UNIVERSITY AND EDUCATIONAL INTELLIGENCE

EDINBURGH.—Five Fellowships in connection with this University (the gift of an anonymous donor) of the value of 100*l.* each, for one year, but renewable for one or two further years at the pleasure of the Senatus Academicus, will be open to applicants in October next. There will be no examinations for election to these Fellowships, but Fellows will be elected by the Senatus Academicus after consideration of the qualifications and circumstances of the applicants. The Fellowships are open to any graduate of a Scottish University, not being more than thirty years of age at the date of application, and provided that he be not an assistant to any Professor, or an examiner in any department. They are intended for persons having attained some proficiency in, and who are desirous to prosecute, unprofessional study and research in one of the following subjects:—Mathematics (pure and applied), or experimental physics, chemistry, biology, mental philosophy, history, or the history of literature. Persons desiring to hold one of these Fellowships should address an application to the secretary of the Senatus, with statement as to previous course of study, and general purposes with respect to future work. Each Fellow will be expected to reside in Edinburgh during the winter and summer sessions of the University (1882-83) to prosecute his particular branch of study under the advice of the Professor to whose department the subject belongs; and within a year after his election to give evidence of his progress by the preparation of a thesis, the completion of a research, the delivery of a lecture, or in some other way approved by the Senatus Academicus. No other fellowship, scholarship, or bursary, in this or any other University, will be tenable together with one of the elective Fellowships.

THE budget commission of the French Chamber of Deputies have printed their estimates for public instruction for 1883. They claim 5½ millions sterling, irrespective of the sums granted by departments for the same purpose. About half of this sum is claimed for elementary instruction, exhibiting, an addition of more than 800,000*l.* on the credit given for 1882. This is in prevision of the working of the law of compulsory education. The more notable items are the following:—Government grant to the grammar schools for young ladies, 12,000*l.*; national library, extraordinary expenses for printing the catalogue, 2000*l.*; ordinary expenses, 21,000*l.*; other public libraries, 12,000*l.*; aid to men of science and letters, 8000*l.*; scientific travelling and exploring, 8000*l.*; College de France, 19,000*l.*; Museum of Natural History, 36,000*l.*; Institute of France, 28,000*l.*, of which 8000*l.* are granted to the Academy of Sciences; Academy of Medicine, 3000*l.*; School of Hautes-Etudes, 12,000*l.*; astronomical and meteorological establishments, 35,000*l.*; including a school for astronomers, which has been opened at the Observatoire of Paris, but will be closed as soon as the several French observatories will have procured a sufficient number of trained observers. The commission refuse to grant money to the meteorological observatory of Mount Ventoux.

SCIENTIFIC SERIALS

Journal of the Franklin Institute, June.—On the several efficiencies of the steam-engine, and on the conditions of maximum economy (continued), by R. H. Thurston.—Ninety miles in sixty minutes (continued), by W. B. Le Van.—Ringing bells, by J. W. Nystrom.—Radio-dynamics; universal phyllotaxy, by P. E. Chase.—A thermograph, a new apparatus for making a continuous graphical record of the variations of temperature, by G. M. Eldridge.—Electricity, by A. E. Outerbridge, jun.—An essay on mechanics and the progress of mechanical science, 1824-82, by F. Finley.—Device for increasing the dynamic effect of the pulsations of diaphragms and the like, by W. B. Cooper.—Influence of pulley-diameter on the driving power of flat belts, by R. Grimshaw.—Recent improvements in the mechanic arts, by F. B. Brock.

Bulletin de l'Academie Royale des Sciences de Belgique, No. 4.—History of the Imperial and Royal Academy of Sciences and Belles-Lettres of Brussels, by M. Mailly.—On the dilatation of alums, by M. Spring.—One word more on the determination of latitude, by M. Folie.—On the rocks of the island of Fernando Noronha, gathered during the *Challenger* expedition, by M. Renard.—On the state of vegetation, March 21, 1882, by M. Dewalque.—On the respiratory variations of the sanguineous pressure in the rabbit, by MM. Moreau and Lecrenier.—Mineralogical examination of the rocks which accompany the diamond in the mines of the Cape of Good Hope, by M. Meunier.

Reale Istituto Lombardo di Scienze e Lettere. Rendiconti, vol. xv., fasc. ix.-x.—On the nature and origin of tumours occasionally found free in the abdominal cavity, by S. Sangalli.—Presentation of a piece of wood from Brazil, with the apparent figure of a serpent, by Dr. Mantegazza.—On protistological examination of the water of Lake Maggiore, extracted at 60 metres depth, between Angera and Arona, by S. Maggi.—Zoological notes, by S. Pavesi.

Rivista Scientifico-Industriale, April 30 and May 15.—New seismic apparatus of the Brothers Brassart, by S. E. Brassart.—The comets seen in the last ten years and Comet Wells, by S. Zona.—On sounds produced by outflow of liquids, by S. Martini.—On succinine, by Drs. Funaro and Danesi.—*Sinaxylon muricatum*, Fab., in the Romagna, by S. Rovelli.—The story of a flint stone, by S. Mascarine.

SOCIETIES AND ACADEMIES

LONDON

Zoological Society, June 20.—Dr. A. Günther, F.R.S., vice-president, in the chair.—The Secretary exhibited a series of the diurnal and nocturnal Lepidopterous insects bred in the Insect House in the Gardens during the present season, and called attention to several specimens of clear-winged Moths (*Sesiidæ*), a group of insects which had not before been exhibited in the Insect House. The cocoon of *Cricula trifenestrata*, together with the imago, was also exhibited.—Mr. W. A. Forbes made remarks on the presence of a rudimentary hallux in certain birds—the Albatrosses and two genera of Woodpeckers (*Tiga* and *Picoides*), commonly described as being three-toed, and exhibited preparations showing its condition in the birds in question.—Prof. Owen read the twenty-fifth of his series of memoirs on the *Dinornis*. The present communication gave a description of the head and feet, with their dried integuments, of an individual of a species supposed to be called *Dinornis didina*. These specimens had been obtained by Mr. H. L. Squires at Queenstown, South Island of New Zealand, and being parts of one individual tended to elucidate in an unlooked for degree the external characters of the Moa.—A second communication from Prof. Owen contained some observations on *Trichina spiralis*.—Prof. E. Ray Lankester gave a description of the valves of the heart of *Ornithorhynchus paradoxus*, and compared them with those of man and the rabbit. Prof. Lankester also made some observations on the *fossa ovalis* of the Monotremes.—Prof. Huxley, F.R.S., read a description of the respiratory organs of *Apteryx*, which he showed did not differ fundamentally from the Avian type, and pointed out that neither of the structures that had been termed diaphragms in the *Apteryx* was really in correspondence with the Mammalian diaphragm.—Mr. W. A. Forbes read the sixth of his contributions to the anatomy of Passerine birds. In the present communication the author showed that *Xenicus* and *Acanthisitta*, hitherto considered to be allied to *Certhia*, *Sitta*, and *Sittella*, were really mesomyodian forms, most nearly allied perhaps to *Pitta*. The discovery of such low forms of Passerine birds in New Zealand was a fact of considerable interest, none of the allied groups being at all represented there at the present day.—A communication was read from Mr. Sylvanus Hanley on the shells of the genus *Leptomya*, to which was added the descriptions of two new species.—Mr. Sclater read a note on Rüppell's Parrot, and showed that the more brightly-coloured individuals, ordinarily supposed to be the males of this parrot, were really the females.—A second paper from Mr. Sclater gave the description of two new species of the genus *Synallaxis* from the collection of Messrs. Salvin and Godman.—A communication was read from Prof. M. Watson containing an account of the muscular anatomy of *Proteles* as compared with that of *Hyæna* and *Viverra*.—Mr. Oldfield Thomas read a paper containing a description of a new species of Rat from China. The specimens upon which the author had founded the description had been sent by the Abbé Armand David to Mr. Milne-Edwards, of Paris, who had placed them in the hands of Mr. Thomas for identification. The author proposed to call this Rat *Mus Edwardsi*.—A communication was read from Mr. E. W. White, F.Z.S., of Buenos Ayres, in which he gave an account of the birds collected by him in the Argentine Republic.—Mr. R. Bowdler Sharpe read the descriptions of two apparently new

species of *Erythropygia*, one from the Zambesi, the other from the Congo River, which he proposed to call respectively *E. zambesiana* and *E. ruficauda*.—A second paper by Mr. Sharpe contained the description of a new Flycatcher which had been obtained by the late Governor Ussher on the Gold Coast. The author proposed to call it *Muscicapa ussheri*, in acknowledgment of the services which its discoverer had rendered to ornithological science.—A communication was read from Mr. F. Moon on the Lepidoptera collected by the Rev. J. H. Hocking, chiefly in the Kangra District, N.Y. Himalaya. The present communication, being the second on the same collection, contained the descriptions of seven new genera and of forty-eight new species. An account of the transformation of a number of the species was also given.

Physical Society, June 24.—Prof. Clifton, president, in the chair.—New Members: Prof. Bartholomew Price, Principal Viriamu Jones.—Prof. G. Carey Foster moved a vote of thanks to Prof. Clifton for the excellent reception accorded to the Physical Society at Oxford on the preceding Saturday, and drew attention to the high efficiency of the Clarendon Laboratory and the admirable provision made for the teaching of physics at Oxford. Prof. W. G. Adams seconded the motion, and endorsed Prof. Forster's views of the position of physical science on the Isis. Prof. Clifton in response to the vote, stated that the University of Oxford had liberally supported him in organising the Clarendon Laboratory, giving him all the funds he required, and showing a laudable desire to put physical teaching on the best possible footing in Oxford.—Prof. C. A. Bjerknes of Christiania, was then introduced to the meeting, and, assisted by his son, M. Vilhelm Bjerknes, delivered a lecture on "Hydrodynamic Analogies to the Phenomena of Electricity and Magnetism," which was illustrated by experiments and projections on the screen. Prof. Bjerknes has been engaged in tracing these analogies for the last twenty-five years, at first mathematically, but latterly by experiments in verification of the deductions from his formulæ. These experiments were shown in the Paris Electrical Exhibition last year, and have been published repeatedly in this country. Dr. Bjerknes has, however, advanced beyond the results there shown. These were chiefly confined to illustrating the static attractions and repulsions of electricity and magnetism; but he has now taken up the subject of electrodynamic attractions and repulsions. The former effects are shown by brass balls oscillating, or by small tambours pulsating, near each other in water. These motions are communicated to the balls and drums by pulses of air transmitted from an ingenious air-pump or bellows along india-rubber tubes. A pulsating drum corresponds to a magnetic pole; an oscillating body to a magnet. When two tambours are vibrating near each other in like phase, they attract; when in unlike phase, they repel each other. The same holds true of the oscillating balls. The motion-lines round these bodies correspond to the lines of force round magnets, as was demonstrated by a hollow ball oscillating or a stem, and tracing its movements in ink on a glass plate. All the phenomena of magnetic forces were illustrated in this way by Prof. Bjerknes, including diamagnetism, which was shown by means of pith cylinders lighter than the water or medium of oscillation. A pulsating drum or oscillatory ball repelled the cylinder of pith, whereas it attracted a cylinder of wax, which is heavier than the water. The more novel part of the experiments consisted in representing the attraction between two electric currents flowing in the same direction by means of two cylinders about five inches long and one inch in diameter, oscillating round their longitudinal axes at close quarters in the water. The cylinders were oscillated by means of a pulsating tambour which communicated its motion to them by a toothed gearing on their ends. Attraction resulted when the oscillations of the cylinders were opposed to each other, and repulsion when they were in the same direction. This is an inversion of what might have been expected to take place after the theory of Ampère. A square of four oscillating cylinders was also formed, and a fifth cylinder oscillated inside it, the attraction or repulsion exerted on the latter being observed. A hydrodynamic galvanometer was made by placing an oscillating ball (which corresponds to a magnet) beside an oscillating cylinder, the result being a deflection of the ball according to the direction of the oscillation of the cylinder. The experiments were witnessed by a full meeting, which accorded a hearty vote of thanks to Dr. Bjerknes.—A paper by Dr. C. R. Alder Wright, F.R.S., was taken as read. It was on the determination of chemical affinity in terms of electromotive force (Part vi.), and on the relations between the E.M.F. in cells constructed like Daniell's cells, but containing different metals, and the chemical affinities involved in their actions. The cells employed were constructed of cadmium and copper, and their sulphates, zinc and cadmium and their sulphates, zinc and silver and their sulphates, cadmium and silver and their sulphates, copper and silver and their sulphates. In all cases the sulphate solutions were of equal molecular strengths. The general result is that the effect of a given alteration in the character of the plates opposed to cadmium or silver was found to be practically identical with that of the same alteration in the case of a Daniell cell. Volta's law of the summation of E.M.F. forces sensibly holds true in the cases examined. These cells also behave like a Daniel under variations of current density. The Society meets again in November.

Geological Society, June 21.—J. W. Hulke, F.R.S., president, in the chair.—Robert Bruce Napoleon Walker was elected a Fellow of the Society.—The following communications were read:—On *Thecospondylus horneri*, a new Dinosaur from the Hastings Sand, indicated by the sacrum and the neural canal of the sacral region, by Prof. H. G. Seeley, F.R.S., F.G.S.—On the dorsal region of the vertebral column of a new Dinosaur, indicating a new genus, *Sphenospondylus*, from the Wealden of Brook, in the Isle of Wight, preserved in the Woodwardian Museum of the University of Cambridge, by Prof. H. G. Seeley, F.R.S.—On organic remains from the Upper Permian strata of Kargalinsk, in Eastern Russia, by W. H. Twelvetrees, F.G.S. In this paper the author described the Kargalinsk steppe, north of Orenburg, as consisting of a grassy, treeless, undulating steppe, with sluggish, winding streams, in the banks of which, and in the ravines, the exposures of subsoil show only red marl or sandstone devoid of fossils. Mine-borings and shafts go down through red, yellow, and grey sandstones and red and white marls, which are fossiliferous wherever the beds of copper-ore exist. On the eastern border of the steppe there are two protrusions of limestone, with *Terebratula elongata*, *Loxonema*, &c., on outcrops running nearly north-west and south-east, which throw off the cupriferous sands east and west. The western of these outcrops in its southern continuation near Sakmarsk is charged with Permian Fossils, including the above; the same limestone, regarded by the author as belonging to the Zechstein, crops up in other places, and apparently underlies the whole basin of the steppe, the upper sandstones resting conformably upon it. From the latter the author gave the following list of fossils:—*Cardiopteris Kutorgæ* (=*Aroides crassispatha*), *Walchia biarmica* and *piniformis*, *Lepidodendron*, *Schizodendron tuberculatum*, *Anomorrhœa Fischeri*, *Caulopteris?*, *Calamites infractus*, *Suckowi gigas* and *leioderma*, *Unio umbonatus*, *Platyops Richardi* (a Labyrinthodont), *Rhopalodon Wangenhäuseri*, *Cliorhizodon*, *orenburgensis*, *Deuterosaurus*, and various Labyrinthodont and Reptilian remains. Upon these the author remarked that the list of plants has a Palæozoic aspect, while the Reptilian remains seem to be more of a secondary character. After consideration of all the facts, the author came to the conclusion that possibly some of the beds in the central part of what is known as the Permian basin may be passage-beds between the Permian and Trias, but that the Kargalinsk series includes the uppermost beds of the Permian.—The Rhætics of Nottinghamshire, by E. Wilson, F.G.S.—On the Silurian and Cambrian strata of the Baltic provinces of Russia, as compared with those of Scandinavia and the British Islands, by Dr. F. Schmidt. Communicated by Dr. H. Woodward, F.R.S., F.G.S. The Cambrian and Silurian strata in question are found stretching over an area 400 miles long by 80 miles wide. The country occupied by these strata is a nearly uniform plain covered by glacial deposits, but sections are presented by the sea-cliffs, which are from 90 to 150 feet high. The strata consist mainly of marls and limestones, arenaceous deposits being rare, and they form a continuous series from the base of the Cambrian to the top of the Silurian, the whole of these strata being in conformable succession and unconformably overlain by the Devonian. Although the representative of the Cambrian or Primordial Silurian contains neither *Paradoxides* nor *Orlenus*, nor, indeed, any Trilobites whatever, but only Lingulidæ and Graptolites, yet its stratigraphical position leaves no doubt as to its age.—On Chilostomatous Bryozoa from Bairnsdale (Gippsland), by A. W. Waters, F.G.S.—The Silurian species of *Glauconome*, and a suggested classification of the Palæozoic Polyzoa, by G. W. Shrubsole, F.G.S., and G. R. Vine.—On the cause of the depression and re-elevation of the land during the glacial period, by T. F. Jamieson, F.G.S.

Edinburgh

Royal Society, June 19.—The Right Hon. Lord Moncreiff, president, in the chair.—Prof. Tait, in Part III. of his paper on Mirage, called attention to an elaborate Memoir on the subject by Biot, who had anticipated him in many particulars. Biot had pointed out the existence of the curve of vertices, which Prof. Tait made the basis of his discussion, but had not made any use of it, preferring to investigate the phenomena by means of the caustics—a much more difficult method. Further, in his explanation of the appearances described by Vince, Biot regarded the rays as being for the first part of their course concave upwards—a state of affairs which Prof. Tait regarded as very unlikely. Such a point, however, could be settled only by careful measurements of the dip of the horizon taken at different heights above sea-level.—Dr. Dobbie and Mr. G. G. Henderson, B.Sc., communicated the results of their analysis of the red resin obtained by Prof. Bayley Balfour, from the Socotra species *Dracæna Cinnabari*, and of their comparisons between it and other specimens of dragon's-blood. These they found to differ considerably, specimens going by the same name being often markedly distinct in their chemical properties. They concluded that of the several distinct and well-defined varieties which they had investigated, each was probably derived from a distinct genus, different species of the same genus yielding the same resin.—Prof. Crum Brown read a paper by the Rev. J. L. Blake, on breath pressure. This paper was a careful analysis of the individual efforts or distinct breath-pulses by which articulated utterance is effected, and by which emphasis is regulated; and was illustrated by examples selected from various authors.—In a preliminary notice on the effect of moisture on the electric discharge, Dr. Macfarlane and Mr. Rintoul mentioned that they had obtained indications that the difference of potential required to cause the discharge between two plates was greater in dried than in undried air.—Prof. Crum Brown communicated a note by Mr. A. P. Laurie and Mr. C. I. Burton, on the heats of combination of the metals with the halogens, which they had compared by the electrometer method, assuming Sir W. Thomson's formula which expresses the electromotive force of a cell in terms of the thermal equivalent of the chemical action. The results obtained were in fair agreement with those of direct calorimetric experiment.

Göttingen

Royal Society of Sciences, August 6, 1881.—On the Biehler collection of gems, by F. Wieseler.

December 3, 1881.—Observations in the Gauss Magnetic Observatory, by K. Schering.

May 6, 1882.—On the geological structure of the neighbourhood of Göttingen, by A. von Kœnen.—Contribution to knowledge of the inflammatory force of retarded discharges, by W. Holtz.

June 13, 1882.—Whence comes the x of mathematicians, by P. de Lagarde.

Paris

Academy of Sciences, July 3.—M. Jamin in the chair.—It was announced that the *Romanche*, with the expedition for Cape Horn, would sail that week. Good wishes were expressed, also thanks to the Naval Minister for carrying out the Academy's request.—On the appearances of the electric arc in sulphide of carbon vapour, by MM. Jamin and Maneuvrier. When a little of the sulphide is brought into the vacuous receiver, there occurs an explosion, as it were, of brilliant unbearable light between the (parallel) carbons; the persistent arc is of horse-shoe form, and pale green, and a long flame rises above. The spectrum consists of four channelled spaces, quite alike, in red, yellow, green, and violet, the green, however, being most luminous. If air have remained in the jar, sulphur is deposited on the walls; if not there is a brown deposit, probably a compound of sulphur and carbon.—On the electrolysis of oxygenated water, by M. Berthelot. The minimum force required was a Daniell. The electrolytic reactions and heat consumed are shown to be in correlation with the electromotive forces.—On the electromotive force of a zinc-carbon element, by M. Berthelot. His experiments (with the Mascart electrometer) show the unfitness of the zinc carbon element to give a constant electromotive force.—M. Berthelot gave some observations on the Channel Tunnel, which he had visited.—Analysis of the mechanism of locomotion by means of a series of photographic images on one plate, representing successive phases of the motion, by M. Marey.—On the second comet of 1784, by M. Gyldén.—On the decomposition of protochloride of gallium by water, by M. Lecocq de Boisbaudran. Metallic gallium is dissolved in the cold state in concentrated hydrochloric acid. The The clear liquid produced, left to itself, yields gas very slowly, but if water be added, "in torrents."—On the mechanism of stoppage of hemorrhage, by M. Hayem. The hematoblasts play an active and considerable part in it, becoming adhesive when they reach the edge of a wound (as when they meet a foreign body), accumulating, stopping others, and so narrowing the orifice. The other elements of blood and the formation of fibrine have only a secondary *rôle*.—MM. Pellicot and Jaubert recommended sulphate of iron as a remedy for phylloxera.—On a new series in elliptic functions, by M. Faa de Bruno.—On entire transcendants, by M. Poincaré.—Researches on the use of crusher manometers for measurement of pressures developed by explosive substances, by MM. Sarrau and Vieille. The authors seek to render the indications of these instruments more definite.—On the theory of equipotential figures obtained by the electro-chemical method, by M. Guébhard.—Determination of the densities of vapour in glass globes at the boiling temperature of selenium, by M. Troost. With glass globes of small fusibility, and 300 c.c. capacity, he finds iodine vapour to have still at 665° a coefficient differing very little from that of air, while even at 440° its coefficient of compressibility is notably different from that of air. Sulphur vapour passes, like oxygen, from one allotropic state to another as the temperature rises.—Some remarks on didymium, by M. Clève.—Action of sulphuretted hydrogen on chloride of nickel, by M. Baubigny.—On the isomerism of cupreous sulphites, by M. Etard.—Reduction of certain silver ores by hydrogen and the wet process, by M. Laur. Wherever hydrogen appears in a liquid containing sulphide, chloride, bromide, and iodide of silver, a hydrogen acid is formed, and the silver passes to the metallic state.—Action of chloroform on β-naphtol, by M. Rousseau.—Introduction into industry of vanadium extracted from the basic scoriæ of Creusot, by MM. Witz and Osmond. The Creusot scoriæ contain vanadium estimated at 60,000 kg. annually. The authors have been able to extract either metavanadate of ammonium, or new vanadic products specially applicable to manufacture of aniline blacks with chlorates.—On an anomaly of the eye, by M. Dareste. He has noticed arrested development of the eye (reduced to the secondary optic vesicle) in anomalous or monstrous embryos.—On the histology of *Ciona intestinalis*, by M. Roule.—On the development of Gregarinæ and Coccidæ, by M. Schneider.—Use of oxygenated water in surgery, by MM. Peau and Baldy. The substance may be advantageously substituted for alcohol or carbolic acid in treatment of wounds, ulcerations, deep abscesses, &c. M. Bert remarked on the killing of microbes, and the incessant libation of oxygen to the wound.—Researches on a new cardiac medicament; physiological properties of *Convellaria maialis* (May lily), by MM. See and Bochefontaine. It acts like digitalis, but is without certain drawbacks to that substance. In man it has diuretic properties superior to those of any known agent.

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