

ANNOUNCEMENT is made that Sir J. S. Burdon-Sanderson, F.R.S., regius professor of medicine at Oxford, has placed his resignation of the professorship in the hands of the vice-chancellor of the university.

THE Mysore Durbar has, says the *Pioneer Mail*, established four scholarships of 40 rupees a month each to encourage the study of analytical chemistry in the laboratory of the agricultural department. The scholarships will be tenable for one year, and will be open to candidates who have taken the B.A. degree in physical or any other branch of natural science. Students awarded scholarships will have to give an undertaking to serve the State for one year if required to do so, or to refund the money in case they refuse to serve.

In a recent address at the distribution of prizes to the students of the classes held under the Liverpool School of Science subcommittee, Sir Philip Magnus, referring to the progress made in the provision of technical education in this country during the last few years, said that in 1886 the number of students in technological classes registered by the City Guilds Institute was 7660, and, during the past session, that number has increased to 38,638. Moreover, apart from the sum of more than 1,000,000*l.* which local authorities expended last year on technical instruction as defined by the Technical Instruction Act, the State contributed the sum of 605,143*l.*, as against a total of 107,583*l.* in the year 1886, whilst the total State contribution last year to education generally amounted to more than 9,000,000*l.*, as against little more than 3,000,000*l.* in 1886.

An appeal is being issued by the Senate of the University of London for funds to build and endow an institute of medical sciences under the control of the university. A letter signed by the chancellor of the university, Lord Rosebery, the vice-chancellor, principal and others has been circulated urging the claims of such an institute. Owing to the great changes which have taken place in medical education of late years, due to the increasing attention given to the teaching of the scientific subjects, it has become impossible, the letter states, for each medical school, out of the income derived from the fees of students, to build, equip, and maintain the laboratories, fitted with costly apparatus, which are necessary for modern scientific teaching. The faculty of medicine, a body consisting of 350 recognised teachers of the university, has ascertained the views of the teachers of the medical schools, and has recommended the Senate to establish an institute for the teaching of physics, chemistry, biology, anatomy, and physiology.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Astronomical Society, December 11.—Prof. H. H. Turner, F.R.S., president, in the chair.—Dr. A. A. Rambaut read a paper on two drawings of the Mare Serenitatis by John Russell, R.A., which afforded some hitherto unpublished evidence with regard to the appearance of Linné in 1788. Dr. Rambaut showed photographs of the original drawings, on which Linné appeared as a white spot, and not as a crater.—Mr. Saunder showed and described a photograph of one of the earliest maps of the moon, made by Langrenus about 1645.—The **Astronomer Royal** showed photographs of Comet Borrelly 1903 and Comet Perrine 1902, and pointed out their great similarity in appearance.—The Astronomer Royal also gave an account of the observations of the recent shower of Leonid meteors on the morning of November 16.—Mr. Denning's paper on the same subject was also read. There was complete agreement among the observers as to the maximum being between 17h. 30m. and 18h.—Mr. J. C. W. Herschel read a paper on an examination of the relative star density on different parts of the plates forming the Harvard photographic star map, from which it appeared that the maximum density was at about 9° from the centre of the plate, after which it fell off very rapidly.—Mr. Crommelin presented his ephemerides for physical observations of Saturn,

1903-4, and gave the different values that had been found for the planet's rotation period.—The secretary read a paper by Prof. G. W. Hough on the rotation period of Saturn deduced from his observations of the white spot first observed by Prof. Barnard on June 15.—Mr. Maunder read a letter from Mr. Percival Lowell, in which the latter affirmed his conviction of the reality of the canals of Mars, and also of the markings on Venus.—Prof. Turner described his graphical method for determining the local or Greenwich time of sunset at different places within a given region, and Mr. Benson spoke of a somewhat similar method previously devised by him.—The secretary read a paper by Mr. P. H. Cowell on the semidiameter, parallactic inequality, and variation of the moon derived from the Greenwich meridian observations from 1847-0 to 1901-5.—Mr. H. C. Plummer described and illustrated his paper on oscillating satellites.

Zoological Society, December 1.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Prof. E. Ray Lankester, F.R.S., exhibited and made remarks upon some specimens of *Medusæ* reported to come from the Victoria Nyanza. Prof. Lankester also exhibited some drawings showing the hair-whorls on the face of two specimens of the okapi.—Mr. F. E. Beddard, F.R.S., exhibited and made remarks upon a portion of the large intestine and the cæcum of a boa (*Boa constrictor*) which had died in the Society's Gardens. The walls of the intestine in the neighbourhood of the cæcum and of the cæcum itself were thickened and inflamed. The cæcum was filled with a hard mass consisting of small stones and a number of the snake's own teeth, the presence of which, it was thought, had given rise to the inflammation.—Mr. Beddard also exhibited, on behalf of Mr. G. A. Doubleday, a hairless specimen of the common rat (*Mus decumanus*) which agreed in its characters with a so-called variety (*Mus nudo-plicatus*) of the common mouse figured in the Society's *Proceedings* (1856, p. 38, mamm. pl. xli.).—Dr. Walter Kidd exhibited a drawing of an *Oryx beisa* showing a reversed area of hair along the median line of the back, a character which was found only in ruminants, but not in all of them.—Mr. Oldfield Thomas exhibited an example of the naked rodent which he had in 1885 described as *Heterocephalus phillipsi*, but now thought should form a special genus, proposed to be called Fornamia, as its possession of only two cheek-teeth proved to be constant. The specimen had been presented to the British Museum by Dr. A. G. W. Bowen, R.N. A second species of *Heterocephalus*, distinguished by its smaller size and much smaller teeth, was described from British East Africa and named *H. ansorgei*.—Mr. G. A. Boulenger, F.R.S., exhibited a young hybrid newt (*Molge marmorata* ♂ × *M. cristata* ♀) obtained by Dr. Wolterstorff, of Magdeburg, in his aquarium, as reported in the *Zoologischer Anzeiger*, September 21. This specimen agrees in all external characters with *M. blasii*, de l'Isle, of which one of the original specimens, from near Nantes, S. Brittany, forming part of M. Lataste's collection, was also exhibited.—Mr. F. E. Beddard, F.R.S., read a paper on the tongue and windpipe of the American vultures, and remarked upon the inter-relations of the genera *Sarcorhamphus*, *Gypagus*, and *Cathartes*.—A communication from Miss Dorothy M. A. Bate contained an account of the species of mammals—fifteen in number—hitherto recorded from Cyprus. One subspecies—*Crocoidura russula cypria*—was described as new to science.—The secretary, on behalf of Dr. R. N. Salaman, read a report on the *post-mortem* examination of the polar bear which had recently died in the Gardens. It stated that death was undoubtedly due to an aneurism of the aorta, which was possibly caused by a sharp bone at some previous time penetrating the œsophageal wall and lacerating the aortic wall.—A communication from Sir Charles Eliot, K.C.M.G., contained an account of thirty species of cryptobranchiate molluscs of the family Dorididæ from the east coast of Africa and Zanzibar. Of these eighteen were described as new.—A communication from Dr. A. G. Butler contained evidence in proof of the fact that the cardinal finch known as *Pavoaria cervicalis* was only an immature condition of *P. capitata*.—Dr. P. Chalmers Mitchell read a paper on the occasional transformation of Meckel's diverticulum in birds into a gland.

Geological Society, December 2.—Sir Archibald Geikie, F.R.S., vice-president, in the chair.—Notes on the garnet-bearing and associated rocks of the Borrowdale volcanic series, by the late Mr. Edward E. Walker. A detailed description of sills and dykes of garnet-bearing rocks in the Langstrath Valley is given, and similar rocks are described, occurring as dykes and sills around the Eskdale granite and the Buttermere granophyre, and also in the Armboth-Helvellyn area. They consist of diabase, porphyrite, and granophyre. The rocks appear to be related to the Eskdale and Buttermere masses of intrusive rocks. Garnets are also found in a group of rocks below the great banded ashes and breccias of the Scawfell group, and in the rocks of the Scawfell group itself. These rocks often have a streaky structure, which exhibits types resulting from infiltration along planes of weakness, lamination of ash, flow of igneous material, and dynamic action on included fragments. The banded ashes of the Scawfell group also contain garnets. The garnets are of the almandine type. They often have a ring of felspar around them, which, when the intrusive rocks are studied, suggests that the mineral is original; but similar rings occur around garnets in the ashes, showing that the felspars may be formed in solid rock.—A contribution to the Glacial geology of Tasmania, by Prof. J. W. Gregory, F.R.S. After giving an analysis of previous contributions to this subject, the author describes the evidence obtained by himself personally in the northern portion of the island. The town of Gormanston stands on a Glacial moraine of recent geological age, formed later than the excavation of the Linda Valley, and occurring as a bank projecting from the southern side of the valley. The moraine is composed of typical Boulder-clay, and behind it are bedded clays, probably accumulated in a glacier lake above the moraine dam. An erratic of fossiliferous limestone, scratched all over and partly polished, is mentioned, while a railway has cut through an enormous boulder of black Carboniferous Limestone 16 feet in length. The northern face of Mt. Owen appears to be ice-worn to the height of about 1900 feet, while the base of the Glacial deposits is not more than 700 feet above the sea. The general evidence suggests that the Eldon Range and the central plateau formed the gathering-ground of the ice which flowed westward and south-westward. A map is given to show the range of Pleistocene glaciation so far as it has been recorded, and also to indicate localities of the glacial deposition, which probably dates from the Carboniferous period. The lowest level at which evidence of Pleistocene glaciation has been found is 400 feet on the Pieman River. Many of the deposits are little more altered than those of northern England, despite the heavy rainfall, and the aspect of some of the rock-scoring is very recent.

Entomological Society, December 2.—Prof. E. B. Poulton, F.R.S., president, in the chair.—Mr. G. T. Porritt exhibited, on behalf of Mr. T. Ashton Lofthouse, a specimen of *Xylophasia zollikoferi* taken at Sugar, near Middlesbrough, Yorkshire, on September 26 last. He said he believed that this was only the second specimen which had been recorded as having been taken in Britain. Mr. McLachlan, F.R.S., said the strongest evidence existed that a very large immigration of insects from the nearest Continental coast took place during the exceptional (for this year) spell of warm and calm weather prevailing towards the end of September, and he was of opinion that the specimen of *Xylophasia zollikoferi*, taken by Mr. Lofthouse in Yorkshire, formed an item in this migratory swarm. Mr. Eagle Clarke had witnessed such immigration when staying on board the "Kentish Knock" lightship for the purpose of studying bird-migration. He had witnessed a considerable immigration of *Vanessa cardui*, for instance, amongst many other insects, and not the least remarkable of his observations was the fact that *V. cardui* flies at night during migration as well as by day. Mr. McLachlan remarked that the laws governing migration in insects were at present little understood, and urged upon entomologists the necessity of obtaining a clearer insight into their working.—Mr. Malcolm Burr exhibited, and remarked on, a specimen of *Dinarchus dasybus*, Illig., belonging to a family of five or six species confined to the Balkans.—The president exhibited a series of photographs sent by Mr. A. H. Thayer to illustrate his views on the significance of the

colours and patterns of butterflies' wings. The insects had been photographed on masses of foliage and flowers, and it was obvious that the dark ground-colour harmonised with the dark shadow behind and under the vegetation, while the light markings stood out as conventionalised representations of single flowers and flower-masses.—The president also exhibited the eyeless imagines and pupae-cases of *Ennomos autumnaria*, in illustration of his remarks at the meeting on November 18. Imagines produced by unblinded larvæ were also shown for comparison.—The Rev. Francis D. Morice read a paper entitled "Illustrations of the Male Terminal Segments and Armatures in Thirty-five Species of the Hymenopterous Genus *Colletes*."

Faraday Society, December 8.—Prof. A. K. Huntington presided.—The total and free energy of the lead accumulator, by Dr. Lehfeldt.—Bitumen in insulating compositions, part i., by Mr. J. A. Sutherland. Little or no trustworthy data have been published as to the use of bitumen for electrical purposes. The chief source of bitumen is Trinidad Lake, where there is estimated to be a quantity of nine million tons, which appears to be renewed to the extent of 20,000 tons annually. More than 150,000 tons are exported yearly. Bitumen is also found in Venezuela, California, and on the shores of the Dead Sea; it occurs in some limestone (asphalt) as an impregnation, about 10 to 15 per cent. being present, but it does not pay to extract it from this source. Its physical and chemical properties and constitution, which are fully dealt with in the paper, prove it to be infinitely superior to gas or coal tar for insulation and durability. The object of the present paper is to invite discussion and the views of electrical engineers to assist the author in the completion of his experiments, and to enable him to draw up a satisfactory definition of bitumen, so that users may secure the best results from its valuable non-hygroscopic and insulating qualities.

Royal Meteorological Society, December 16.—Capt. D. Wilson-Barker, president, in the chair.—Mr. W. Marriott gave some account of the meteorological work of the late Mr. James Glaisher, F.R.S. Mr. Glaisher was best known to the public for the twenty-eight balloon ascents which he made for scientific purposes in 1862-9 on behalf of the British Association committee. The highest ascent was that from Wolverhampton on September 5, 1862, when the height of about seven miles from the earth was reached. Mr. Glaisher was rendered insensible, while Mr. Coxwell's hands were frozen, and he was only able to open the valve of the balloon by tugging at the rope with his teeth.—A paper by Mr. J. R. Sutton on certain relationships between the diurnal curves of barometric pressure and vapour tension at Kenilworth (Kimberley), South Africa, in the absence of the author was read by the secretary.

PARIS.

Academy of Sciences, December 14.—M. Albert Gaudry in the chair.—The principal characters of band and line spectra, by M. H. Deslandres. The two classes of spectra have one important property in common, they are both formed by the repetition of similar groups of lines or bands, but there are numerous points of difference, the repetition of the groups being regulated by functions of different form in the two cases; line spectra are also affected by alteration of pressure and by an intense magnetic field, whilst band spectra are unaffected under similar conditions. The experiments made by the author, especially on the line and band spectra of nitrogen, are not in agreement with the usual view that line spectra correspond to the vibrations of the atoms, and band spectra to those of molecules. The views of Runge are also criticised, and the need of further experimental work pointed out.—Spectroscopical studies of the blood made on Mt. Blanc by the late M. Henocque, by M. J. Janssen.—The discovery of cones of Sequoia and of pine in the Portland strata in the neighbourhood of Boulogne-sur-Mer, by MM. R. Zeiller and P. Fliche.—On the suppression of magnetic hysteresis by an oscillating magnetic field, by M. P. Duhem. The author applies the theories previously developed by him to the experimental results of M. C. Maurain. M. Marconi has attributed the effects produced in his receiver to the suppression of magnetic viscosity, and M. Tissot to the suppression of

hysteresis; according to the author's theory it is the intervention of the viscosity which determines the suppression of the hysteresis.—The direct preparation of cyclohexanol and cyclohexanone starting from phenol, by MM. **Sabatier** and **Senderens**. The vapour of phenol mixed with hydrogen in excess and passed over reduced nickel at 215° to 230° C. gives a mixture of cyclohexanone and cyclohexanol. The vapour of this mixture, passed over reduced copper at 330° C., gives hexanone in a practically pure state; the same mixture, mixed with an excess of hydrogen and passed again over reduced nickel, gives the pure cyclohexanol. The method is general, and has been applied with success to the cresols.—On partial differential equations of the second order, by M. **Hadamard**.—On a generalisation of the theory of algebraical continued fractions, by M. E. **Goursat**.—On the differential equation of Riccati of the second order, by M. George **Wallenberg**.—A simple method permitting of the registration on the walls of a rotating cylinder of great pressures with small forces, by M. Albert **Hérisson**.—An internal combustion motor firing by compression, by M. **Cannevel**. In the motor described, the ignition is produced by a compression of about 30 atmospheres.—On a new method of measuring thicknesses and refractive indices, by MM. J. **Macé de Lépinay** and H. **Buisson**. The method consists in the observation of the rings of parallel plates and the fringes of mixed plates. The thickness of the plate is measured approximately to 0.01 mm., and the excess measured by the fringes, results having been obtained with plates up to 36 mm. thick. With plates of quartz of this thickness, the refractive index can be measured with an accuracy of some units in the seventh decimal place. Measurements on the same block of quartz, carried out on different portions of the plate, gave differences of four units in the sixth place, although the quartz was apparently perfectly homogeneous.—On the ionisation of phosphorus, by M. Eugène **Bloch**. Independent measurements of the mobilities, the coefficients of recombination, and of the ratio $\epsilon = a/4\pi(K_1 + K_2)$ for phosphorus ions lead to perfectly concordant results, the agreement giving the best demonstration of the real ionisation of phosphorus.—Study of a contact resistance, by M. A. **Bianc**. A contact resistance is of a very different nature from a metallic resistance, and is, under certain conditions, a reversible function of the intensity of the current. It undergoes an irreversible diminution whenever it is traversed by a sufficient current during an appreciable time, and this last phenomenon depends on the direction of the current.—On the distortion developed by shock in notched test-pieces, by M. A. **Pérot**. The effect of notching the test-piece is to limit to a narrow region the deformation produced, which is then recorded automatically by a photographic method. Diagrams are given showing the curves obtained with different specimens of the same metal.—Luminous sensation as a function of the time for coloured light. Discussion of the results, by MM. André **Broca** and D. **Sulzer**. A study of the retinal fatigue for different colours. Sources of light very rich in blue rays, such as the electric arc or very powerful incandescent burners, are injurious to the eye. The mean radiations of the spectrum, for which the energy is at a maximum, are those for which the human eye works most economically.—The emission of the n -rays (Blondlot rays) by the human organism, especially by the muscles and nerves, by M. Aug. **Charpentier** (see p. 182).—The action of a mixture of oxygen and hydrochloric acid on some metals, by M. Camille **Matignon**. Most of the metals of the platinum group are attacked by hydrochloric acid in the presence of air. Palladium and ruthenium are slowly attacked in the cold; iridium, rhodium and osmium at 150° C., the chloride being formed in all cases.—On the constitution and properties of the silicon steels, by M. Léon **Guillet**. Only steels containing less than 5 per cent. of silicon can be utilised; after tempering, these steels offer great resistance to shock, this power of resistance being relatively higher in high carbon steels. The results agree with those of M. Osmond in proving the existence of two solutions of silicon in iron, the one Fe—Si, the other Fe—Fe₂Si.—A new method for determining the critical points in iron and steel, by M. O. **Boudouard**. A modification of the self-recording method of Saladin, in which only one thermo-couple is required instead of two.—On meteoric irons, by MM. F. **Osmond**

and G. **Cartaud**. Meteoric irons, on account of the extreme slowness of their cooling, show the normal state of equilibrium of the alloys of nickel and iron, whilst terrestrial alloys are in a metastable state.—On the preparation of the sesquioxide of iridium, by MM. C. **Chabrié** and A. **Bouchonnet**. The selenide was prepared by the action of a stream of hydrogen selenide upon a solution of an iridium salt. It is amorphous, insoluble in nitric acid, and gave figures on analysis corresponding to Ir₂Se₃.—On the acetates of the alkaline earths, by M. Albert **Colson**. No acetochloride of calcium or magnesium, corresponding to the known barium salt, could be isolated.—The action of bromosuccinic and dibromosuccinic acids upon the pyridine and quinoline bases, by M. Louis **Dubreuil**. The action varies with the base and the solvent; by varying the experimental conditions malic, fumaric, bromofumaric, bromomaleic, and acetylenedicarboxylic acids can be isolated.—On a new tri-iodophenol, by M. P. **Brenans**.—Stereoisomerism in the esters of substituted camphocarbonic and methylhomocamphoric acids. Ethylcamphocarbonic acid, by M. J. **Minguin**.—Mercurammonium iodides of the primary and tertiary amines, by M. Maurice **François**.—On the esterification of phosphoric acid by glycerol, by M. P. **Carré**.—The origin of pearls, by M. Louis **Boutan**.—On the elementary factors of heredity, by M. Georges **Coutagne**.—On the geology and subterranean hydrology of the Eastern Caucasus, by MM. A. **Yermeloff** and E. A. **Martel**.—The supposed alcoholic fermentation of animal tissues, by M. F. **Batelli**. The results of the experiments described confirm those of Cohnheim, the alcoholic fermentation of the sugar obtained *in vitro* by extracts of the organs of higher animals being due to the presence of micro-organisms, and not to the action of an enzyme or of a nucleoprotein of animal origin.—Contribution to the study of amylo-coagulase, by M. A. **Boidin**.—Functional correlations between the poison glands and ovary in the common toad, by M. C. **Phisalix**.—The conditions special to the circulation of the glands in activity, by MM. G. **Moussu** and J. **Tissot**.

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