

advanced students who are qualified to enter on the fourth year of the course should apply. There is no restriction as to income, but intending candidates must be ordinarily resident within the area of the administrative County of London, and must be students who have been in regular attendance at appropriate courses of instruction for at least two sessions. The free studentships do not entitle the holders to any maintenance grants, but cover all ordinary tuition fees. 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. 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 24.

VACATION courses for foreigners are to be held in Hamburg from July 24 until August 6 next. In all seventy-five lectures and courses have been arranged in connection with the scientific institutions of the State of Hamburg, with the hospitals and the Colonial Institute. The courses will aim at acquainting foreigners with the position of scientific studies in Germany. Scientific problems of the day will be treated by competent specialists in a manner intelligible to educated persons. Some sixty-five professors from German universities and institutes will assist at the courses. For the convenience of foreigners, special practical courses in German have been arranged daily between June 16 and July 26. These courses offer an opportunity of acquiring a practical knowledge of the language. Courses have been arranged also for medical students, including practical work at the Eppendorf Hospital, and a series of lectures on diseases of the heart and lungs. Students will be given opportunities of sight-seeing in Hamburg and its environs. Prospectuses and all information may be obtained gratis on application to "Geschäftsstelle der Akademischen Ferienkurse," Hamburg 20, Martinistrasse 52.

THE organiser for technical education in the Transvaal, Mr. W. J. Horne, has amplified a paper he read before the South African Institution of Engineers at Johannesburg shortly after the establishment of the Johannesburg Trades School, and the result is a volume on the Trades School in the Transvaal, a copy of which has been received. After explaining the need for vocational instruction, he gives a description of the character and scope of the work done in the urban trades schools of the Transvaal, explains the nature and cost of the buildings and equipment in different centres, and reviews what is being done to meet the special needs of rural areas on one hand, and of girls on the other. The volume shows that considerable progress has been made already in the provision of technical education in the Transvaal. The Pretoria Trades Schools and Polytechnic, for example, has accommodation for 200 pupils, and is provided with shops for blacksmiths and farriers, workers in wood, electricians, mechanical engineers, plumbers, wagon-builders, and printers. As Mr. J. Percy FitzPatrick, the chairman of the Witwatersrand Council of Education, says, in the introduction he contributes to the volume, "the motto of the Transvaal Trades Schools is 'theory and practice.'" and Mr. Horne insists that the mission of the trades schools must be to unite and harmonise these two essential things. The volume is full of practical suggestions for ensuring this end and of providing means

for boys and girls to proceed as far in their study of technology as their capabilities permit.

THE Indian newspapers recently received in this country contain fuller particulars of what is in future to be the Government policy with regard to education in India. The statement circulated in India in February last, we learn from *The Times*, after a recognition of the beneficial effects of the Universities Act of 1904, refers to the new decentralising policy. It is pointed out that there are only five Indian universities for 185 art and professional colleges in British India, besides several affiliated institutions in native states. The day is probably far distant, it is remarked, when India will be able to dispense altogether with the affiliating university. But it is necessary to restrict the area over which the universities have control, securing in the first instance a separate university for each of the leading provinces, so far as possible on a teaching and residential basis. A university of this new type is being founded at Dacca, and the establishment of universities at the provincial capitals of Rangoon, Patna, and Nagpur is contemplated. The Government is also prepared to sanction, under certain conditions, teaching and residential universities at Aligarh and Benares, and elsewhere as occasion may demand. The importance of secondary and high-school education as the basis of all professional or industrial training in India is emphasised. Private enterprise in this field is so extensive that of 3,852 high and middle English schools only 286 are Government institutions. Unsatisfactory schools have in certain cases gained recognition and eluded the control of inspection. The Government intends to increase largely the grants-in-aid in order that non-State institutions may keep pace with improvements in Government schools; to multiply and improve training colleges; and to found Government schools where a survey of local conditions leads to the conclusion that they are needed. The provision for technical, industrial, and scientific studies is surveyed, and incidentally the statement is made that "the grave disadvantages of sending their children to England to be educated away from home influence at the most impressionable time of life are being realised by Indian parents."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 24.—Sir Archibald Geikie, K.C.B., president, in the chair.—A. G. **Huntsman**: (1) Protostigmata in Ascidians. (2) The origin of the Ascidian mouth.—F. A. **Bainbridge**, S. H. **Collins**, and J. A. **Menzies**: Experiments on the kidneys of the frog. When the frog's kidneys are perfused through the aorta and the renal portal veins with oxygenated normal or hypotonic Ringer's solution the urine formed is hypotonic to the perfusing fluid and is derived entirely from the glomeruli, since the tubules secrete no urine under these conditions. When the tubules are poisoned with corrosive sublimate or (temporarily) with caffeine the urine becomes isotonic with the perfusing fluid. On the contrary, if the glomeruli are killed by the arterial perfusion of boiled Ringer's solution, while the tubules still receive an adequate supply of oxygen through the renal portal veins, the urine formed continues to be more dilute than the perfusing fluid.—Cecil **Revis**: (1) The probable value to *Bacillus coli* of "slime" formation in soils. When kept in sterilised soils, particularly if these contain excreta, *B. coli* shows a great tendency to the formation of "slime," a property which is retained for some time when the organism is plated out on ordinary

nutrient media. It has been found that soils so inoculated with *B. coli*, together with other soil organisms of a sporogenous type, are able to retain and absorb moisture from the air in a remarkable manner, so that during a period of three years flasks containing these soils and only closed with cotton-wool plugs retained and even increased the original water added to them, whilst controls which did not contain the colon organism rapidly dried up.—C. Revis: Variation in *B. coli*. The production of two permanent varieties from one original strain by means of brilliant green. From the experiments it appears (1) that from one single cell there may arise new cells differing in the power of resistance to the same environment and consequently modified by it in a different manner; (2) that the exhibition of physiological activity is not an intrinsic and integral part of the protoplasm, but that such powers may be entirely lost without loss of vitality in the organism itself.

Zoological Society, April 15.—Sir J. R. Bradford, K.C.M.G., F.R.S., vice-president, in the chair.—C. Tate Regan: (1) Fishes from Easter Island collected by Prof. F. Fuentes. The collection included examples of ten littoral species, four widely distributed in the tropical Indo-Pacific and six new to science; of the latter two were related to tropical forms and the rest to species described from New South Wales or from Norfolk Island. (2) A revision of the fishes of the genus *Kuhlia*; twelve species were recognised, including three described as new to science.—R. I. Pocock: The affinities of *Canis antarcticus*. It was shown that (1) *C. antarcticus* and *C. latrans* are not closely related, as has been claimed; (2) the affinities of *C. antarcticus* lie with certain South American species of *Canidae*; and (3) *C. latrans* must be affiliated with the wolves and large jackals of the northern hemisphere. These conclusions were based mainly upon cranial and dental characters, and the points were illustrated by a series of lantern-slides of the skulls of several species of *Canidae*.—Major G. E. H. Barrett-Hamilton and M. A. C. Hinton: A collection of mammals from the Inner Hebrides. This collection was made during an expedition organised and managed by Mr. W. R. Ogilvie-Grant. Three new forms were discovered: of these one (*Sorex grantii*) is regarded by the authors as an insular development of *S. araneus*, whilst they are inclined to think that the other two (*Eutamias alstoni* and *Microtus agrestis macgillivraii*) are slightly modified survivals from the Pleistocene period. The authors argue that the evidence shows that Islay, and perhaps Jura, were separated from the old Hebridean land-area as well as from the mainland of Scotland earlier than were the other islands. Secondly, they think it likely that the severance of the Hebridean district transpired before that of the Orkneys. Lastly, they consider that the evidence of the mammals supports the suggestion of a former direct land-connection between western Norway and the Hebrides, put forward by Stejneger.—R. Lydekker: *Bubalis caama selbornei*, subsp. n., a male hartebeest from the Transvaal.

Royal Meteorological Society, April 16.—Mr. C. J. P. Cave, president, in the chair.—W. H. Dines: The vertical distribution of temperature in the atmosphere and the work required to alter it. It seems likely that the vertical distribution of temperature is the result of two opposing tendencies, one the effect of radiation, and the other the forced mixing produced by the general circulation, aided perhaps by the convection caused by the heating of the earth by solar radiation and by the latent heat set free by condensation.—J. E. Clark and R. H. Hooker: Report on the phenological observations for the year ending November, 1912. The chief factors affecting the field crops

were probably the dry warm April and May, followed by the cold wet sunless summer. The spring was perhaps the more important of the two; it affected the corn crops and the hay. All the crops in the United Kingdom were below the average of the preceding ten years, although in Great Britain alone meadow hay was a little better than usual, and hops were also above the mean by fully 23 per cent. The harvest of 1912 must thus be classed as very deficient, and one of the worst experienced for many years.—R. Corless, G. Dobson, and Dr. C. Chree: Meteorological, electrical, and magnetic observations during the solar eclipse of April 17, 1912. The observations discussed were mostly made at the Meteorological Office, South Kensington, and Kew Observatory. The temperature fell nearly 3° during the eclipse, the minimum occurring ten minutes after the maximum phase. At stations in the south of England the loss of recorded sunshine due to the eclipse varied from about twenty to twenty-five minutes.

DUBLIN.

Royal Irish Academy, April 14.—Rev. Dr. Mahaffy, president, in the chair.—H. Kennedy: The large ions in the atmosphere. This paper is a continuation of work by Prof. McClelland and the author. The previous work had reference to the air of the city, and it was suspected that flames of various sorts were chiefly responsible for the large ions observed. This view was supported by laboratory experiments showing that ions of the same mobility (1/2000 cm. per sec.) were present in flame gas when allowed to cool. Observations were therefore made at Dalkey, about eight miles from Dublin, at a point on the coast, so that tests could be made of air from over the sea, from country districts, or coming from the city. The average number of large ions per c.c. previously observed in Dublin was 16,000, with a maximum of 54,000. At Dalkey the average was about 1000, and numbers as low as 200 were observed. Only when the air was coming from the city to the place of observation or during fogs were large numbers observed. The paper also contains further data on the relation between the numbers of small and large ions present. The small ions increase in number with the decrease of large ions present.—R. Southern: (1) *Oligochæta* (Clare Island Survey); (2) *Gephyrea* (Clare Island Survey). (1) *Oligochæta*. Thirty-four species were recorded. The earthworm fauna of Clare Island was poor, only fourteen species being found. Two new species of the family *Enchytraeidae* were described, the first, *Enchytraeus cliarensis*, living in weeds on the shore. The second species was of considerable interest, being the first undoubted *Oligochæta* found below low-water mark. Its remarkable characteristics necessitated the creation of a new genus, and the species was named *Grania maricola*. It was dredged in twenty-four fathoms in Clew Bay. It is closely related to *Enchytraeus monochaetus*, described by Michaelsen from South Georgia, an island in the South Pacific, a species which evidently belongs to the genus *Grania*. The chief character of the genus is the great reduction in the number of setæ, which are quite absent from the anterior end of the body. (2) *Gephyrea*. Ten species were recorded from the district. The most interesting were *Aspidosiphon mülleri*, Diesing, and *Phascolosoma intermedium*, a new species dredged in twenty-four fathoms, showing characters intermediate between the genera *Phascolosoma* and *Phascolion*.

PARIS.

Academy of Sciences, April 21.—M. F. Guyon in the chair.—A. Haller: The formation of tetra-alkyl derivatives of cyclohexanone and β -methylcyclohexanone and of trialkyl derivatives of menthone.

Using the method with sodium amide, previously described by the author, all of the four hydrogen atoms of the two carbon atoms adjacent to the ketone group can be replaced by methyl or allyl; the introduction of the ethyl group offers difficulties. Full details of the preparation and properties of the compounds obtained by the application of the reaction are given in the paper.—M. de **Forcrand**: Thermochemical study of uranyl nitrate and its hydrates.—M. **Sabatier** was elected a member of the section of non-resident academicians, and M. Jules Boulvin a correspondant for the section of mechanics.—H. **Burkhardt**: A theorem on the gamma function.—Michel **Petrovitch**: The entire transcendentials generalising exponential and trigonometric functions.—A. **Bilimovitch**: Conservative non-holonomial systems with linkages dependent on the time.—Jules **Andrade**: Friction and isochromism of the double spiral. A remarkable property of a group of double spirals suitably chosen. A solution of a problem in chronometry.—Louis **Roy**: The motion of indefinite viscous media.—L. **Décombe**: The electronic theory of gravitation.—Henri **Bénard**: The structure of vortices behind an obstacle. The motion has been studied with the aid of the kinematograph, and a reproduction of a film is given.—C. **Dauzère**: A new species of cellular vortices. A study of the eddies produced in the surface of molten stearic acid.—M. **Deslandres**: Remarks on the preceding communication of M. Dauzère, pointing out the analogy between the phenomena observed by M. Dauzère and those occurring in the atmosphere.—A. **Blondel**: The nitometer, an apparatus for rapidly measuring the brilliance of a luminous surface.—G. **Sizes**: The transversal vibrations of strings.—A. **Portevin**: The elastic limit of alloys. The method used was based on the appearance of the slip bands on the polished surface of the specimen. Six reproductions of microphotographs illustrating the results obtained with different alloys are given.—Georges **Charpy** and André **Cornu**: The transformations of the alloys of iron and silicon. The measurement of the coefficient of expansion of the alloy was utilised as a means of following the transformations instead of the more usual cooling velocity. The critical points obtained by the two methods do not agree.—Daniel **Berthelot** and Henry **Gaudechon**: The dissociation of gaseous compounds by light. The gases ammonia, phosphoretted hydrogen, arseniuretted hydrogen methane, silicon hydride, zinc ethyl, phosgene, sulphur hexafluoride, were submitted to the light from a mercury-vapour lamp. Of these sulphur hexafluoride and methane were the only gases unaffected.—Ch. **Maguin**: The orientation of liquid crystals by sheets of mica.—G. **Lafon**: The use of fat in the animal organism. Fats can be utilised directly, similarly to glucose, particularly in muscular work.—E. **Wertheimer** and G. **Battez**: The mechanism of the salivary secretion produced by the injection of saline water into the vessels. It is shown that the action is almost entirely due to the effects on the nerve system.—André **Mayer** and Georges **Schaeffer**: Lipocytic coefficients and the imbibition of living cells by water. It is proved that there is a numerical relation between the lipocytic coefficient of tissues and their maximum imbibition by water.—Maurice **Arthus**: Experimental researches on the poison of *Buthus quinquestriatus*.—L. C. **Soula**: The relations between anaphylaxy, immunity, and autoprotoleolysis of the nervous centres. The state of anaphylaxy is accompanied by a marked increase of autoprotoleolysis of the nerve centres.—Marcel **Belin**: The relations existing between anaphylaxy and immunity. A study of the effect of the injection of oxidising agents on the toxins of tetanus, colibacillus, and vaccine.—Albert

Robin: The metabolism of the urinary chlorides in cancerous subjects.—Em. **Bourquelot** and Em. **Verdon**: Researches on the biochemical synthesis of β -methylglucoside in a neutral fluid, not taking part in the reaction. This synthesis can be effected by emulsin in aqueous acetone solutions.—E. **Kayser**: Contribution to the study of ropy beer.—Venceslas **Moycho**: Study of the action of ultra-violet light on the ear of the rabbit. The influence of intensity and of intermittent radiations. A continuation of work described in an earlier paper.—Echsner de **Coninck**: The presence of propionic acid in the secretions of rheumatic subjects. Propionic acid was isolated from the urine.—G. R. **Blanc**: Parasitic typhlitis of the Nandou. The disease appears to be due to a new species of Heterakis, for which the name *H. parisi* is proposed.—Raphael **Dubois**: A micrococcus from the calcareous concretions of tuberculous origin.—J. A. **Samuels**: Cytological studies on the relations existing between the nucleus and the development of crystals in the parenchymatous cells of the perianth of Anthurium.—François **Bochin**: Hydrographical phenomena in the western region of the Paris basin.—Louis **Mengaud**: Contribution to the study of the Wealdian in the province of Santander.—Edmond **Bordage**: The Eocene gulf of Royan.—Jacques **Deprat**: The geology of Tonkin.—Ph. **Négris**: Contribution to the geology of Greece.—F. **Dienert**: The use of absorbent pits. A reply to a communication of M. Dollfus relating to a means of combating floods in the Paris basin.—A. **Boutaric**: A relation between the atmospheric absorption and the polarisation of light diffused by the sky.

BOOKS RECEIVED.

Life and Evolution. By F. W. Headley. New edition. Pp. xx+272+plates. (London: Duckworth and Co.) 5s. net.

Geologischer Führer für Exkursionen im Wiener Becken. By Dr. F. X. Schaffer. III. Teil. Pp. x+167+x plates+map. (Berlin: Gebrüder Borntraeger.) 5.80 marks.

New Zealand. Department of Mines. Geological Survey Branch. Bulletin No. 15 (New Series). The Geology of the Waihi-Tairua Sub-division, Hauraki Division. By J. M. Bell and C. Fraser. Pp. vii+192+plates. (Wellington: J. Murray.)

Java. Zoologisch en Biologisch. Afladering I.-V. By Dr. J. C. Koningsberger. Pp. 254. (Batavia: G. Kolff and Co.) 5 francs.

Single-Phase Commutator Motors. By F. Creedy. Pp. x+113. (London: Constable and Co., Ltd.) 7s. 6d. net.

Rainfall Reservoirs and Water Supply. By Sir A. R. Binnie. Pp. xi+157+xvi plates. (London: Constable and Co., Ltd.) 8s. 6d. net.

Report on the Danish Oceanographical Expeditions 1908-1910 to the Mediterranean and Adjacent Seas. Vol. i., Introduction, Hydrography, Deposits of the Sea-Bottom. Pp. 269+xx plates. (Copenhagen: A. F. Høst and Son.)

Earthquakes and other Earth Movements. By Prof. J. Milne. Sixth edition. Pp. xvi+388. (London: Kegan Paul and Co., Ltd.)

Mathematics, Science, and Drawing for the Preliminary Technical Course. By L. J. Castle. Pp. vi+149. (London: G. Routledge and Sons, Ltd.) 1s. net.

The Game of Mind. By P. A. Campbell. Pp. iii+80. (New York: Baker and Taylor Co.) 75 cents net.

Practical Physiological Chemistry. By S. W. Cole. Third edition. Pp. xii+230. (Cambridge: W. Heffer and Sons, Ltd.) 7s. 6d. net.