UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The completion of the fiftieth year of Sir George Stokes' tenure of the Lucasian Professorship will be celebrated by the University on June 1 and 2, 1899. Invitations to assist will be issued to distinguished representatives of universities and learned societies, British and foreign. A grant of 400*l.* has been made by the University for the purpose, and it is understood that some permanent memorial of the occasion will be provided.

The Walsingham Medal has been awarded to Mr. J. Graham Kerr, of Christ's College, for his researches on *Lepidosiren*. Mr. A. C. Hill, of Trinity, is *proxime accessit*, and five other essays are pronounced by the adjudicators to be of a high order of merit.

A John Lucas Walker Studentship in Pathology, value 200*l.* a year for three years, is about to be vacant. Candidates, who may be of either sex, are to send in their names to Prof. Kanthack by January 18, 1899.

An Isaac Newton Studentship in Astronomy, value 200*l.* a year for three years, will be filled up next term. Candidates must be B.A.s under the age of twenty-five on January 1, 1899. Names are to be sent into the Vice-Chancellor between January 16 and 26

The Sheepshanks Telescope Committee report that the erection of the polar-reflecting photographic telescope at the Observatory, with its building and dome, is nearly complete. Dr. Common has provided the mirror, and the object-glass is one of Cooke's triple lenses. The tube and apparatus are by Messrs. Grubb. The adjustments and tests have still to be carried out.

Mr. Shipley and Mr. Cronin are to represent the University at the centenary of the Imperial Military Academy at St. Petersburg at the end of this month.

INFORMATION of two examples of munificence to education and science reaches us from the United States. Mrs. Emmons Blaine has given 250,000 dollars to Chicago University for the establishment of a college for teachers. Miss Anna T. Jeanes has recently presented the Academy of Natural Sciences of Philadelphia with 20,000 dollars, the income to be used for museum purposes.

THE following Scholarships have been awarded in connection with the present Session 1898-99 of the Central Technical College:—Clothworkers' Scholarship, 60*l.* a year, to A. J. Cook; Mitchell Scholarship, 50*l.* a year, to R. H. Collins; John Samuel Scholarship, 30*l.* and free education, to F. C. Hounsfield; Institute's Free-Studentships to R. H. Buckie, A. W. Harrold, and W. H. P. Brounger.

THE *British Medical Journal* states that Mr. Alfred L. Jones has offered the sum of 350*l.* a year to establish and maintain a laboratory in Liverpool for the study of tropical diseases. The laboratory will be opened in association with the Royal Southern Hospital, and a Committee has been formed to carry out the scheme in connection with the hospital and with University College.

THE first number of a new monthly magazine, devoted to the principles and practice of teaching the subjects usually studied in secondary schools—by which is meant all schools, public and private, other than public elementary schools—will be published by Messrs. Macmillan in the middle of January next, under the title of *The School World*. The magazine is not designed to be an educational newspaper so much as a periodical for the publication of articles on methods of teaching, and of notes by experienced teachers on the treatment of difficulties met with in actual school work. Rational methods of teaching will be advocated so far as they are practicable under existing conditions in secondary schools, and articles will be published showing how they can be carried out. Among the contributors to the scientific section of early numbers of the magazine will be Prof. L. C. Miall, on experimental natural history; Prof. G. B. Mathews, on the teaching of algebra; and Dr. Francis Warner, on physical observations of boys and girls in schools. Other scientific subjects to be dealt with are the stars month by month, current geographical topics, and experimental general science.

SCIENTIFIC SERIALS.

Bulletin of the American Mathematical Society, November.—The first "Cambridge Colloquium" was held at Buffalo in 1896. In consequence of the British Association holding its meeting in 1897 at Toronto there was no Colloquium held in that year. The second Colloquium was held in the present year (August 22-27), at Harvard University. Two courses of six lectures each were delivered, the lecturers being Profs. Osgood and Webster. The latter gentleman took as his text "The partial differential equations connected with wave propagation"—an abstract of this course is to be given in a future number. Prof. Osgood lectured "On some methods and problems of the general theory of functions." Lecture i. was devoted to Picard's theorem, and the application of Riemann's geometric methods in the general theory of functions. Lectures ii. and iii. discussed the representation of multiple-valued functions by means of single-valued functions of a parameter, treated geometrically by Riemann's methods and also Poincare's theorem. Lectures iv. and v. dwelt on some recent study of the relation between the properties of a function defined by a power series and the coefficients of that series. The last lecture was on certain Cantor's sets, and their application in a question concerning Cauchy's definition of an analytic function. The lectures are very fully reported, and illustrated with diagrams and bibliographical notes. The "Colloquium" is a very interesting and useful addition to the ordinary meetings of the Society. The above meeting was held at the same time as the American Association for the Advancement of Science held its semi-centennial meeting, at which about 900 members were present. The section of mathematics and astronomy was well attended. The committee of the section accepted twelve papers in pure mathematics, thirteen in applied mathematics, and sixteen in astronomy. The titles of these are given, and short abstracts of their contents follow. Interesting notes and a list of recent mathematical publications close the number. The *Bulletin* well maintains the high position it has attained.

American Journal of Mathematics, vol. xx. No. 4, (October 1898).—Sur l'intégration hydraulique des équations différentielles, by M. M. Petrovitch. The author writes: "Tous les intégraphes et les appareils pour l'intégration graphique des équations différentielles, proposés jusqu' aujourdhui, sont fondé sur l'emploi de certains principes cinématiques, p. ex. sur les propriétés des roulettes (*cf.* the Catalogue of Models, Apparatus and Instruments, by W. Dyck, Munich, 1892-3)." He shows briefly that these integrations can be effected in quite another way. "Supposons que l'on fasse immerger un corps solide M plus ou moins profondément dans le liquide contenu dans un vase B. Le niveau du liquide montera ou s'abaissera d'après une certaine loi dépendant dé la forme du corps M et du vase B et ces formes une fois fixées, la variation de la hauteur du niveau y, comptée à partir d'un plan horizontal fixe, p. ex. à partir de la face inférieure du vase B ne dépendra que de la distance x entre l'extrémité e de la tige ef et la face inférieure du vase B." The principle is applied to the graphical integration of a certain type of differential equations of the first order. The article is illustrated with a few diagrams.—On the hyperelliptic sigma functions, by H. F. Baker. This memoir, which occupies pp. 301-384, appears to be a brilliant contribution to the literature of the Riemann surface.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 24.—"The Origin of the Gases evolved on heating Mineral Substances, Meteorites, &c." By Morris W. Travers, D.Sc. Communicated by Prof. W. Ramsay, F.R.S.

Conclusions.

It would appear that the only evidence on which the assumption that gases of a permanent character, such as hydrogen, carbon monoxide, nitrogen, helium, and argon, exist in the free state in the mineral substances from which they are evolved on heating, rests on certain observations with regard to the cavities which can sometimes be detected by microscopic examination.

The cavities may be either apparently empty or they may contain liquid, and when the mineral is warmed the liquid

disappears at a temperature which is a few degrees below the critical point of carbon dioxide or of some hydrocarbon. The fact that the critical temperature of the liquid is a little below the point corresponding to carbon dioxide, in the case of a mineral containing that substance is not, however, of very great significance as pointing to the presence of a permanent gas. A small quantity of methane would produce the same result (Kuenen, *Phil. Mag.*, 1897).

Further, although it can be shown that *compact* minerals do enclose carbon dioxide and hydrocarbons, gases which can easily be liquefied, the analogy cannot be extended to gases such as hydrogen and helium in connection with minerals like chlorite, mica, and clevite, which exhibit many cleavages.

On the other hand, there is, as I have endeavoured to show, a considerable amount of evidence in favour of the theory which I have put forward:—That in the *majority of cases* where a mineral substance evolves gas under the influence of heat, the gas is the product of the decomposition or interaction of its *non-gaseous* constituents at the moment of the experiment. The results of such experiments cannot, therefore, serve as basis for speculation as to origin and history of the substances in question.

Geological Society, November 2.—W. Whitaker, F.R.S., President, in the chair.—Sir A. Geikie drew attention to some specimens on the table which had been collected by the Geological Survey from the Silurian rocks of County Tipperary. These contained impressions that bore a close resemblance to flattened and drawn-out graptolites, and others that might be taken for mollusca or phyllopoda enlarged by cleavage. It seemed to him, however, extremely doubtful whether these forms were truly of organic origin. They were exhibited in the hope that the palaeontologists in the Society might be able to throw some light upon them from the zoological side.—Dr. G. J. Hinde exhibited and commented on specimens of Devonian rocks sent by Prof. Edgeworth David and Mr. Pittman from the railway-section at Tamworth, New South Wales, which had been received since their paper was read.—Note on a conglomerate near Melmerby (Cumberland) by J. E. Marr, F.R.S. In this paper the author describes the occurrence of a conglomeratic deposit which shows indubitable effects of earth-movement, not only on the included pebbles, but also on the surface of one of the deposits. The rocks are coloured as basement Carboniferous rocks on the Geological Survey map. Sir A. Geikie remarked that in his opinion the author had completely proved the point sought to be established. The peculiar features of the conglomerate described in the paper were obviously due to earth-movements, and not to glacial action. At the same time, while frankly admitting the explanation of the case now brought forward, he held that conclusive evidence had been obtained of glacially-striated boulders in old geological deposits. Other speakers supported Dr. Marr's view that the surface-features of the stones exhibited were due, not to glacial action, but to earth-movements. The author, in reply, stated that he had brought the case forward simply as an example which might be appealed to in future discussions, as showing exceptionally good indications of the various features produced by slickensiding.—Geology of the Great Central Railway (New Extension to London of the Manchester, Sheffield and Lincolnshire Railway): Rugby to Catesby, by Beeby Thompson.—On the Remains of *Amia* from Oligocene Strata in the Isle of Wight, by E. T. Newton, F.R.S.

Entomological Society, November 16.—Mr. R. Trimen, F.R.S., President, in the chair.—Mr. Tutt showed, for Mr. Herbert Williams, a series of specimens of *Pararge egeria* bred from eggs laid in July. A portion of the brood were forced, and the imagos, which emerged in November and December of the same year, showed marked darkening of the hind margin of the under side of the hind wings, and were of a greyer colour than those which appeared at the normal time. He also exhibited a batch of fifty specimens of *Amphidasys betularia* bred from ova deposited by a female captured in Essex. The progeny ranged from a colour rather lighter than the normal form to a blackish tint almost equal to that of var. *doubledayaria*; all intergrades were represented without sign of discontinuity.—Mr. H. J. Elwes gave an account of a journey undertaken by him in June and July of the present year to the Russian portion of the Altai mountains, partly for sport and partly to investigate the distribution of insects in that region, and the line of demarcation between the Eastern and Western Palaearctic sub-regions. He exhibited samples of 141 species of butterflies taken by himself. Of these many had not been previously recorded from the region, of which the total number of species now stood at 184; his list showed that the lepidopterous fauna had a more European and Siberian character than had been previously supposed, or than Seebohm had found to exist in the avifauna. The number of undescribed species taken was small, but several forms were previously known only from remote localities, such as *Melitaea iduna*, hitherto recorded from the fells of Lapland. Few Heterocera were taken, but among them was the third recorded example of *Arctia thulea*, Dalm.—Dr. A. G. Butler communicated a paper on some new species of African Pierinae in the collection of the British Museum, with notes on seasonal forms of *Belenois*.

Linnean Society, November 17.—Dr. A. Günther, F.R.S., President, in the chair.—Prof. Stewart, F.R.S., exhibited and made remarks on the skull of a fox that was described and figured by Bateson in his work on variation. Both upper canines had divided crowns. He also exhibited the double tusk of an Indian elephant. The tusk was two feet in length, and had a deep groove on its anterior and posterior surfaces. He considered that in both cases the condition was probably due to partial cleavage or grooving of the dental papilla. The President, referring to the exhibition of a somewhat similar tusk at the previous meeting, indicated the points in which the two examples differed.—A paper was read by Mr. F. Pickard Cambridge on some spiders from Chile and Peru, collected by Dr. Platte of Berlin. The collection was made during a journey extending from Tumbez, in Northern Peru, down the coast of Chile to Cape Horn, and contained nineteen species, of which seven proved to be new to science.—Mr. Spencer Le M. Moore read a paper entitled "The botanical results of a journey into the interior of Western Australia; with some observations on the nature and relations of the desert flora, and on the probable origin of the Australian flora as a whole." The author briefly sketched the physical and botanical features of the West Australian desert, indicating the parallel of 30° S. as, at least in the Coolgardie district, the dividing line between two subfloras. Flowering takes place almost entirely in spring-time, when alone the conditions are favourable to it. Statistics of the desert-flora were then given. These comprise 867 known species, of which 860 are Phanerogams, referable to 319 genera, distributed among 73 natural orders. Of the flora 58 per cent. consist of species ranged under 8 orders, with *Compositae* and *Leguminosae* heading the list, leaving 42 per cent. to be shared between the remaining 65 orders. The author disbelieved the current theory of Scandinavian predominance; and the prevalence in Eastern Australia of forms of Indo-Malayan facies was held to be due, in great measure, not to immigration, but to descent from the primitive Tertiary flora. Moreover, the balance of exchange between Indo-Malaya and Australia in favour of the former area, was considered as coming under the doctrine of chances, and not as implying any inherent superiority of the one flora over the other. While in Europe the Australian, *i.e.* the xerophilous, element was, owing to change in climate, eliminated in favour of the present hygrophilous vegetation, in Eastern Australia the conditions remained as they were in earlier Tertiary times until desiccation set in. He held that this desiccation dates from an earlier period in Western Australia; and that this, together with the isolation of the Western portion of the continent in Secondary times by a sea, and later by stretches of desert, explains the floristic difference between the two halves of Australia.—Mr. C. B. Clarke, F.R.S., made some observations on the origin of the Australian flora, and on the dispersal northwards of species from the Antarctic.—The President made some remarks by way of comparing the botanical statistics mentioned by Mr. Moore with the results obtained by zoologists in Australia, both as regards the character and origin of the fauna.

Zoological Society, November 29.—W. T. Blanford, F.R.S., Vice-President, in the chair.—Mr. G. A. Boulenger, F.R.S., exhibited a dancing-stick from New Guinea, to which were attached as ornaments two imperfect skulls of the rare Chelonian *Carettochelys insculpta*, a species previously known only from a single specimen in the Australian Museum, Sydney. Mr. Boulenger also exhibited and made remarks upon a large female specimen of a sea-snake, *Distira stokesi*, which had been caught by Mr. F. W. Townsend in Kurrachee Harbour covered with a thick growth of green seaweeds.—Mr. C. W. Andrews

exhibited and made remarks on some bird remains which had been obtained from excavations at the Lake-dwellings near Glastonbury, Somersetshire, and among which were numerous bones of a Pelecan.—Mr. Oldfield Thomas read a letter which he had received from Señor Ameghino on the subject of the newly discovered mammal *Neomylodon*, giving further information, obtained from the Indians, as to its distribution, characters, and habits.—A communication was read from Dr. E. A. Goeldi on the Amazonian Lepidosiren, in which he recorded the capture of two further examples of this Dipnoan in the island of Marajo. Dr. Goeldi gave a short description of the physical features of the locality in which he had found Lepidosiren—a "pirisal" or papyrus-meadow. He also referred to the live specimen in his aquarium which had recently developed branches on its fore limbs. Dr. Goeldi pointed out the gill-like character of the fore limb, and adduced it as a support to the Gegenbaur theory of limbs. He also suggested the possibility that the so-called fore limb of Lepidosiren is not a true fore limb, but a persistent external gill. This paper was illustrated by the exhibition of three specimens of the Amazonian Lepidosiren, which Dr. Goeldi had forwarded for presentation to the British Museum.—Mr. F. G. Parsons read a paper on the anatomy of adult and foetal specimens of the Cape Jumping Hare (*Pedetes caffer*). In it the different systems—osseous, muscular, nervous, circulatory, digestive, &c.—were described in some detail, and contrasted with the corresponding parts in two Jerboas (*Dipus hirtipes* and *D. jerboa*).—A communication was read from Mr. F. O. Pickard-Cambridge on a small collection of spiders from Trinidad, West Indies. Specimens of six species were contained in the collection, of which three were described as new.—Mr. W. E. de Winton read some notes on the breeding of a female African Wild Ass (*Equus asinus*) in the Society's gardens, and called attention to certain facts as regards her offspring, which gave some support to the doctrine of telegony.—Mr. de Winton also read a paper describing the moulting of the King Penguin (*Aptenodytes pennanti*), as observed in a specimen in the Society's gardens. The author remarked that the specimen in question had lived in the gardens for sixteen months, and during that period had moulted only once.—A communication was read from Dr. A. G. Butler on a collection of butterflies made at Salisbury, Mashonaland, in 1898, by Mr. Guy A. K. Marshall. The collection contained specimens of sixty-five species, which were enumerated. Two new genera (*Torynesis* and *Tarsocera*) and one new species (*Aslanga marshalli*) were described in the paper.—Mr. G. A. Boulenger, F.R.S., read a third report on the additions to the Lizard Collection in the Natural History Museum, containing a list of this class (165 in number), new or previously unrepresented, of which specimens had been added to the collection since 1894.

CAMBRIDGE.

Philosophical Society, October 31.—Annual General Meeting.—Mr. F. Darwin, President, in the chair.—The following were elected officers for the ensuing year :—President, Mr. J. Larmor. Vice-Presidents : Mr. F. Darwin, Prof. Forsyth, Dr. Gaskell. Treasurer : Mr. Shipley. Secretaries : Mr. Newall, Mr. Bateson, Mr. Baker. Members of Council : Mr. H. Gadow, Mr. D. Sharp, Prof. J. J. Thomson, Mr. A. Berry, Mr. Wilberforce.—On the evaluation of a certain determinant, which occurs in the theory of statistics and of elliptic space, by Mr. A. Berry.—(1) Metrical relations between linear complexes, by Mr. J. H. Grace. In this paper are discussed the metrical relations which exist between the mutual moments and pitches of systems of four, five and six linear complexes. Some of the results are applied to a geometrical representation of a four-system of screws. (2) Apolar systems of quadrics.—Certain systems of quadratic complex numbers, by Mr. A. E. Western.—On Mittag-Leffler's theorem, by Mr. H. F. Baker.—The connection between the chemical constitution of a gas and the ionisation produced in it by Röntgen rays, by Prof. J. J. Thomson. The measurements of the ionisation produced by Röntgen rays in fourteen gases showed that the ionisation was connected with the chemical composition in a very simple manner. The ionisation was found to be an additive property.—On convection currents, and on the fall of potential at the electrodes in conduction produced by Röntgen rays, by Mr. J. Zeleny. During conduction through a gas exposed to Röntgen rays, convection currents are set up in the gas. When two parallel, plane electrodes are used, the motion of the gas begins symmetrically from the centre towards each of the plates. The motion is conveniently made visible by particles of ammonium chloride formed in the gas from ammonia and hydrochloric acid. Screening from the rays the space next to one of the electrodes increases the strength of the convection currents on that side. The cause of these currents is attributed to the motion through the gas near the electrodes of an unequal number of the two kinds of ions by means of which the conduction takes place.—On velocity of solidification, by Mr. H. A. Wilson. The relation between the velocity of solidification of a super-cooled liquid and the super-cooling has been investigated for a number of substances by G. Tammann and Friedländer (*Zeitschrift P. C.*, xxxiv. p. 152, 1897, and xxiii. p. 326, 1897). Assuming that the rate of solidification is directly proportional to the difference between the internal pressures in the liquid and solid and inversely proportional to the viscosity of the liquid, the velocity of solidification can be expressed by a simple formula.

November 28.—Mr. J. Larmor, President, in the chair.—(*a*) On the flame spectrum of mercury and its bearing on the theory of the distribution of energy in gases, by Prof. Liveing. The author had found that mercury heated in a flame of cyanogen, burning in oxygen, emitted at least two rays, at wave-lengths 2535 and 4358, which he had been able to photograph. The vibrations producing these rays must, he thought, be the result of a direct change of heat into vibratory energy; and if so, the ratio of the specific heats of mercury, at constant pressure and constant volume, proved only that, at the temperature of the compressed vapour in a sound wave, no very sensible proportion of the heat is converted into vibratory motion, though at a higher temperature a sensible proportion is so converted. This appears to negative the hypothesis that energy is always distributed equally in all the degrees of freedom of the molecules, as well as the assumption that a gas having 1·66 for the ratio of its specific heats must have monatomic molecules. (*b*) On the variation of intensity of the absorption bands of different didymium salts dissolved in water, and its bearing on the ionisation theory of the colour of solutions of salts. The author exhibited a series of photographs of the absorption bands produced by equivalent solutions of didymium nitrate and chloride, of which the strength was regularly graded, and the absorbent thickness varied.—Note on the vapour of iodine, by Prof. Dewar. The author had found that by careful distillation in vacuo films of iodine could be made so thin as to transmit light and exhibit the colours of thin plates by reflection. He exhibited experiments showing that at ordinary temperatures pure dry iodine emits vapour which, in a half-litre flask containing air, is sensibly coloured, whereas in similar circumstances, except that the air pressure was reduced, the colour is much less. This difference is enhanced as the temperature rises, so that at 100° it is very marked in a tube of only 1 cm. diameter.—On the partitions of numbers which possess symmetrical graphs, by Major Macmahon, F.R.S.

MANCHESTER.

Literary and Philosophical Society, November 15.—Mr. J. Cosmo Melvill, President, in the chair.—Dr. G. H. Broadbent described the development and life-history of *Vorticella putrina* by means of thirty-four diagrams made from his own investigations. The cyst is circular in shape, the contents being finely granular, and the only indication of life is given by the contractile vesicle. This at first contracts at rare intervals and very slowly, and after a time an oral canal appears which gradually becomes more distinct, whilst the contractions of the vesicle grow more frequent. When the vorticella emerges from the cyst, a small portion is at first protruded through a very small aperture in the cyst-wall, in shape like a bladder, this gradually increasing in size until the whole creature has emerged, the aperture meanwhile appearing not to increase in the least. It is remarkable that after full extrusion the cyst-wall remains as large and as circular as before, whilst the organism is much larger than the cyst, and the vesicle greatly increased in size, thus indicating that the creature has been under great pressure in the cell. After emerging, the vorticella may remain quiescent for a time, until the basal cilia are developed, when it swims rapidly away as a "free-swimming" form. It afterwards attaches itself by the basal portion to some foreign body, and begins to shoot out a stalk which increases in length, while cilia are developed at the oral end. "Detached" as distinguished from "free-swimming" forms

were described, and it was shown that the development of basal cilia was always identified either with attachment to or detachment from the stalk.

DUBLIN.

Royal Dublin Society, November 16.—Mr. W. E. Wilson, F.R.S., in the chair.—Sir Howard Grubb, F.R.S., Vice-President of the Royal Dublin Society, read a paper on the correction of errors in the distribution of time signals. After referring to the various methods that are in use for the purpose of time distribution and the difficulties to be overcome, he described a system which he had recommended for a large institution in England, in which the conditions were somewhat similar to those of the Royal Dublin Society, though on a very much larger scale. He proposed that the best regulator clock should be procured and made to serve as the controlling clock of the whole system, which, however, would be further checked once every twenty-four hours by a signal from Greenwich, this being very much the same system as adopted at the Royal Dublin Society. The controlling clock, however, in this case he proposed should be sealed up in an air-tight case and in an atmosphere of nitrogen, and this placed in an outer case, or jacket, also containing nitrogen. By this means a constant pressure can be kept in the inside case, and with due precautions such a clock can be kept under conditions of constant pressure and temperature, and therefore should be expected to give extremely good results. This clock is then used to control a piece of uniform motion clock worked by a device very similar to what he has adopted with such success for his astronomical instruments, which has now been tested for several years and given excellent results. This piece of uniform motion clock is further checked by the Greenwich signal, it being supplied with a device by which the services of a human being to receive the signal and correct the clock are dispensed with. By an automatic arrangement the signal is received by this clock and corrected by exactly the amount it varies at that moment from the true time, and further a register is made of the amount of that correction, which can be afterwards inspected and noted. This uniform motion clock then serves as the central or distributing clock for some 200 other clocks spread throughout the building, which are practically only dials worked from this distributing clock.—Prof. G. A. J. Cole exhibited a method of intensifying the coloration imparted to a Bunsen flame by potassium in silicates. The minute assay is decomposed in a bead of sodium carbonate, as described in the *Geological Magazine*, March 1898. The method is of service in estimating the nature of the undifferentiated ground mass in many igneous rocks.

PARIS.

Academy of Sciences, November 28.—M. Wolf in the chair.—On the relation which exists between the progressive motion and the motion of inclination in the safety bicycle, by M. J. Boussinesq.—A differential method for determining variations of latitude and the constant of aberration, by M. G. Bigourdan. The method described is purely differential, and hence the results are free from errors inseparable from absolute measurements. It is independent of the stability of the telescope, and since only zenithal stars are employed, practically independent of refraction.—On the measurement of small diameters, by M. Maurice Hamy. The application of the interference method of Fizeau and Michelson is difficult for faint stars, the bands being scarcely visible. In the modification suggested the slits have a width which is appreciable compared with the distance of their centres, and hence the formula of Michelson is inapplicable. An approximate formula for the method thus modified is developed by the author. On some types of partial differential equations of the second order, by M. E. Goursat.—On orthogonal systems, by M. Tzitzéica.—On the complex multiplication of Abelian functions, by M. G. Humbert.—The mechanical equivalent of heat and the specific heats of gases, by M. A. Leduc. An application of the formulae developed in previous papers to determination of J from air and carbon dioxide. The deviations found are very large, and are due to the difficulty of measuring accurately the specific heat at constant pressure of a gas. The inverse calculation of this latter constant from the experimental value of the mechanical equivalent would probably be the better application of the formulae.—On condensed oxides of rare earths, by MM. G. Wyrouboff and A. Verneuil. The power of polymerising with great ease under a variety of conditions is especially characteristic of the ceroso-ceric group of oxides, and many reactions in this group can be more satisfactorily explained by this hypothesis than by the assumption of the formation of basic salts.—Observations on the spectra of aluminium, tellurium, and selenium, by M. A. de Gramont.—On the aromatic urethanes of tetra-hydroquinoline, by MM. Cazeneuve and Moreau. The urethanes were obtained by the action of an excess of tetra-hydroquinoline upon the carbonates of phenyl, ortho-chlorophenyl, methoxy-phenyl, and α-naphthol.—On pulegenacetone, by M. Ph. Barbier.—Action of potash upon oxynitrocellulose, by M. Léo Vignon. The chief product of this reaction is oxypyruvic acid, $CH_2.(OH).CO.CO.OH$.—On a new crystalline principle extracted from *Artemisia absinthium*, by MM. Adrian and A. Trillat.—Researches on the means of increasing the adhesive power of copper solutions used for spraying diseased vines, by M. Joseph Perraud. Of the various substances tried, colophane proved to be by far the most effective, soap being the next useful.—Composition and food value of cheese, by M. Balland.—On a method of colouring living protoplasm by the pigments of fungi, by M. L. Matruchot.—Influence of anaesthetics on the formation of chlorophyll, by MM. E. C. Teodoresco and Henri Coupin. Chloroform or ether prevent the production of chlorophyll in etiolated plants exposed to the light. Used in quantities too small to completely prevent the formation of chlorophyll, the production of the green colouring matter was greatly retarded.—Geobotanical study of the flora of the high basins of the Sallanche and Trient, by M. Paul Jaccard.—On the discovery of fossils in the layers constituting in Provence the formation called *étage de Vitrolles*, and on the limit of the Cretaceous and Tertiary beds in the basin of Aix Bouches-du-Rhône, by M. G. Vasseur.—Measures proposed to avoid collisions at sea, by M. E. Lacoine.—Remarks concerning the green ray, by M. Piot-Bey.

NEW SOUTH WALES.

Royal Society, September 7.—Mr. G. H. Knibbs, President, in the chair.—Key to tribes and genera of Melanospermeae (olive-green seaweeds), by R. A. Bastow.—A study of the dialects of New Caledonia, by Jules Bernier, curator of the Musée Néo-Caledonienne. No less than twenty dialects are distinguished in New Caledonia, which are grouped into the following main divisions: the Southern, inclusive of the Isle of Pines; the Central; the Northern; and those parts of the Loyalty Islands peopled by Melanesians.—An interesting collection of photographs from the Don Dorrigo and Brush districts, New South Wales, chiefly geological, were shown by his Honour Judge Docker.—A new Eucalyptus oil was exhibited by Messrs. Baker and Smith of the Technological Museum, Sydney. On rectification this oil was found to contain a fraction boiling between 280°-290° C., equalling 18 per cent. of the whole, and which consisted almost entirely of eudesmol, comparatively in a pure condition. The fraction wholly crystallised in less than one hour.—The latest type of polariscope (Wright-Newton projecting polariscope) was exhibited by Dr. F. H. Quaife.

Linnean Society, October 26.—Prof. J. T. Wilson, President, in the chair.—On *Carabidae* from West Australia, sent by Mr. A. M. Lea (with descriptions of new genera and species, synoptic tables, &c.), by Thomas G. Sloane.—Descriptions of new species of Australian Coleoptera, Part v. by Arthur M. Lea.—A statistical note on variations in the flowers of *Anguillaria dioica*, R.Br., by C T. Musson. As is well known, *Anguillaria dioica*, R.Br. (N.O. *Liliaceae*), is widely distributed in extra-tropical Australia and Tasmania, and occurs under three forms—with male flowers only (without even rudimentary pistils), with female flowers only (without even rudimentary stamens), and in a polygamous condition (with male, and hermaphrodite flowers). But whether or no all three forms occur together throughout the area of distribution, and if so in approximately what relative numerical proportions are matters not ascertainable from present records. From the data collected it would appear that in the locality mentioned the tendency towards the condition of dioecism has reached an advanced stage.—Mr. North exhibited the skin of a fledgling fan-tailed cuckoo, *Cacomantis flabelliformis*, which he had caught on October 3 in a gully at Chatswood. It was being fed by its foster parents, a pair of rock warblers, *Origma rubricata*, whose nest was found in a dark recess in the rocks a few feet away. Usually the egg or young of this parasite is found in domed nests built in situations which are more or less exposed to the

sun's rays. That it is not a solitary instance of this cuckoo depositing its egg in the nest of this gloom-loving species is borne out by the fact that the same pair of rock warblers built again in a rocky chamber about two hundred yards away from their previous nesting site.

DIARY OF SOCIETIES.

THURSDAY, DECEMBER 8.

ROYAL SOCIETY, at 4.30.—Effects of Prolonged Heating on the Magnetic Properties of Iron: S. R. Roget.—On the Topographical Anatomy of the Abdominal Viscera, especially the Gastro-intestinal Canal: Prof. Addison.—Mathematical Contributions to the Theory of Evolution. VI. Reproductive Selection. Part I. Theoretical: Prof. Pearson. Part II. On the Inheritance of Fertility in Man: Prof. Pearson and Miss Lee. Part III. On the Inheritance of Fecundity in Thoroughbred Racehorses: Prof. Pearson, with assistance of L. B. Moore.—Nitragin and the Nodules of Leguminous Plants: Miss Maria Dawson.

MATHEMATICAL SOCIETY, at 8.—On Groups of the Order $pq\beta$: Prof. Burnside, F.R.S.—On Simultaneous Partial Differential Equations: J. E. Campbell.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Improvement in Magnetic Space Telegraphy: Prof. Oliver Lodge, F.R.S.—And, if time permit: Telegraphy by Magnetic Induction: Sydney Everard.

FRIDAY, DECEMBER 9.

PHYSICAL SOCIETY, at 5.—Longitudinal Vibrations in Solid and Hollow Cylinders: Dr. C. Chree, F.R.S.—On the Thermal Properties of Normal Pentane: J. Rose-Innes and Dr. Sydney Young F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 8.—The Division Errors of the Greenwich Transit-Circle: F. W. Dyson and W. G. Thackeray.—On a New Instrument for Measuring Astrophotographic Plates: Dr. David Gill.—Observations of the Leonids, 1898 November, made at Cambridge Observatory: A. R. Hinks.—Note on the Effect of Wear on the Errors of Micrometer Screws: Dr. David Gill.—On a Probable Instance of Periodically-Recurrent Disturbances on the Surface of Jupiter: W. F. Denning.—Observations of Comet Coddington (*c* 1898): John Tebbutt. The Extra-Equatorial Currents of Jupiter during the Apparition of 1897-98: Rev. T. E. R. Phillips.

MALACOLOGICAL SOCIETY, at 8.—Notes on a Third Collection of Marine Shells from the Andaman Islands, with Descriptions of New Species of *Litrina*: J. Cosmo Melvill and E. R. Sykes.—Description of Three New Species of Marine Shells from N.W. Australia: Edgar A. Smith.—The Melaniidae, a Heterogeneous Family: J. E. S. Moore.—On the Affinities of *Donovania* (*Lachesis*) *minima*: M. F. Woodward.

MONDAY, DECEMBER 12.

SOCIETY OF ARTS, at 8.—Acetylene: Prof. Vivian B. Lewes.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Exploration in the Caroline Islands: F. W. Christian.

TUESDAY, DECEMBER 13.

ZOOLOGICAL SOCIETY, at 8.30.—On the Cerebral Convolutions of the Gorilla: F. E. Beddard, F.R.S.—On certain Characters of Reproduced Appendages in Arthropoda, and particularly in the *Blattidae*: H. H. Brindley.—Contributions to the Osteology of Birds. Part II. Impennes: W. P. Pycraft.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Paper to be discussed: The Ventilation of Tunnels and Buildings: Francis Fox.

ROYAL STATISTICAL SOCIETY, at 5.30.

WEDNESDAY, DECEMBER 14.

SOCIETY OF ARTS, at 8.—Commercial Education: Sir Albert Rollit.

THURSDAY, DECEMBER 15.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Reciprocal Innervation of Antagonistic Muscles. Fifth Note: Prof Sherrington, F.R.S.—The Action of Magnetised Electrodes upon Electrical Discharge Phenomena in Rarefied Gases. Preliminary Note: C. E. S. Phillips.—Observations on the Anatomy, Physiology, and Degenerations of the Nervous System of the Bird: Prof. Rubert Boyce and Dr. W. B. Warrington.—Note on the Densities of Atmospheric Nitrogen, Pure Nitrogen, and Argon: Prof. W. Ramsay, F.R.S.

LINNEAN SOCIETY, at 8.—Sketch of the Zoology and Botany of the Altai Mountains: H. J. Elwes, F.R.S.—A Description of some Marine and Freshwater Crustacea from Franz Josef Land, collected by W. S. Bruce, of the Jackson-Harmsworth Expedition: Thos. Scott.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.

CHEMICAL SOCIETY, at 8.—The Interaction of Ethylic Sodiomalonate and Mesityl Oxide: Dr. A. W. Crossley.—Derivatives of Camphoric Acid, Part III.: Dr. F. S. Kipping, F.R.S.—Synthesis of $\alpha\beta\beta$ Trimethylglutaric Acid: H. Perkin, jun., F.R.S., and Dr. J. F. Thorpe.

FRIDAY, DECEMBER 16.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Kentish Town Widening, Midland Railway: Walter Daniel.

QUEKETT MICROSCOPICAL CLUB, at 8.

BOOKS, PAMPHLET, SERIALS, &c., RECEIVED.

BOOKS.—The Tutorial Algebra: W. Briggs and G. H. Bryan, Part 2 (Clive).—Elementary Botany: Prof. G. F. Atkinson (New York, Holt).—Through New Guinea and other Cannibal Countries: H. Cayley-Webster (Unwin).—Flora Capensis, Vol. vi. (Reeve).—Flora of Tropical Africa, Vol. vii. (Reeve).—Geological Survey of Canada, Annual Report (new series), Vol. ix., 1896 (Ottawa, Dawson).—Physical Chemistry for Beginners: Dr. van Deventer, translated by Dr. R. A. Lehfeldt (Arnold).—My Horse; my Love: S. Buckman-Linard (Unwin).—Matter, Energy, Force and Work (Prof. S. W. Holman (Macmillan).—Prismatic and Diffraction Spectra: J. von Fraunhofer (Harper).—The Free Expansion of Gases; Gay-Lussac, Joule and Thomson (Harper).

PAMPHLET.—Chemische Technologie, &c.: Dr. F. Fischer (Braunschweig, Vieweg).

SERIALS.—Bulletin of the American Mathematical Society, November (New York, Macmillan).—Encyklopädie der Mathematischen-Wissenschaften, Band 1, Heft 1 (Leipzig, Teubner).—Journal of the Asiatic Society of Bengal, Vol. lxvii. Parts 170, 171 and 173 (Calcutta).—Proceedings of the Royal Society of Edinburgh, Vol. xxii. No. 2, Pp. 137-248 (Edinburgh).—Zoologist, November (West).—American Naturalist, November (Ginn).—Transactions of the Academy of Science of St. Louis, Vol. vii. Nos 17 to 20 (St. Louis).—Agricultural Gazette of New South Wales, September (Sydney).—Bulletin de la Société Imperiale des Naturalistes de Moscou, 1898, No. 1 (Moscou).—Monthly Weather Review, October (Washington).—Longman's Magazine, December (Longmans).—Chambers's Journal, December (Chambers).—Good Words, December and Christmas (Isbister).—Sunday Magazine, December and Christmas (Isbister).—Bulletin of the Liverpool Museums, October (Liverpool).—Contemporary Review, December (Isbister).—Astrophysical Journal, November (Chicago).—Natural Science, December (Dent).—National Review, December (Arnold).—Fortnightly Review, December (Chapman).—Scribner's Magazine, December (Low).—Photogram, December (Dawbarn).—Kew Bulletin, Additional Series, ii. (Eyre).—Century Magazine, December (Macmillan).—Humanitarian, December (Duckworth).—Zeitschrift für Physikalische Chemie, xxvii. Band, 3 Heft (Leipzig).—L'Anthropologie, tome ix. No. 5 (Paris).—Knowledge, December (Witherby).

Bacon's Chart of Common Poisonous Plants (Bacon).

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