

jects will continue to be given at the London School of Economics, and the courses will be treated as inter-collegiate courses.

MANCHESTER.—Mr. J. L. Simonsen, Schunck research fellow, has been appointed a junior demonstrator in chemistry.

OXFORD.—The professor of human anatomy has notified the Vice-Chancellor that the Welsh prize, 1907, has been awarded to Mr. Wathen E. Waller, of University College.

An election to the Philip Walker studentship in pathology will take place in October next. The studentship, which is of the annual value of 200*l.*, is tenable for three years, is open to either sex, and the holder need not necessarily be a member of the University of Oxford nor be legally qualified to practise the profession of medicine, but while holding the studentship he or she must be devoted to original pathological research. If the work done by a student be of exceptional promise, the studentship may be extended for a second period not exceeding two years. Applications, accompanied by three testimonials, must reach the registrar of the University by September 14 next.

At the Convocation to be held on September 30 it will be proposed to confer the honorary degree of D.Sc. upon Dr. Ludwig Mond, F.R.S., who was unable to be present and receive the degree at the late *Encaenia*.

Prof. W. Baldwin Spencer, F.R.S., the holder of the chair of biology in the University of Melbourne, has been elected to an honorary fellowship at Exeter College.

DR. NORMAN MOORE will deliver the first Finlayson lecture in Glasgow in February next. The lectureship was founded in commemoration of the late Dr. James Finlayson. The subject and actual date of the lecture will be announced later.

MR. W. ERLAM SMITH, who is at present acting as temporary professor of natural science at Government College, Rangoon, has been appointed to succeed Dr. W. H. Wilson as professor of chemistry in the Presidency College, Madras, when the latter retires in October next.

FOR work carried on in the cancer research laboratories of the Middlesex Hospital, the Walter Emden research scholarship and the Richard Hollins scholarship have been awarded respectively to Dr. Victor Bonney and Mr. L. Courtauld.

THE Joule studentship of the Royal Society has been awarded to Dr. T. H. Laby, of the University of Sydney, now of the Cavendish Laboratory, Cambridge, for the investigation of the conditions of condensation and super-saturation of vapours other than steam.

MR. RICHARD HENRY CURTIS, principal assistant in the observatories branch, has been appointed superintendent of the instruments branch at the Meteorological Office. The observatories branch will in future be incorporated with the instruments branch. Mr. Richard Corless, of Sidney Sussex College, Cambridge, has been appointed special assistant to the director.

A FELLOWSHIP in agriculture has been awarded to Mr. W. Dawson by the executive committee of the Carnegie trust for his thesis entitled "Production of Seed by Forest Trees," and a scholarship in agriculture has been awarded by the same committee to Mr. F. S. Marr for his paper on "The Stimulus of Phosphoric Acid on the Early Development of Plant Growth."

THE following appointments have been made in connection with the Rothamsted Experimental Station:—Dr. E. J. Russell, lately of the South-Eastern Agricultural College, Wye, as the Goldsmiths' Company's assistant for the investigation of soils, and Dr. H. B. Hutchinson, of the Midland Agricultural and Dairy College, Kingston, Derby, as bacteriologist.

MR. MURRAY has published at 5*s.* net a handsome memorial volume of the visit in June, 1906, to the Uni-

versity of London of representatives of the University of France, the Collège de France, and the French provincial universities. We published in our issue of June 14, 1906, an article on the visit, so do not need to say more about the volume than that it contains the names and particulars as to the standing of the guests, verbatim reports of the various addresses delivered, and accounts of the numerous receptions, luncheons, &c., arranged in honour of the distinguished visitors, concluding with the *conversazione* held at the University of London, South Kensington, at which about 2000 guests were present.

THE council of the Institution of Civil Engineers is prepared to consider applications for a nomination to a Palmer scholarship. The annual value of the scholarship, which will be vacant at the end of next month, is 40*l.* Sons of civil engineers alone are eligible for nomination, and they must be desirous of matriculating, and subsequently graduating, at the University of Cambridge, and their circumstances must be such as to need the help afforded by the scholarship. Copies of the regulations may be obtained from the secretary of the Institution of Civil Engineers.

THE following appointments in universities abroad are notified in *Science*:—Dr. G. L. Streeter, professor of anatomy in the University of Michigan; Dr. J. Heath Bawden, professor of philosophy in the University of Cincinnati; Dr. F. R. Noll, of the Agricultural Academy at Poppelsdorf, professor of botany at Halle; and the following appointments at Syracuse University have been made:—Joseph E. Kirkwood, professor of botany; W. M. Smallwood, professor of comparative anatomy; and George D. Babcock, professor of practical mechanics.

THE most recent report of the U.S. Commissioner of Education deals with the year ending June 30, 1905, and has just been published. The growth of facilities for higher instruction as recorded in the report is remarkable. The total value of property possessed by the institutions for higher education increased during the year with which the volume deals by 10,000,000*l.* At the date mentioned the total value reached approximately 103,000,000*l.*, of which 47,000,000*l.* represents endowment funds, the remainder being the value of the material equipment used for instruction purposes. Forty-one institutions have endowment funds of more than 200,000*l.* each. The rate of increase per year in the endowment funds was 41.3 per cent. during the five years 1900-1905. The total income for the year of these institutions for higher education, excluding benefactions, amounted to 8,355,000*l.*, an increase of 289,200*l.* over the preceding year. Of this amount 23.6 per cent. was from endowment funds, 23.6 per cent. from State appropriations, and 6.9 per cent. from Federal appropriations. It is interesting to note that Harvard and Columbia had incomes exceeding 200,000*l.* each, eight other institutions had over 150,000*l.* each, three over 100,000*l.*, and twelve more over 60,000*l.* The total amount of benefactions reported by all institutions during 1904-5 was 3,335,790*l.*, of which 71 per cent. was received by thirty-three institutions which each obtained 20,000*l.* or more. Harvard received gifts amounting to 466,000*l.*, Yale 279,000*l.*, and Columbia 236,000*l.* The total number of men students in these institutions of higher education increased during the year under consideration from 86,006 to 92,161, and of women students from 32,023 to 34,243.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 27.—"On the Velocity of the Kathode Particles emitted by Various Metals under the Influence of Röntgen Rays, and its Bearing on the Theory of Atomic Disintegration." By P. D. Innes.

(1) The velocity of the electrons emitted by lead, silver, zinc, platinum, and gold under the influence of Röntgen rays has been measured, both for soft and hard rays.

(2) The values found are as follows, the accuracy being within about 3 per cent.:

	Soft rays	Hard rays
Lead	6.3 to 7.6×10^9	6.3 to 8.3×10^9
Silver	6.0 to 7.2×10^9	6.1 to 8.0×10^9
Zinc	6.0 to 6.4×10^9	
Platinum	6.1 to 7.5×10^9	6.4 to 8.1×10^9
Gold	6.1 to 7.5×10^9	6.2 to 8.1×10^9

(3) The velocity of the fastest electrons emitted from each metal is completely independent of the intensity of the primary rays, but increases with the hardness of the tube.

(4) The velocity decreases with the atomic weight, the difference between the speed of the fastest electron with hard rays and that with soft rays being practically the same for the various metals, if the variation in hardness of the rays is the same.

(5) A minimum velocity is necessary to enable the electron to emerge, and the minimum velocity is nearly the same in the different metals.

(6) The number of electrons given off decreases with decreasing intensity of the rays, as well as with increasing hardness.

(7) The number emitted also decreases with decreasing atomic weight and density.

(8) The conclusion is drawn from calculation and discussion of other theories that the most probable theory is that of atomic disintegration. It is shown that the velocity of the emitted electron is too great to be that acquired under the influence of the electric force in the X-ray pulse. The other theory of ejection is discussed and objections to it pointed out. A possible explanation is given of the increase of the velocity with increasing hardness of the rays, and this fact is shown not to be inconsistent with the disintegration theory.

EDINBURGH.

Royal Society, August 8.—Dr. Robert Munro, vice-president in the chair.—The plant remains in the Scottish peat mosses, part III.: F. J. Lewis. The third part dealt with the peat mosses of the east and north-west Highlands, Shetland and the Outer Hebrides. All the Scottish peat mosses show a definite succession of plant remains. The oldest in the south of Scotland and the Shetland Islands have an Arctic plant bed at the base. This is succeeded by a forest of birch, hazel, and alder containing temperate plants. A second Arctic plant bed occurs above the lower forest, and is overlaid in all districts except the Hebrides, Cape Wrath, and the Shetland Islands by the upper forest, covered by several feet of peat bog plants. While it is difficult to reconcile the several stages in the peat with the theory of a single glaciation, the peat beds as a whole agree very closely with the scheme of classification proposed by Geikie in "The Great Ice Age."—Note on the abyssal temperature of fresh-water lakes: E. M. Wedderburn. Observed distributions of lake temperatures were brought forward as illustrations of the author's view that the surface current set up by wind action produces a back current at a moderate depth, with a slow movement of the bottom layers parallel to the surface current.—The action of sodium ethylate on trichloromethylsulphonic chloride: Prof. A. Crum Brown and T. F. Cowie.—A hybrid between Prejvalsky's horse and a Highland pony: Prof. J. C. Ewart. In most respects the hybrid differed little from an ordinary cross-bred pony. In its mane, however, it afforded striking evidence of its mixed origin. The front part of the mane projected forward, but failed to form a forelock. The rest consisted of hairs which were either erect or arched outward, some falling towards the right, others towards the left. The experiment gave further evidence in favour of the theory that our modern horses are descended from several distinct stocks, of which the Prejvalsky horse is one.—A note on a reflected mirage: Dr. C. G. Knott. This was an account of a curious mirage observed in South Africa by members of a cadet corps who were camping out to the south-east of Worcester. With the town at their back the observers saw about four miles off, apparently on the back of the river, a recognisable image of the town itself.—The system

sulphur-iodine: Prof. Alex. Smith and C. M. Carson. The freezing points of mixtures of iodine and sulphur show that these elements neither combine chemically nor form solid solutions.—Precipitated sulphur: Prof. Alex. Smith and R. H. Brownlee. Sulphur precipitated from polysulphides by means of acids is almost wholly composed of soluble rhombic sulphur. The fluid droplets of which the precipitate is at first composed crystallise to monoclinic sulphur, and the masses of the latter afterwards turn into rhombic sulphur without change in their spherical form. The sulphur precipitated from sodium thiosulphate by means of acids is wholly soluble when acetic acid is used. With hydrochloric acid the precipitate is viscous. The amount of insoluble sulphur is proportional to the concentration of the acid, and varies from 6 per cent. to 96 per cent.—Preliminary note on the optical rotations (throughout the spectrum), the electrical conductivities, and the densities of mixtures of sodium-potassium-tartrate and ammonium molybdate in aqueous solutions. The essential feature of the method lay in the measurements being made for all kinds of light. Interesting results were obtained with respect to the influence of non-active substances when added to active solutions.

July 15.—Dr. Robert Munro, vice-president, in the chair.—The Pycnogonida of the Scottish National Antarctic Expedition: T. V. Hobson. The main interest of the Scotia collection lay in the problem of distribution to which it gave rise. Antarctic and sub-Antarctic regions were distinguished being separated provisionally by the sixtieth parallel south. Of the fifteen species recorded from the Scotia the most striking was the *Decolopoda australis*, a species discovered and accurately described some seventy years ago, but forgotten, and when first noticed despised as a monstrosity or as a sample of defective work.—The marine mollusca of the Scottish National Antarctic Expedition: J. C. Meivill and R. Stander. The collection is interesting because of the number of deep-sea forms brought for the first time from unusual depths, and because of the extension of the geographical range of certain species already known. A second example of the hitherto unique *Guivillea alabastrina*, Watson, was dredged from a station not far from the original *Challenger* locality. Of the ninety-five species described, the gastropods claim fifty-nine with eleven new species, the scaphopods two with one new species, and the pelecypods thirty-four with nine new forms.—Preliminary note on the internal structure of *Sigillaria mamillaris*, Brongt., and *Sigillaria scutellata*, Brongt.; and description of a new species of *Lepidodendron* (*L. pettycurense*) from Pettycur: Robert Kidston.—The periods of the elliptic functions of Weierstrass: R. T. A. Innes. The paper gave a new method of calculating the periods when the invariants of the cubic were given.—Hydrachnidæ collected by the Lake Survey: W. Williamson. Among the various forms described there was a species of *Whitfeldtia*, which until now had not been found outside Norway.—Degenerations following experimental lesions in the motor cortex of the monkey: Drs. W. A. Jolly and Sutherland Simpson. Lesions were made in the motor cortex of the monkey, *Macacus rhesus*, involving portions of the leg, arm, and face areas. The fibres of the pyramidal tract arising from these areas were traced by the method of secondary degeneration from their source to their termination. It was found that the fibres from these areas begin to intermingle soon after they leave the motor cortex. In the internal capsule there is already a good deal of overlapping, and this is more marked still in the pes pedunculi. Throughout the pons, medulla oblongata, and spinal cord the intermixture is practically complete, so that below the level of the mid-brain there is no localisation or grouping of the fibres within the pyramidal tract as there is of the cells from which they take origin in the motor cortex. Above this level some localisation of fibres does take place, but it is only partial, the degeneration from one area encroaching upon that from the neighbouring areas to a considerable extent.—Classification of igneous rocks according to their chemical composition: Dr. H. Warth.—Note on quaternion integrals: Dr. H. Hermann. This was an improved demonstration of the generalised quaternion form of the theorems which include those of Green, Gauss, and Stokes.

PARIS.

Academy of Sciences, August 5.—M. H. Poincaré in the chair.—M. A. Lacroix announced the death of J. F. C. Klein, correspondent for the section of mineralogy, and gave an account of his work in the field of mineral crystallography.—Report presented by the committee charged with the scientific control of the geodesic operations on the equator: H. Poincaré (secretary). The last report was presented in April, 1905. A summary is given of the work done at seventy-four geodesic stations. Three base lines were measured, and magnetic and pendulum observations were also carried on throughout. The provisional calculations are well advanced. The triangulation and the concordance of the bases measured and calculated appear to be of the same order of accuracy as those used in the revision of the meridian of France.—The law of the velocity of hæmolysis of the red blood corpuscles under the action of light, of heat, and of some hæmolytic bodies: Georges Dreyer and Olav Hansen. The decrease of the corpuscles after treatment with light or heat can be expressed by the monomolecular formula, and examples of this are given in three tables.—The heat of combustion and formation of gaseous hydrogen phosphide: P. Lemoult. This measurement has hitherto been made by indirect methods only. The author has carried out direct measurements by exploding hydrogen phosphide with oxygen in the calorimetric bomb. Observations were made with a Mahler enamel lined bomb and with a Berthelot platinum lined bomb, the results agreeing to about 0.5 per cent. The molecular heat of combustion of phosphorated hydrogen is 310 calories at constant volume, 311.2 calories at constant pressure.—The silicide of platinum, SiPt, and on a double silicide of platinum and copper: Em. Vigouroux. Referring to a recent publication concerning this silicide SiPt by M. Lebeau and A. Novitzky, the author points out that he recently described the same compound, further details of which are now given.—The use of foreign materials modifying the forms of a crystal in course of growth to determine its crystalline symmetry: Paul Gaubert. Crystals of nitrate of urea have been variously ascribed to the monoclinic and rhombic systems. By utilising the effects of the presence of methylene blue or picric acid in the mother liquor from which the urea nitrate crystals are separating it has been found that the crystals of urea nitrate are monoclinic, and it is by an association following a plane perpendicular to the base that the groups appear to show a rhombic symmetry. This made presents the curious property of not being noticeable from the optical behaviour.—Concerning two notes of M. Gerber on the ferment of the Cruciferae and the ferment of the Rubiaceae: M. Javillier.

NEW SOUTH WALES.

Linnean Society, June 26.—Mr. A. H. Lucas, president, in the chair.—New Australian species of the family Calopterygidae (Neuroptera: Odonata): R. J. Tillyard. *Diphlebia lestoides*, Sélys, is the only species of this exceedingly beautiful and interesting family so far described from Australia. Two additions are now made, one a common East Indian species (*Rhinocypha tincta*, Ramb.), and the other a beautiful new *Diphlebia* from northern Queensland.—A contribution to the geology of Viti Levu, Fiji: Dr. W. G. Woolnough. This paper comprises the results of the author's second expedition to Fiji in 1905. The granitic rocks met with in 1901 were shown to occur at intervals over an area of at least 400 square miles; evidence is now adduced to prove that their surface represents an ancient peneplain. The sections at Nasaqo and Nadrau previously described, and new and very instructive ones at Rewasau and Nukuilau, were examined. These prove conclusively that the granite is very much older than the volcanic series which builds the bulk of the island. The slaty rocks associated with the granites are shown to be, in part at all events, altered eruptive rocks. Their geological relationship to the granites has not yet been definitely proved. The earliest stage of the Cainozoic history of the island is marked by extensive submarine eruptions, later stages by terrestrial eruptions of andesites; and a probable sequence of eruptive

rocks is suggested. The causes which led to the separation of the Fiji mass from the continental land to the west were assumed to be faulting, but no definite evidence of such a phenomenon was cited. Now fairly definite evidence is adduced to show that heavy faulting has taken place along a N.N.W.-S.S.E. axis. It is suggested that a second faulting has taken place along a W.S.W.-E.N.E. axis, parallel to the long axis of the Viti Levu-Vanua Levu massif. Extensive movements of elevation have taken place, causing a maximum uplift of nearly 5000 feet on the north-west with a marked tilt towards the south-east. River development affords scope for very interesting speculations, and several theories are dealt with in the paper. The marked rectangular network arrangement of the rivers is commented on, and is explained as chiefly due to earth movement. River capture has subsequently modified the original drainage in some particulars, and adjustment of drainage is proceeding very rapidly under almost ideal conditions. All the evidence obtained up to the present confirms the opinion formerly expressed that Fiji at one time formed part of a great Austral-Papuan continent.—Revision of the Australian Curculionidae belonging to the subfamily Cryptorhynchides, part viii.: Arthur M. Lea. In this contribution the revision of the genera allied to *Cryptorhynchus* is continued.

CONTENTS.

PAGE

Cornish Geology	377
Modern Introductions to Physical Theories. By G. H. B.	377
Theoretical Electrochemistry	380
Our Book Shelf:—	
Korteweg: "Christiaan Huygens, Traité: De iis quæ liquido supernatant."—H. L.	381
Shelly and Stenhouse: "A Health Reader"	381
Neisser: "Ptolemæus oder Kopernikus? Eine Studie über die Bewegung der Erde und über den Begriff der Bewegung"	381
Letters to the Editor:—	
British Association; Section A.—Sir Oliver Lodge, F.R.S.	382
Fecundity of the Leopard Moth.—Prof. R. Meldola, F.R.S.	382
The Second International Congress on School Hygiene	382
Electricity in Bulk	385
Notes	385
Our Astronomical Column:—	
Helium Absorption in the Solar Spectrum	389
Possible Changes in the "Owl" Nebula (M. 97)	389
A Quickly Changing Variable Star	389
Venus as a Luminous Ring	389
Observations of Jupiter, 1906-7	390
August Meteors. By W. F. Denning	390
Treasury Grants to University Colleges	390
The British Association:—	
Section G.—Engineering.—Opening Address by Silvanus P. Thompson, D.Sc., F.R.S., Past President of the Institution of Electrical Engineers, President of the Section	391
Section H.—Anthropology.—Opening Address by D. G. Hogarth, M.A., President of the Section	397
Section I.—Physiology.—Opening Address by Augustus D. Waller, M.D., LL.D., F.R.S., President of the Section	402
University and Educational Intelligence	405
Societies and Academies	406