

of a model lecture to exhibit methods of dealing with the subject, adapted for science teachers and teachers in Board schools who, having some knowledge of the subject, desire to receive instruction in the scientific construction and use of experimental apparatus and the improvements of methods of teaching. A course of ten lectures with demonstrations on advanced graphical statics as applied to girders and arches will be delivered by Prof. Karl Pearson. A course of twenty lectures on physiology will be delivered by Prof. Halliburton. Some of the meetings of the class will be devoted to the performance by the students themselves of the fundamental experiments in connection with the microscope and the methods of chemically testing substances of physiological importance, such as foods, the air, &c. A course of ten lectures on elementary physical measurements, each lecture followed by a class for practical work, will be given by Miss Edith Aitken at Bedford College. The Technical Education Board is doing very valuable work by thus assisting to extend the knowledge of the principles of rational science teaching.

SCIENTIFIC SERIAL.

Bollettino della Società Sismologica Italiana, vol. iv. No. 1. —The new volume begins with the rules of the Society and a list of the Fellows, there being forty-four Italian and nine foreign members. —Dr. Papavasiliou continues his list of earthquakes observed in Greece in 1897; during the last half of the year sixty-four shocks were recorded, fifty-two of which were felt in Zante. —Vesuvian notes for the year 1897, by G. Mercalli. —The Indian earthquake of June 12, 1897, by G. Agamennone; a summary of several preliminary notices in NATURE and elsewhere. —Notices of earthquakes observed in Italy (July 1–27, 1897), by G. Agamennone, the most important being the Garganic earthquakes of July 3 and 24, earthquakes in Alessandria on July 6, Carniola on July 15, and Pisa on July 27, and distant earthquakes on July 22 and 27.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, August 1. —M. Wolf in the chair. —Further researches on the metal-backed glass mirrors of antiquity, by M. Berthelot. The three mirrors described were originally discovered in Thrace and Egypt. The metal backing consists of almost pure lead, which, in the molten state, appears to have been poured on the concave surface of discs cut from balloons of blown glass. —On the theory of the abacus of alignment, by M. Ernest Duporcq. —On the theory of reed-pipes, by M. A. Aignan. Remarks and experiments on the production of sound in pipes with free and beating reeds. —Action of pure hydrogen phosphide upon cupric sulphate, by M. E. Rubénovitch. The results obtained by previous experimenters seem to show that the product of the action of hydrogen phosphide upon salts of copper is of variable composition. The author, however, by working with pure hydrogen phosphide obtained by the dissociation of phosphonium chloride, and by taking precautions to exclude air or oxygen from the apparatus employed, finds that a well-defined copper phosphide of the formula $P_2Cu_5H_2O$ is produced. This is a black substance, which, on heating to $150^\circ C.$, loses all its water and becomes of a reddish brown colour. It oxidises slowly in the air, and dissolves in sulphuric acid with liberation of hydrogen phosphide, whilst excess of oxygen during its preparation gives rise to rapid decomposition with formation of metallic copper and phosphoric acid. —Action of bromine upon normal propyl bromide in presence of anhydrous aluminium bromide, by M. A. Mouneyrat. It has been shown, in a preceding note, that by treating ethyl bromide with bromine in presence of aluminium bromide, the hydrogen atoms may be successively replaced by bromine, the final product being hexabromethane, C_2Br_6 . The present paper describes a series of similar experiments with normal propyl bromide, the highest brominated derivative yet obtained being pentabromopropane, $CHBr_2-CHBr-CHBr_2$. In the reactions involved the aluminium bromide abstracts the elements of hydrobromic acid from the alkyl bromide and the ethylenic derivative, thus temporarily formed, immediately takes up two atoms of

bromine. —On the hydrolysis of ethane-dipyrocatechin, by M. Ch. Moureu. The author has previously shown that ethane-dipyrocatechin yields, on hydrolysis with dilute sulphuric acid, pyrocatechin and a compound of the formula $C_8H_8O_4$. This latter, it is now proved, is identical with the orthohydroxy-phenoxyacetic acid obtained by the interaction of monochloroacetic acid and the monosodium derivative of pyrocatechin. The mechanism of this singular reaction is discussed. —On a new *Trichophyton* productive of herpes in the horse, by MM. Matruchot and Dassonville. An epidemic of herpes among the horses of an artillery regiment was found to be due to a fungus which the authors succeeded in isolating, and the pathogenic nature of which was verified by inoculation experiments on guinea-pigs and on man. The organism is a *Trichophyton* related to, but not identical with, the species described by Sabourand and Bodin as producing herpetic affections. —Physiological function of iron in the vegetable organism, by M. Jules Stoklasa. It has long been recognised that iron is necessary for vegetable life, and microscopic observations have led to the supposition that the metal exists in organic combination in the nucleus of the cell. It is not present in chlorophyll. The author has extracted from onions and from peas a substance, containing 1.68 per cent. of iron, which closely resembles, in composition and properties, the hermatogen obtained by Bunge from yolk of egg. This compound is also contained in non-chlorophyllaceous plants, as was proved by its being obtained from moulds (*Mucor mucedo*) and fungi (*Boletus edulis*). —Fructifications of *Macrostachya*, by M. B. Renault. —On pietine, or stalk disease, in wheat, by M. Louis Mangin. This disease has been attributed by MM. Prillieux and Delacroix to the action of *Ophiobolus graminis*, but inoculation experiments carried out by the author tend to prove that the injurious effects are, for the most part, caused by *Leptosperia herpotrichoides*, although the two parasites are frequently associated.

NEW SOUTH WALES.

Linnean Society, June 29. —Prof. J. T. Wilson, President, in the chair. —Observations on the vegetation of Lord Howe Island, by J. H. Maiden. The author visited Lord Howe Island in H.M.C.S. *Thetis* in March and April last, spending nine days on the island. Hemsley's Flora of the island (*Annals of Botany*, x. p. 221, June 1896) records 206 plants and three introduced ones, total 209. The author has added 16 species and one named variety to the indigenous flora, and 17 species of introduced plants, while he has removed five species of supposed indigenous plants from Hemsley's list. So that, according to the present paper, the flora of Lord Howe Island stands at present at 217 indigenous species (being a net addition of 11), and 10 introduced ones. —Notes on *Sterculia (Brachyhiton) lurida* and *S. discolor*, by J. H. Maiden and E. Betche. The authors give reasons for believing that *Sterculia lurida* is but the young state of *S. discolor*, and cannot even rank as a distinct variety, much less as a species. —On two well-known, but hitherto undescribed, species of *Eucalyptus*, by R. T. Baker. The author shows that under *Eucalyptus Stuartiana*, F.v.M., no less than three species and one variety are included. —Descriptions of some apparently common Australian Nematodes found at Sydney or in Port Jackson, by Dr. N. A. Cobb. Nineteen species and one variety, referable to eleven genera, are described as new. With two exceptions they are marine forms.

AMSTERDAM.

Royal Academy of Sciences, June 25. —Prof. van de Sande Bakhuyzen in the chair. —Prof. H. Behrens and Mr. H. Baucke on Babbitts' antifriction metal. By slow cooling this alloy (82Sn, 9Sb, 9Cn) is really split up into compounds of different fusibility. The separation and chemical examination of these compounds have been carried out by Mr. H. Baucke, analytical chemist, of Amsterdam. By pressure between hot iron plates a metallic mother liquid was squeezed out; the remaining cakes of crystalline metal were treated with hydrochloric acid and washed with water. An alloy, containing 90Sn, 10Sb, on being thus treated, yielded the same cubic crystals as Babbitts' metal, which were found to answer to the formula $SbSn_2$ (found 33.7 Sb, calculated 33.8 Sb). With 42Sb prismatic crystal of the compounds $SbSn$ were obtained (found 50.35 Sb, calculated 50.37 Sb). In Babbitts' metal the copper forms brittle needles of whitish bronze containing no antimony. Such bronzes show less stability than the

compounds of tin and antimony. From an alloy of 90Sn 10Cn, the compound CnSn was obtained. Repeated heating and cooling brought the percentage of copper up from 35 to 58. Microscopical examination of bearings showed that cushions heated by running, were poor in cubic crystals of the compound $SbSn_2$. Babbitt's metal is made amorphous by casting in cold moulds. Axles running on such metal get tinned; this leads to sticking and heating; finally recrystallisation sets in, and liquid tin is squeezed out; while a compact layer of crystals is formed on the axle. Microscopical examination of the metallic deposit from the lubricating oil led to the unexpected result, that metal with crystals of moderate size will develop ball-cushions. Tin is ground to a fine dust by the sharp fragments of the bronze needles, the hard cubes of $SbSn_2$ are rounded, undermined, and finally worked up into something like metallic pebbles of microscopical size (0.08 to 0.1 mm.). Similar spheroids were obtained from bearings of magnolia metal and of aluminium brass, but not from ordinary brass, nor from grey cast iron.—Prof. Lobry de Bruyn communicated a number of observations on the state of insoluble amorphous substances, which are made to form in gelatine as medium. These substances, which are precipitated from aqueous solutions, remain dissolved in gelatine as colloids, and on solidification yield transparent masses. With incident light some exhibit fluorescence or light reflexion; others do not do so, or only very sparingly.—Prof. van de Sande Bakhuizen made a communication on behalf of Dr. E. F. van de Sande Bakhuizen, entitled "The motion of the terrestrial pole according to the observations of the years 1890 to 1896."—Prof. Haga, on a five-cellular quadrant electrometer and the measurements of current intensity carried out with it. A description was given of a five-cellular quadrant electrometer furnished with a damper, consisting of a copper cylindrical mantle, moving in a magnetic field. Owing to the great stability and sensitiveness of the instrument, the strength of strong as well as of weak currents could easily be measured to within 0.1 per cent. by comparing the potential difference at the extremities of a known resistance with a normal Clark-element.—Dr. C. H. Wind, on the influence of the dimensions of the source of light in Fresnel's diffraction phenomena and on the diffraction of X-rays (third communication). The diffraction phenomena, modified by the widening of the light slit, were discussed, this time in connection with the optical delusion discovered by the author. By this discovery some difficulties that still remained were cleared up, but the conclusion as to the evidence of the undulatory character of X-rays, which was to be inferred from previous experiments, had to be retracted. Finally new experiments were communicated, in which a still faint indication of diffraction of X-rays manifested itself, and from which was inferred, with the greatest possible reserve, $T_x = 0.1$ to 0.2μ .—Prof. Kamerlingh Onnes (a), on behalf of Dr. E. van Everdingen, jun., on the galvano-magnetic and thermo-magnetic phenomena in bismuth. Observations were made of the four transverse phenomena in one plate of bismuth decomposed by electrolysis. The results were compared with those arrived at by Von Ettingshausen and Nernst and with Riecke's theory of electrical and thermal phenomena in metals. Some among them appeared to agree neither with those results nor with the theory in its present form. (b) On behalf of Dr. J. Verschaffelt, on the deviation of De Heen's experiments from Van der Waals's law of continuity. (c) On behalf of Mr. C. M. A. Hartman, on composition and volumes of the coexisting phases of mixtures of methyl chloride and carbonic acid. The equilibrium between the two phases being established, parts of both are separated, each between two cocks, and then collected in gas-measuring tubes. The densities of the phases are inferred from the volumes of the gas, and the molecular proportions of the components are found by analysing. A remarkable result of the preliminary determinations is that there is a nearly linear relation between the pressure and the composition of the liquid phase, showing that the exponents in Van der Waals's formula for this case are nearly zero.—Prof. Lorentz, on the influence of a magnetic field on radiation. The elementary theory of the Zeeman-effect is not sufficient to account for the phenomena observed by Cornu, Michelson, Tolver Preston and Becquerel; it will therefore have to be replaced by a more general one. Fortunately, without entering into the details of the mechanism of radiation, it is possible to arrive at some general results concerning the state of polarisation in different cases. After dis-

cussing this question, the author shows how (as was suggested to him by Mr. A. Pannekoek) the equations in his paper in *Wied. Ann.*, 63, p. 278, may be made to furnish an explanation of Cornu's quadruplet. This explanation would, however, require a structure of the molecules which it seems difficult to imagine.

GÖTTINGEN.

Royal Society of Sciences.—The *Nachrichten* (mathematico-physical section) for 1898, part 1, contains the following memoirs communicated to the Society.

January 8.—E. Study: Proof of a theorem of Dedekind's.

February 5.—A. Peter: The anatomical structure of the stem in the genus *Scorzonera*; contributions (II.) to our knowledge of the *Hieracia* of Eastern Europe and Asia.

February 19.—E. Riecke: Theory of galvanism and of heat.

March 5.—A. Schönflies: A new geometrical method in the domain of differential geometry.—G. Kolossoff: A particular case in the motion of a "universal top" whose point of support is free to move in a horizontal plane.—A. Sommerfeld: Remarks on Hess's case in the motion of a top.

March 19.—E. Wiechert: Hypotheses subserving a theory of electric and magnetic phenomena.

April 30.—W. Voigt and L. Januszkiewicz: Observations on rigidity under homogeneous deformation.

The *Proceedings* of the Society, part 1, 1898, contain reports on the progress made in the publication of Gauss's works, by F. Klein; on the publication of the great *Lexicon* of the Egyptian language, hieroglyphic and hieratic, by R. Pietschmann; and on the oldest papal documents. There is also a sympathetic memoir of the antiquary Wattenbach, by Dr. P. Kehr.

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