorded in which it was shown that the genus *Rhipicephalus* shows a considerable natural variation in size, and that imperfect feeding of the tick in its immature stages leads to the development of very small adults which, whilst fertile, are so different from the normal forms that they could readily be taken for other species.—E. Hindle: Exhibition of a Chinese flea-trap. The author exhibited an ingenious device for catching fleas commonly employed by the natives of Setchuen, western China. The apparatus consists of two pieces of bamboo one inside the other.

The inner bamboo is coated with bird-lime to which any fleas adhere, whilst the outer one merely protects the sticky surface from coming into contact with bed-clothes, &c., but is fenestrated in order to allow the free entrance of fleas.—Prof. A. D. Imms: Exhibition of living fermites. The author exhibited tubes containing living examples of the termite *Archotermopsis wroughtoni*, Desn. The termites were obtained by him from the Kumam Himalayas, where they occur in dead trunks of the Chir pine (*Pinus longifolia*) at an altitude varying from about 4500 to 5800 ft.—K. R. Lewin: The division of *Holosticha scutellum*. The account of the behaviour of the micronuclei at division, given by A. Gruber ("Weitere Beobachtungen an vielkernigen Infusorien," *Ber. Naturf. Ges. zu Freiburg I.B.*, Bd. iii. (1887), pp. 57-70), is not confirmed. In the period between divisions, *H. scutellum* possesses only a small number of micronuclei of about the size of the meganuclear segments, with which they have been confused. There is therefore no necessity to assume that numerous micronuclear divisions occur at the fission of the infusorian.—H. B. Fantham: *Sarcocystis colii*, n. sp., a Sarcosporidian occurring in the red-faced African mouse bird, *Colius erythromelon*. The author gave an account of a new species of Sarcosporidia from a new avian host. The Sarcosporidian trophozoites (Miescher's tubes) were distributed throughout the skeletal musculature, being more concentrated in some areas than in others. They occurred also in the heart muscle, and were scattered in the pericardium, peritoneum, and in the intestinal mesentery.—J. T. Saunders: Note on the food of freshwater fish. The food of fish varies considerably, many different things being taken by one species as an article of diet. But a single fish does not eat indiscriminately everything that it comes across; on the contrary, its meals are found usually to consist of one kind of food only. A mixture of food is not often found in the stomach, and this will only occur when the fish is very hungry or under artificial conditions, such as obtain in a laboratory aquarium. The food also varies according to locality, even in ponds which are separated from each other by only a few yards; the food in the stomachs of fish taken from these ponds may be quite different. This variation affects equally all the individuals that live in the same pond; under the same conditions they will all feed on the same food.

PARIS.

Academy of Sciences, May 13.—M. F. Guyon in the chair.—Paul Appell: The polynomials $V_{m,n}$ of Hermite and their analogues connected with spherical functions in space of any number of dimensions.—Armand Gautier and P. Clausmann: Fluorine in the animal organism. Skeleton, cartilages, tendons. Determinations of amounts of fluorine in bones and teeth, cartilage, and tendons of mammals and fish. Fluorine has been found in all the organs examined, but the proportions vary widely. Fluorine is localised in a definite manner in the organism; it accompanies the phosphates of the alkaline earths and increases with them.—Paul Sabatier and M. Murat: The preparation of several dicyclohexylbutanes. Description of the preparation and properties of five out of the nine possible isomeric dicyclohexylbutanes.—L. de Launay: Some broken-up rocks of the Central Plateau (France).—M. de Forcrand: Trouton's law. The relation $L/T = \text{constant}$ (about 22) is known not to hold in many cases, the value of L/T varying from 4.5 for helium to 0.27 for copper. Nernst has suggested $L/T = 9.5 \log T - 0.007 T$. This gives a closer approximation to experiment, but is still unsatisfactory. The author further modifies this formula to

$$L/T = 10.1 \log T - 1.5 - 0.009 T + 0.0000826 T^2.$$

Between 250° and 900° , this gives a value for L/T approximating to 22, the original Trouton constant.—Ph. **Barbier** and R. **Locquin**: The methodical degradation of some monobasic and dibasic acids (see p. 303).—M.M. **Fayet** and **Schaumasse**: The provisional orbit of the new comet 1913a (Schaumasse). The comet will be best seen about the beginning of June.—Gaston **Cotty**: The reduction of binary quadratic forms with integral coefficients in a real quadratic body.—E. **Landau**: Lambert's series.—Jules **Andrade**: Lateral independence of the balance spring in marine chronometers. Diminution of the variation from isochronism due to inertia.—A. **Cotton** and H. **Mouton**: The magnetic double refraction of liquids. The magnetic double refraction of solutions of nitrobenzene in carbon tetrachloride shows wide variation from an additive law; the specific double refraction of the nitrobenzene appears to be reduced by the addition of an inactive diluent.—R. **Fortrat**: The simplification of lines of the spectrum by the magnetic field. A study of the effect on the lines of a very strong magnetic field (40,000 Gauss). In the case of the green band of carbon the field reduced all the doublets to single lines, and the triplets were also reduced to single lines when the three lines were fairly close together. Similar effects were also noted in the blue band of the Swan spectrum, and the spectrum of the negative pole of nitrogen. The phenomenon appears to be general in band spectra.—M. de **Broglie** and F. A. **Lindemann**: The optical phenomena presented by the Röntgen rays meeting crystalline media. An examination of the various hypotheses proposed for explaining the production of fringes described in an earlier paper. The hypothesis that the fringes are caused by reflections on the cleavage planes of the crystal agrees best with the experimental results.—L. **Gay**: The calculation of the latent heats of evaporation. A modification of the Clapyron formula is proposed, partly based on Nernst's expression.—Louis **Hackspill**: The solid hydrogen phosphides. The alkaline phosphides of the type M_2P_5 , described in a previous communication, give a solid hydrogen phosphide on treatment with dilute acetic acid, and this on analysis gives figures agreeing with the composition H_2P_5 .—J. **Bougault**: Phenyl- α -oxycrotonic acid, its preparation and a new isomeride. A study of the best conditions of obtaining the acid from its amide; the hydrolysis of the latter is best carried out by heating with a solution of oxalic acid. An isomeride was obtained in the course of this work which differed from those previously known; it would appear to be the enolic form of benzoyl-propionic acid.—Edouard **Bauer**: 1-Benzoyl-2-phenyl- Δ_5 -cyclopentene.—Maurice **Lugeon** and Mlle Elisabeth **Jérémine**: The presence of limestone bands in the Swiss part of the massif of the Aiguilles Rouges.—V. **Vermorel** and E. **Dantony**: Fungicidal pasty solutions possessing moistening power. It is important that the copper preparations used in viticulture should moisten the leaves. This effect can be secured by the addition of gelatine to solutions with acid reaction and casein to alkaline solutions.—Ch. **Brioux** and M. **Guerbet**: Sulphur in the soil: study of its oxidation. The oxidation of the sulphur in the soil is shown to be due to microbial action. The phenomenon is complicated, several bacteria appearing to take part in the oxidation.—J. M. **Lahy**: Organic adaptation in states of attention.—Raoul **Bayeux**: The comparative resistance of the dog and the rabbit to intravenous injections of carbonic acid. The ratio between the receptivity of the dog and the rabbit is the same for carbonic acid as for oxygen; in the two cases the volume of the former gas is five times greater than that of the latter.—P. **Chaussé**: The methods to be used for experimental tuberculosis

by inhalation. Details of the methods used for the pulverisation of wet and dry virus.—Jacques **Pellegrin**: A new genus of the Centrarchideæ of the Gabon.—Charles **Lepierre**: The replacement of zinc by copper in the culture of *Aspergillus niger*. Copper, like cadmium, uranium, and beryllium, may replace zinc in Raulin's solution, and has the same effect in causing a rapid growth of the mould.—H. **Bierry** and Z. **Gruzewska**: The estimation of glycogen in the muscles.—Em. **Bourquelot**, H. **Hérissey**, and M. **Bridel**: The biochemical synthesis of the glucosides of alcohols (α -glucosides) by the aid of a ferment, α -glucosidase, contained in the yeast from low beer, air dried. α -Propylglucoside and α -allylglucoside.—L. **Cayeux**: The genesis of sedimentary iron minerals.—Pierre **Bonnet**: The structure of the chains between Lake Gœktchai and the Araxe.

BOOKS RECEIVED.

Atlas Notes. By J. C. Chute. Pp. 82. (London: Oxford University Press.) 1s.

Dent's Practical Notebooks of Regional Geography. By Dr. H. Piggott and R. J. Finch. Book iii. Africa. (London: J. M. Dent and Sons, Ltd.) 6d. net.

The Fishes of the Stanford Expedition to Brazil. By Prof. E. C. Starks. Pp. 77+xv plates. (California: Stanford University.)

The Statesman's Year-Book, 1913. Edited by Dr. J. Scott Keltie, assisted by Dr. M. Epstein. Pp. xcvi+1452+x plates. (London: Macmillan and Co., Ltd.) 10s. 6d. net.

The National Physical Laboratory. Report for the Year 1912. Pp. 123. (Teddington: W. F. Parrott.)

Report for 1912 on the Lancashire Sea-Fisheries Laboratory at the University of Liverpool and the Sea-Fish Hatchery at Piel. Edited by Prof. W. A. Herdman. Pp. 318+iii plates+v charts. (Liverpool: C. Tinling and Co., Ltd.)

Flowerless Plants: How and Where They Grow. By S. L. Bastin. Pp. xi+152+plates. (London: Cassell and Co., Ltd.) 6s. net.

Metamorphose der Muraenoiden. By Dr. B. Grassi. Pp. x+211+xv plates. (Jena: G. Fischer.) 50 marks.

Papers Set in the Mathematical Tripos, Part i., in the University of Cambridge, 1908-12. Pp. 70. (Cambridge University Press.) 2s. 6d. net.

A Text-Book of Thermodynamics (with Special Reference to Chemistry). By J. R. Partington. Pp. viii+544. (London: Constable and Co., Ltd.) 14s. net.

The Laws of Thermodynamics. By W. H. Macaulay. Pp. viii+71. (Cambridge University Press.) 3s. net.

The Principles of Projective Geometry applied to the Straight Line and Conic. By J. L. S. Hatton. Pp. x+366. (Cambridge University Press.) 10s. 6d. net.

Insects: Their Life-Histories and Habits. By H. Bastin. Pp. xii+349+xlvi plates. (London and Edinburgh: T. C. and E. C. Jack.) 7s. 6d. net.

Mathematical Physics. Vol. i., Electricity and Magnetism. By C. W. C. Barlow. Pp. vii+312. (London: W. B. Clive.) 4s. 6d.

An Index to the Scientific Contents of the Journal and Proceedings of the Academy of Natural Sciences of Philadelphia. Pp. xiv+1419. (Philadelphia: Academy of Natural Sciences.) 3.50 dollars.

The Social Guide, 1913. Edited by Mrs. H. Adams