

their capabilities and tastes. Prof. W. M. Wheeler showed how large a part of the value of fellowships was lost to research by expecting fellows to perform extraneous duties and to do their research always at a given institution. Prof. Münsterberg insisted that the only two factors which really count for research are to be found in the minds of the men engaged upon it; they are, first, intellectual quality, and secondly, the will to achieve. In these two respects he maintained American research to be defective. He urged the men of wealth who had millions ready for endowment first to make the career of research attractive, so that more men of first-class type may be tempted, and to create great premiums by putting above the present university system a still higher institution, an over-university where the finest masters of research, chosen by their peers, are brought together for far-reaching work which transcends the possibilities of the educational institutions. Whatever can be done to give the career national glory thus to attract the finest men will be productive for the work of research. To secure that able men shall do their best work he advised the following course:—Make the academic career in the real universities, the promotion to higher positions, dependent in first line upon research work, as it is in Germany, and the work will be done, in spite of all obstacles. There is at present no greater educational need than to educate the trustees and benefactors of universities.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 26.—"Some Physical Properties of Nickel Carbonyl." By James Dewar, M.A., Sc.D., LL.D., F.R.S., and Humphrey Owen Jones, M.A., B.Sc.

The authors' communication gives an account of the investigation of a number of the physical properties of nickel carbonyl which have hitherto been investigated only to a slight extent.

It was found that the compound in the gaseous state was much more stable than it had hitherto been supposed to be, and that no explosion took place when the vapour was suddenly heated, provided that oxygen was not present in the surrounding gas. When the vapour was decomposed by heat the products of dissociation were nickel and carbon monoxide; at temperatures below 180° C. only traces of carbon dioxide could be detected, so that the decomposition postulated by Berthelot to explain the explosion of the vapour does not take place to any appreciable extent.

A large number of vapour density determinations were made by Victor Meyer's method at a number of temperatures between 63° C. and 216° C. in an atmosphere of various inert gases (hydrogen, nitrogen and ethylene), and also in carbon monoxide.

The effect of temperature, of rate of admixture of the vapour with the surrounding gas by diffusion, and of the presence of one of the products of dissociation on the extent of the dissociation is very clearly seen from the numerical values and the curves.

A number of determinations of the vapour-density at various temperatures under reduced pressure were made, and also show the marked effect of temperature on the dissociation. The dissociation becomes practically complete only at the boiling point of aniline.

The critical temperature was found to be about 200° C., and the critical pressure was estimated to be about thirty atmospheres.

A number of vapour-pressure determinations were made by the static method over a range of temperature between -9° C. and +30° C. From the values obtained, the Rankine formula gives the following relation between the absolute temperature T and the pressure p in millimetres of mercury:—

$$\log p = 7.355 - 1415/T.$$

The results are compared with those obtained by Mittasch by the dynamic method.

Various constants are calculated from the results obtained, and these are found in several cases to be very similar to the corresponding constants for ether. The latent heat of vaporisation is 38.1 calories per gram, and the Trouton constant is 20.6. The molecule of nickel carbonyl appears to be 4.2 times larger than that of carbon monoxide.

Some experiments which were made show that the reaction between carbon monoxide and nickel is reversible, and proceeds rapidly at the ordinary temperature, and with a measurable velocity at very low temperatures.

Royal Microscopical Society, April 15.—Dr. Hy. Woodward, F.R.S., in the chair.—Mr. F. W. Millett's report on the recent Foraminifera of the Malay Archipelago collected by Mr. A. Durrand, part xiv., was taken as read.—The secretary read a paper by Mr. E. B. Stringer on a new method of using the electric arc in photomicrography. The method consists in employing the radiation of the electric arc itself altogether separated from the incandescent carbons. This, modified by certain light filters, yields a powerful violet monochromatic light on the extreme limit of visibility. The separation is effected by the substage diaphragm, the opening in which is adjusted so as to allow only the radiation of the arc to pass. A trough containing a solution of ammoniated sulphate of copper suppresses all but the violet band, and the ultra-violet rays are intercepted by another trough containing a solution of sulphate of quinine. Lantern slides of *Pleurosigma angulatum*, dry, and *Cocinodiscus asteromphalus* in styrax, taken with a Zeiss 3 mm. oil immersion apochromatic objective of 14 N.A. and 8 compensating eye-piece giving a magnification of 2200 diameters, were shown upon the screen. The author discussed the possibility of obtaining lenses corrected for the ultra-violet rays which would enable photography to do for the microscope what it had already done for the telescope. Three slides of *Navicula bombus* were shown on the screen to demonstrate the advantage of using the troughs containing solutions of ammoniated sulphate of copper and sulphate of quinine.—Dr. R. Hamlyn-Harris sent a description of an apparatus for facilitating the manipulation of celloidin sections. The apparatus consisted of a circular vessel $3\frac{1}{2}$ " diameter and $\frac{3}{8}$ " deep outside. The body is made of a non-corroding metal, and the bottom of brass. It is divided into twenty compartments; in each compartment are perforations to allow fluid to escape when the transfer is made from one fluid to another. The apparatus suggested itself to the writer's mind in consequence of the difficulties experienced by him in preparing, staining, and mounting a series of celloidin sections in successive order.—Mr. C. F. Rousselet exhibited about two dozen mounted slides of Rotifers of the genus *Brachionus*. The specimens, besides those collected in England, came from America, Asia Minor, Bohemia, China, Germany, and Hungary, and comprised sixteen species, including one not yet described, and a number of varieties. The author mentioned that the *B. reubens* exhibited was the true species of Ehrenberg, and different from the one figured under that name in Hudson and Gosse's monograph.

PARIS.

Academy of Sciences, April 20.—M. Albert Gaudry in the chair.—Statistics of the minor planets. The distribution of the elements taking the aphelia as the argument, by M. O. Callandreau. The aphelia distances arrange themselves symmetrically about their mean value in a manner resembling the arrangement of accidental errors.—On spirillosis in the Bovidae, by M. A. Laveran. An account, with drawings, of the detailed examination of the blood of Transvaal cattle infected with spirilla. These parasites have always been found in the blood of cattle associated with other organisms. At the present time only two diseases are definitely known to be produced by spirilla, the relapsing fever caused by *Sp. Obermeieri*, peculiar to man, and the spirillosis produced by *Sp. anserinum*. The parasite described in the present paper forms a new species, to which the name *Sp. Theileri* is given.—On the integration of differential equations of the second order with constant coefficients, by M. E. Vallier.—The specific heats and heats of vaporisation and of fusion of aniline and some other organic compounds, by M. de Forcrand. The specific heat of aniline in the solid and liquid state and of the latent heat of fusion has been determined by the method of mixtures. Measurements are also given for nitrobenzene, benzene, and acetic acid.—Photographic observation of the eclipse of the moon on April 11, 1903, at the Observatory of Toulouse, by M. Montangerand. The atmospheric conditions on the night of the eclipse were

very favourable, eleven negatives being obtained.—Observation of the lunar eclipse of April 11–12, 1903, by M. R. Mailhat. Eighteen negatives were taken and submitted to the Academy.—On M. Guichard's new transformation of surfaces of total constant curvature, by M. Tzitzeica.—On a new generalisation of the theorem of M. Picard on entire functions, by M. Georges Remondos.—Researches on electric convection, by MM. V. Crémieu and H. Pender. In spite of the contradictory nature of some of the experimental results obtained, the authors believe that they are justified in drawing the conclusion that charged metallic surfaces, either continuous or divided into sectors, and turning in air in their own plane, produce magnetic effects in the sense predicted by electric convection, and agreeing within 10 per cent. with the order of magnitude calculated for convection. The interposition of fixed armatures between the moving surfaces and the measuring apparatus appears to have no influence on the magnetic effects obtained.—On magnetic hysteresis at high frequencies, by MM. C. E. Guye and B. Herzfeld. The question has frequently been raised as to whether the energy lost by hysteresis in a magnetic cycle is independent of the speed with which the cycle is completed, and very contradictory results have hitherto been published. The chief cause of uncertainty is the presence of Foucault currents, and in the experiments described in the present paper an attempt has been made to eliminate this difficulty by the use of very fine iron wires, and a thermal method for measuring the energy dissipated in the wire has been adopted. Up to 1200 periods per second the energy consumed by hysteresis is independent of the velocity of the cycle.—On the magnetic properties of the terrestrial atmosphere, by M. Charles Nordmann. The magnetic properties of the atmosphere can only have a very small effect on the earth's magnetic field, and can only produce a negligible fraction of the diurnal period of a magnetised needle.—On electric sparks, by M. B. Egnitis.—The electrical separation of metallic powders and inert material, and of the metallic part of a mineral from its gangue, by M. D. Negreano.—On a self-registering galvanometer and a rotating contact, and their use in tracing the curves of alternating currents, by M. J. Charpentier. The mechanism controlling the introduction and motion of the sheet of paper upon which the curve is to be drawn is the chief characteristic of the recording galvanometer for which novelty is claimed.—The nature of the sulphur compound in the water from the Bayen spring at Bagnères-de-Luchon, by M. F. Garrigou. The Bayen water, before contact with air, contains a sulphhydrate of sulphur.—Soluble cellulose, by M. Léo Vignon. Oxycellulose, prepared from cellulose by means of hydrochloric acid and potassium chlorate, is acted upon by aqueous solutions of potash in the cold, with regeneration of cellulose and forming a soluble cellulose, which can be precipitated from the solution by hydrochloric acid, or chlorides of the alkalis and alkaline earths.—Physiological and histological observations on the Gephyrians (endothelial derivatives and pigmentary granules), by M. Marcel A. Hérubel.—On the existence of an axile filament in the adult conjunctival fibrilla, by M. P. A. Zachariades.—Indophil reaction of the leucocytes in the aseptic suppurations caused by the subcutaneous injection of essence of turpentine, by MM. J. Sabrazès and L. Muratet.

DIARY OF SOCIETIES.

THURSDAY, APRIL 30.
ROYAL SOCIETY, at 4.30.—Croonian Lecture: The Cosmical Function of the Green Plant: Prof. K. A. Timirjazev.
ROYAL INSTITUTION, at 5.—Hydrogen: Gaseous, Liquid and Solid: Prof. Dewar, F.R.S.
INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Divided Multiple Switchboards: An Efficient Telephone System for the World's Capitals: W. Aitken.
FRIDAY, MAY 1.
ROYAL INSTITUTION, at 9.—Recent Advances in Stereochemistry: Prof. W. J. Pope.
GEOLOGISTS' ASSOCIATION, at 8.—The Zones of the White Chalk of the English Coast. IV.—Yorkshire: Dr. A. W. Rowe.
MONDAY, MAY 4.
SOCIETY OF CHEMICAL INDUSTRY, at 8.—Problems in the Fat Industry: Dr. Julius Lewkowitzsch.
SOCIETY OF ARTS, at 8.—Mechanical Road Carriages: W. Worby Beaumont.
VICTORIA INSTITUTE, at 4.30.—Report on the Congress of Orientalists held at Hamburg, together with a Short Description of the Laws of

Hammurabi, the Amraphel of Genesis, Ch. xiv., as Engraved on the Recently Discovered Monument: Dr. T. G. Pinches.
TUESDAY, MAY 5.
ROYAL INSTITUTION, at 5.—The Blood and some of its Problems: Prof. Allan Macfadyen.
SOCIETY FOR THE PROMOTION OF HELLENIC STUDIES, at 4.30.
SOCIETY OF ARTS, at 4.30.—The Lagos Hinterland: its People and its Products: Major J. H. Ewart.
WEDNESDAY, MAY 6.
ENTOMOLOGICAL SOCIETY, at 8.—Descriptions of twelve New Genera and Species of Ichneumonidae and three New Species of Ampulex from India: Peter Cameron.
SOCIETY OF PUBLIC ANALYSTS, at 8.
SOCIETY OF ARTS, at 8.—The Construction of Maps and Charts: G. J. Morrison.
THURSDAY, MAY 7.
ROYAL SOCIETY, at 4.30.—*Probable Papers*:—On *Lagenostoma Lomaxi*, the Seed of Lyginodendron: Dr. F. W. Oliver and Dr. D. H. Scott, F.R.S.—On the Physiological Action of the Poison of the Hydrophidæ: Dr. L. Rogers.—Preliminary Note on the Discovery of the Pigmy Elephant in Cyprus: Miss D. M. A. Bate.
ROYAL INSTITUTION, at 5.—Hydrogen: Gaseous, Liquid and Solid: Prof. Dewar, F.R.S.
RÖNTGEN SOCIETY, at 8.30.—Exhibition Evening.
CHEMICAL SOCIETY, at 8.—(1) β -Bromonitrocamphor and β -Bromocamphoxyloxime. Influence of Impurities in Conditioning Dynamic Isomerism; (2) Spontaneous Decomposition of Nitrocamphor: T. M. Lowry.—The Active Constituents of *Butea frondosa*: E. G. Hill.
LINNEAN SOCIETY, at 8.—The Ingolfellidæ, fam. nov., a New Type of Amphipoda: Dr. H. J. Hansen.—The Evolution of the Marsupials of Australia: A. Bensley.—Copepoda Calanoida from the Farøe Channel, and Other Parts of the North Atlantic: Rev. Canon Norman, F.R.S.
INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Applications of Electricity in Engineering and Shipbuilding Works: A. D. Williamson.—Electric Driving in Machine Shops: A. B. Chatwood.
FRIDAY, MAY 8.
ROYAL INSTITUTION, at 9.—Rural England: H. Rider Haggard.
ROYAL ASTRONOMICAL SOCIETY, at 5.
MALACOLOGICAL SOCIETY, at 8.—On the Necessity of Examining and Comparing the Animals before Determining some Species of the Genus *Oliva*: F. G. Bridgman.—Notes on some British Eulimidæ: E. R. Sykes.—Note on the Occurrence of *Planorbis marginatus*, Drap., and *Limnæa pereger*, Müll., in the Pleistocene of Bognor, Sussex: Alexander Reynell.

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