

the ordinary pass or in the highest honours. Then the third feature to which I should call attention, and which I am inclined to say is the most important of all, is that a University should be a place where knowledge is increased and where the limits of learning are extended. Original research, the addition of something to the total sum of human knowledge, must always be an essential part of our proposals. We want to secure that those who teach in this University shall never cease to learn, and that those who are students shall unite with them in the work of fresh and new investigation. And, lastly, a University is a place where the application of knowledge must be indicated and directed. That perhaps brings us nearer to what may yet be the distinctive feature of our University. At all events we start with the belief that here we are going to combine theory with practice, and to see that in our University we shall combine both in one course of instruction, with due regard to the needs of our own time and of our own district. And now, if I may summarise in one sentence what I have been saying, it is that a University should be a place where knowledge is taught, tested, increased and applied."

SOCIETIES AND ACADEMIES.

LONDON.

**Royal Meteorological Society, June 19.**—Mr. W. H. Dines, president, in the chair.—A paper by Mr. H. Helm Clayton, of the Blue Hill Observatory, U.S.A., on the eclipse cyclone, the diurnal cyclones and the cyclones and anti-cyclones of temperate latitudes, was read by the secretary. The author has discussed the meteorological observations made along the path of the total solar eclipse in the United States on May 28, 1900, and also those made during three previous eclipses. He finds that a cyclone follows in the wake of the eclipse—though the changes are very minute and feeble—the fall of temperature developing a cold-air cyclone in an astonishingly short time, with all the peculiar circulation of winds and distribution of pressure which constitute such a cyclone.—A paper, by Mr. F. Napier Denison, of Victoria, British Columbia, on the seismograph as a sensitive barometer, was also read by the secretary. A Milne seismograph was installed in 1898 at the Meteorological Office, Victoria, B.C., and the author has since that time compared its movements with the changes of atmospheric pressure recorded by his "aerograph." He finds that when the barometric pressure is high over the Pacific slope from British Columbia southward to California, while off the Pacific coast the barometer is comparatively low, the horizontal pendulum of the seismograph tends to move towards the eastward. This movement appears to be due to a distortion of the earth's surface, caused by the heavier air over the Pacific slope depressing the underlying land surface below its normal position, while, on the other hand, the comparatively light air over the adjacent ocean tends to allow the sea and earth beneath to rise above its normal level. It has been found that when an extensive storm area is approaching from the westward, and often eighteen to twenty-four hours before the local barometer begins to fall, the pendulum of the seismograph swings steadily to the eastward, completely masking any diurnal fluctuations that might have existed, as the storm area approaches, and in the event of it being followed by an important high area, the pendulum will begin to swing towards the westward before it is possible to ascertain this area's position on the current weather charts.

**Anthropological Institute, June 19.**—Extraordinary joint meeting with the Folklore Society. Prof. A. C. Haddon, F.R.S., in the chair.—Prof. Haddon vacated the chair in favour of Mr. E. W. Brabrook, president of the Folklore Society.—Mr. E. S. Hartland exhibited the collection of Musquakie bead-work and other objects presented by the late Miss Florence Grove to the Folklore Society, and to be deposited in the Museum of Ethnology at Cambridge.—Mr. R. Shelford exhibited two charms against stomach-ache from Borneo.—Mr. H. Balfour read a paper, by Mr. W. G. Aston, C.M.G., on Japanese Gohei and Aino Tiraó.—Mr. N. W. Thomas read a paper, by Mr. E. Tregear, on the spirit of vegetation.

DUBLIN.

**Royal Dublin Society, May 22.**—Sir Howard Grubb, F.R.S., in the chair.—Prof. Hartley, F.R.S., and Mr. Hugh Ramage communicated a paper upon the banded flame-spectra of metals. This was a continuation of some former work on flame spectra at high temperatures by Prof. Hartley, published in the

*Phil. Trans.*, in which it was shown that fluted and banded spectra are characteristic of many metals. The list is now extended, banded and fluted spectra of copper, gold, palladium, zinc, cadmium, aluminium, beryllium, lanthanum, indium and thallium have been photographed and the principal bands in their spectra measured. A banded spectrum has also been obtained from iridium. In well-defined groups, such as magnesium, zinc, cadmium, aluminium, indium and thallium, the spectra appear to be homologous.—Prof. Hartley communicated a paper on a theory of the molecular constitution of supersaturated solutions. The chemical constitution of these solutions, which exhibit the well-known phenomenon of sudden crystallisation when either a crystal of the same salt or one of the same constitution and isomorphous with it gains access to the liquid, has been thus explained by the author. When a supersaturated solution is formed the salt in solution is a definite hydrate, but it is not the same hydrated salt as that which crystallises out. The cause of the supersaturation is the greater solubility of the one hydrate over the other at a given temperature; and its conversion into the other by combination with some of the water, acting as a solvent, causes its sudden solidification. In cases where the supersaturated solution is prepared by digesting a dehydrated salt in cold water, the course of change is first hydration, secondly solution, and thirdly crystallisation. Reference is made to the work of H. Le Chatelier, Wyruboff, and others.—Sir Howard Grubb communicated a note on a case of true stereoscopic effect obtained from a single picture, which he demonstrated by means of a model.—Mr. F. W. Moore exhibited and described a living specimen from the Botanic Garden, Glasnevin, Dublin, showing the germination of the double cocoa-nut (*Lodoicea sechellarum*).

EDINBURGH.

**Royal Society, June 17.**—Prof. Sir William Turner, K.C.B., in the chair.—Prof. Cossar Ewart, in a paper on in-breeding, gave the results of a number of experiments he had tried on pigeons, rabbits, mares and goats, and examined in the light of these the views as to the injurious effects of in-breeding which were held by certain naturalists. Thus Darwin had concluded that in-breeding was injurious; other biologists, including Weissmann, that it was not. Similarly, Huth and Westermarck differed as to the harmfulness of consanguineous marriages. The general result of his own experiments led Prof. Ewart to the conclusion that in-breeding led to loss of constitutional vigour and sometimes of size, but not to loss of fertility; and the diversity of view held by naturalists he regarded as being due to the fact that members of one family often differed in constitution to a marked degree, brothers and sisters, for example, differing more than their parents, and there being occasionally greater similarity between second cousins than between first cousins. It was also pointed out that, in certain circumstances, in-breeding by arresting reversion (which was favoured by crossing) tended to favour the appearance of new varieties.—Mr. F. H. A. Marshall read a paper on hair in the Equide. It was found that the hairs of the three principal types of zebra were fairly distinct, while the Somali zebra stood quite by itself, a conclusion agreeing with that of Nathusias. The hairs of horses showed considerable variability dependent largely on the breed, while those of zebra-horse hybrids, so far as the observations went, were fairly constant in character. The hairs of the mane, as well as those from the sides of the body, were also dealt with. The paper concluded with a reference to a suggestion by Nathusias that, if the telegony hypothesis were true, we might expect to find evidence of it in the hair characters of the "subsequent foals." Such evidence was, however, utterly lacking.

PARIS.

**Academy of Sciences, July 1.**—M. Fouqué in the chair.—Chemical equilibria; phosphoric acid and the chlorides of the alkaline earths, by M. Berthelot. The author's recent experiments on the subject are continued, the reactions dealt with in this paper being those occurring between phosphoric acid, monosodium phosphate or disodium phosphate, and calcium, barium or magnesium chloride. It is found that the number of equivalents of the alkaline earth entering into combination with a molecule of precipitated phosphoric acid varies from 2 to 4, according to the nature of the substances and the time which has elapsed since the commencement of the reaction.—New treatment of niobite; preparation and properties of fused niobium, by M. Henri Moissan. The native mineral, consisting chiefly of niobic and tantalic acids together with iron, man-

ganese and silica, is heated with charcoal in the electric furnace, a fused mass of niobium and tantalum combined with carbon being thus obtained. The two metals are separated by Marignac's method, based on the different solubilities of sodium fluoniobate and fluotantalate, the former salt being finally calcined and fused with charcoal. Niobium is thus obtained as a very hard, metallic mass, having a melting point above  $1800^{\circ}$ ; it is almost unacted on by acids, and does not decompose water vapour at a red heat. When heated in oxygen, it burns with the production of niobic acid.—New nebulae discovered at the Paris Observatory, by M. G. Bigourdan.—Observations at sea of the comet of May 1901, by MM. Doué and Rivet. The observations were made in the course of a voyage from Tahiti to Panama.—On a mechanical interpretation of the principles of thermodynamics, by M. André Sélignmann-Lui.—On the indices of refraction of mixtures of liquids, by MM. J. de Kowalski and Jean de Modzelewski.—The dielectric constant of a mixture of liquids has been shown not to be connected by any simple law with that of its constituents, and it seemed of interest to determine whether this anomaly held with regard to the index of refraction, which is closely connected with the dielectric constant. Experiments with mixtures of alcohol and benzene, alcohol and toluol, and ether and chloroform have shown, however, that such is not the case, the index of refraction of each of the pairs of mixed liquids being readily calculated from the indices of its constituents.—Hertzian waves in storms, by M. F. Larroque. A demonstration of the production of Hertzian waves in storms and their transmission to great distances.—Acidimetry of arsenic acid, by MM. A. Astruc and J. Tarbouriech. If methyl orange is employed as indicator, one molecule of arsenic acid is neutralised by one molecule of potash, soda or ammonia and by half a molecule of baryta, strontia or lime, identical results being obtained in the cold and on heating. With phenolphthalein, however, two molecules of an alkali or one molecule of an alkaline earth are required; on boiling, no difference is observed in the case of the former, but one and a half molecules of baryta, strontia or lime are then required for neutralisation.—On the uncoloured compound of sodium tetrazotolylsulphite with ethyl- $\beta$ -naphthylamine and its conversion into a colouring matter, by MM. A. Seyewetz and Blanc. The coloured substance, a red insoluble powder, is formed by the exposure to light of the uncoloured compound, and is identical with the product of the action of ethylnaphthylamine hydrochloride on tetrazotolidine chloride.—On the action of benzaldehyde on sodium menthol and new methods for the preparation of benzylidenementhone, by M. C. Martine. Sodium menthol resembles sodium borneol in its action on benzaldehyde, the product of the reaction being benzylidenementhone; this compound is also formed by the action of benzaldehyde on the sodium derivative of menthone.—Combinations of camphor with  $\beta$ -hydroxy- $\alpha$ -naphthaldehyde, by M. André Helbronner. The new compound,  $C_{23}H_{26}O_2$ , which is designated ethoxynaphthalcamphor, crystallises in brilliant white crystals melting at  $100^{\circ}$ ; it is dextrorotatory. On reduction with sodium amalgam it yields a compound melting at  $112^{\circ}$ , which bears the same relation to the parent compound as benzylcamphor to benzalcamphor. Methoxynaphthalcamphor, which has also been prepared, melts at  $78^{\circ}$  and its reduction product at  $96^{\circ}$ .—Action of bromacetophenone on sodium acetylacetone, by M. F. March. The reaction studied gives rise to a triketone of the constitution  $(CH_3-CO)_2=CH-CH_2-CO-C_6H_5$ , which forms large, colourless crystals melting at  $57-58^{\circ}$ ; on treatment with soda it yields acetophenacetone.—Action of hydrogen sulphide on acetylacetone, by M. F. Leteur. When hydrogen sulphide is passed into a solution of acetylacetone in concentrated hydrochloric acid, an abundant deposit of needle-shaped crystals is produced. This compound melts at about  $163^{\circ}$ , and is shown by analysis and by microscopic molecular weight determinations to have the formula  $(C_7H_8S_2)_2$ .—Influence of sodium fluoride in the saccharification, by seminase, of the carbohydrates contained in the seeds of leguminous plants, by M. H. Hérissey. Sodium fluoride, which was used as an antiseptic in the study of the saccharification, was found to exert a marked favourable influence on the process.—On epithelial centrosomes, by M. P. Vignon.—Observations on the root of vascular cryptogams, by M. G. Chauveaud.—On the vegetation of punctiform nostoc in the presence of different carbohydrates, by M. R. Bouilhac. Sucrose, maltose or starch may replace dextrose in the cultivation of nostoc, whilst with lactose or  $\alpha$ -lævulose only a very feeble

vegetation is obtained.—Generality of the fixation of metals by the cell-wall, by M. H. Devaux. The fixation of metals by the cell-wall in plants, previously demonstrated in the case of injurious metals such as copper, silver and lead, is now shown to be a very general phenomenon. The proportion of metal absorbed is always small, and is not sensibly increased by the use of more concentrated solutions.—On the optical data relative to the macle of pericline, by MM. F. Pearce and L. Duparc.—On the presence of Devonian strata containing *Calceola sandalina* in the Western Sahara, by M. G. B. M. Flamand.—Action of currents of high frequency on the urinary secretion. Information furnished by chemical analysis, by MM. Denoyés, Martre and Rouvière. During electrical treatment there is an increase in the amount of urine, and in the urea, uric acid, total nitrogen and salts contained therein.—Passage of carbon monoxide from the mother to the foetus, by M. Maurice Nicloux.—Cellular heredity, by MM. A. Charrin and Gabriel Delamere.—On a reaction characteristic of pure waters, by M. H. Causse. Pure, uncontaminated water restores the colour of crystal violet which has been previously decolourised by sulphurous acid, but has no action on decolourised magenta or on paradiabenzene sulphonate. In the presence, however, of human or animal excreta the colour of the two last mentioned reagents is restored, whilst the decolourised crystal violet is unacted on.

## NEW SOUTH WALES.

**Linnean Society, May 29.**—Mr. J. H. Maiden, president, in the chair.—Notes on the botany of the interior of the Colony, part iii., by Mr. R. H. Cambage. Part iii. is descriptive of the botany of the country extending from the Bogan to the Lachlan, *viâ* Nymagee.—Revision of the Genus *Paropsis*, part vi., by Rev. T. Blackburn.—The nature of the bacteroids of the leguminous nodule and the culture of *Rhizobium leguminosarum*, by R. Greig Smith. The bacteroids of the leguminous nodule are neither higher nor lower types of growth, but are normal bacteria contained in a bulky branching capsule. A medium prepared from leguminous plants is not essential for the growth of *Rhizobium* as claimed by Hiltner. The author has grown the organism for more than a year on media devoid of all plant infusion.—On one of the so-called honeysuckles of Lord Howe Island, by J. H. Maiden. In the Society's *Proceedings* for 1898 (p. 126), the author described a tree under the name *Cupania Howeana*. He believes that this is identical with the plant described by Radlkofer in 1886 as *Guioa coriacea*, and gives the complicated synonymy of the species. The author tabulates the radical alterations that Radlkofer proposes in the nomenclature of Australasian Sapindaceæ and submits them for further consideration of Australian botanists since they were not adopted by Mueller.

## CONTENTS.

	PAGE
Rothschild's Novitates Zoologicæ . . . . .	249
The Metric System . . . . .	250
Prof. Max Müller's Last Essays . . . . .	251
Heterocyclic Organic Compounds. By W. T. L. . . . .	252
<b>Our Book Shelf:—</b>	
Behrend: "The Induction Motor. A Short Treatise on its Theory and Design, with Numerous Experimental Data and Diagrams" . . . . .	252
"Bulletin of the Philosophical Society of Washington" . . . . .	253
<b>Letters to the Editor:—</b>	
On the Theory of Temporary Stars. ( <i>Illustrated.</i> )—Dr. J. Halm . . . . .	253
Vitality of Seeds.—Dr. Henry H. Dixon . . . . .	256
An Instance of Adaptation among the Deer.—R. Lydekker, F.R.S. . . . .	257
Snow Conditions in the Antarctic.—C. E. Borchgrevink . . . . .	257
Photographic and Photometric Surveys of the Stars. By W. E. P. . . . .	257
The Treatment of Disease by Light. ( <i>Illustrated.</i> ) . . . . .	259
<b>Notes</b>	261
<b>Our Astronomical Column:—</b>	
Light Variation of the Minor Planet (345) Tercidina . . . . .	265
United States Naval Observatory . . . . .	265
The Comptometer. By C. V. Boys, F.R.S. . . . .	265
Recent Reports of the Smithsonian Institution . . . . .	269
University and Educational Intelligence . . . . .	270
Societies and Academies . . . . .	271