

Societies and Academies.

LONDON.

Faraday Society, June 22.—Prof. A. W. Porter, president, in the chair.—C. J. **Smithells** (for the Research Staff of the General Electric Co.): High-temperature phenomena of tungsten filaments. Part i. Two types of tungsten wire are in general use for lamp filaments. One is composed of pure tungsten, and the other of tungsten containing up to 1 per cent. of a refractory oxide such as thoria. The crystal growth during burning has been investigated for both types. It is shown that the deformation of the filament which occurs during life is a function of the crystal growth. Crystal growth, which is suppressed in thoriated filaments, occurs when the thoria is reduced. Thoria and other refractory oxides can be reduced by phosphorus vapour at a high temperature. Part ii. deals with the chemical reactions which occur in gas-filled tungsten filament lamps when traces of the common gases are present in the filling gas.—E. **Hatschek**: A simple apparatus for determining the coagulation velocity of gold sols. The percentage of blue formed in coagulation of red gold sol is taken as a measure of the degree of coagulation. The percentage is determined by comparing the original red sol with a double wedge, one half consisting of the original sol, and the other of the completely coagulated blue sol. It is necessary that the latter should be coagulated by the same electrolyte as that used in the sol under examination, as the blues obtained with different electrolytes are not exactly alike. A number of determinations have been compared with V. Smoluchowski's formula for the coagulation velocity, and show good agreement for complete and fairly rapid coagulation.—Prof. A. W. **Porter**: The variation of surface tension and surface energy with temperature. Any satisfactory formula must correspond with the vanishing of both the surface tension σ and the surface energy u at the critical point. The connection is $u = \sigma - T \frac{\partial \sigma}{\partial T}$; hence $\frac{\partial \sigma}{\partial T}$ must also vanish at the critical point. These conditions are all satisfied by the formula put forward by van der Waals, and afterwards by Allan Ferguson, viz.

$$\sigma = \text{constant} (T_c - T)^n,$$

where n is a constant between 1.2 and 1.3. Whittaker has shown that u is proportional to $T \times$ internal latent heat. The author shows that if the reduced temperature be taken as the factor (instead of T), the numeric values show that for many substances u and the internal latent heat of evaporation tend to equality (on the C.G.S. system) as the temperature is approached. He also directed attention to the connection between van der Waals's equation for σ and Thiessen's equation for the latent heat, $\sigma = \text{constant} (T_c - T)^m$, where m is about 0.3.—S. M. **Neale**: The influence of solvent upon ionisation and the accompanying heat effect. A determination by electrical conductivity methods of the ionisation of picric and *paranitrobenzoic* acids in mixtures of acetone and water. From the values obtained at 25° and 35° C. the heats of ionisation are calculated. In the case of picric acid the heat of ionisation varies largely with the nature of the solvent, passing through a minimum at about 70 per cent. acetone. In the case of *paranitrobenzoic* acid the heat of ionisation is sensibly zero both in water and in 44 per cent. acetone, although in the latter solvent the ionisation constant has fallen to 1/20th of its value in pure water as solvent.—A. **McKeown**: The potential of the iodine electrode and the activity of the iodide ion at 25° C. The potential of the saturated

iodine electrode in combination with the normal calomel electrode has been measured for various values of the concentration of the iodide ion. The results have been compared with those of other investigators, making use of the concept of activity coefficient; the activities of the iodide and of the tri-iodide ion in the various solutions have been estimated and compared with the values of the concentration of these ions. It is found that the activities of both ions increase less rapidly than their concentrations. From the results the normal potential of the iodine electrode is calculated to be +0.2454 volt, the normal calomel being taken as zero.

PARIS.

Academy of Sciences, July 4.—M. Georges Lemoine in the chair.—The president announced the death through a motor-car accident of Jules Carpentier, free member.—G. **Lemoine**: The mutual reaction of oxalic acid and iodic acid. The influence of different catalysts. As catalysts, platinum sponge, platinum black, wood charcoal, and sugar carbon were used. In general, for the same reaction velocity a higher temperature was necessary in the absence of a catalyst. Increasing the weight of catalyst increased the reaction velocity, but this was proportional neither to the weight nor to the surface. The activity of the platinum black was very great in proportion to the other substances.—A. **de Gramont**: Spectra of quantitative sensibility of silicon in fused salts and in steels. Working with fused salts, two characteristic lines of silicon persist down to a content of 0.005 per cent. of silicon. With steel, the sensibility is less on account of the brightness and number of the iron lines.—P. **Sabatier** and B. **Kubota**: The action of heat on allyl alcohol in presence of various catalysts. There are two main reactions, dehydrogenation and dehydration; copper and manganous oxide especially effect the first of these, and tungstic acid, thoria, and alumina the second. With zirconia and uranic oxide both reactions occur together. Owing to secondary changes the final product is very complex, and contains water, acrolein, propyl aldehyde, higher aldehydes formed by condensation, and hydrocarbons (mesitylene). The gases include propylene, hydrogen, carbon monoxide, and dioxide, but neither acetylene, allene, nor allylene could be detected.—B. **Gambier**: Imaginary surfaces applicable to a surface of revolution; real corresponding cyclic systems.—D. **Riabouchinski**: The cyclic movement of a liquid round a solid which moves parallel to a rectilinear wall.—J. **Mascart**: Observation of the occultation of Venus of July 1, 1921, made at the Observatory of Lyons. Observations were made under good atmospheric conditions by six observers with different types of instrument.—E. **Belot**: The law of rotation of the sun explained by evolution and flattening of the protosun.—M. **Brillouin**: Bohr's atom. The circumnuclear Lagrange function.—A. **Lafay**: The figures of M. de Heen and the electric discharge.—M. **Solomon**: A radiological ionometric arrangement. A description of an apparatus for the measurement of ionisation in medical radiology. It is standardised by a known quantity of radium.—A. **Dauvillier**: The principle of combination and the absorption lines in the X-ray spectra.—A. **Marcelin**: Surface tension of the monomolecular layers.—A. de G. **Rocasolano**: Variations of catalytic power in the electroplatinosols.—G. **Tanret**: An ammonium molybdo-quinat. Quinic acid is known to show a marked increase in rotatory power when mixed with solutions of molybdates. This is due to the formation of a definite complex compound, ammonium molybdo-quinat, the isolation and analysis of which are described.—J. **Cvijić**: The correspondence

of the fluvial steps and river-banks.—R. **Souèges**: The embryogeny of the Labiates. Development of the embryo in *Glechoma hederacea* and in *Lamium purpureum*.—P. E. **Pinoy**: The germination of the spores, the nutrition, and the sexuality of the Myxomycetes.—Mme. Z. **Gruzewska**: The mucilaginous substances of *Laminaria flexicaulis*. Nitrogen does not appear to be an essential constituent of the mucilage; hydrolysis is slow, the sugar formed being glucose or galactose.—G. **Bertrand** and R. **Vladesco**: The variation in the proportion of zinc in the organism of the rabbit during growth. The proportion of zinc contained in the entire body of the rabbit is a maximum at birth, diminishes during the period of lactation, and then, after the twenty-fifth day, on weaning, the zinc increases rapidly.—H. **Bierry**, F. **Rathery**, and Mlle. **Levina**: The proteid sugar in cancerous subjects. The amounts of free sugar and proteid sugar in the blood-plasma of ten cancerous subjects have been determined. The proteid sugar is from twice to four times the normal amount.—M. **Aron**: The existence and rôle of an endocrinian tissue in the testicle of some Batrachians.—C. **Pérez**: A new Ceponian, *Onychocepon harpax*, a branchial parasite of Pinnotheres.—H. **Faes** and M. **Stachelin**: The resistance of the adult cockchafer to low and high temperatures. The adult cockchafer can be submitted to a temperature down to -8° C. and recover its activity on warming; at lower temperatures it is killed. This insect is more susceptible to high temperatures, since at 45° C. it is killed.

BRUSSELS.

Royal Academy of Belgium, January 8.—M. A. **Gravis** in the chair.—A. **Demoulin**: The equations of Moutard with quadratic solutions.

February 5.—M. G. **Cesàro**, president, in the chair.—C. **Julin**: Report of the decisions taken at the meeting of the section of biological oceanography of the International Union of the Biological Sciences.—J. **Massart**: The four steps of sexual conjugation.—P. **Stroobant**: Complementary note on the nature of the temporary stars.—C. **Servais**: A group of three tetrahedra.—P. **Nolf**: The action of chloroform on the coagulation of the blood plasma of birds. Antithrombosine is generally considered the physiological antagonist of thrombine, its function being to neutralise this substance wherever it is in excess. This is not found to be in accord with the experiments described. It would appear that antithrombosine, instead of neutralising thrombine, contributes to its formation.—Th. **de Donder**: The *gravific* field.—L. **Godeaux**: Researches on the cubic involutions belonging to an algebraic surface.—F. **Carpentier**: The prothoracic endo-skeleton of *Gryllotalpa vulgaris*.

March 5.—M. G. **Cesàro**, president, in the chair.—A. **de Hemptinne**: The law of Faraday, and the action of the silent electric discharge on the metallic oxides. An account of experiments in which the oxides of lead, copper, nickel, and mercury are exposed to the silent discharge in an atmosphere of hydrogen under reduced pressures (10 to 30 mm.).—E. **van Aubel**: (1) The atomic heat of the elements. According to a recent communication by M. Félix Michaud, the atomic heat should have the value 3.5 for a temperature corresponding to a maximum of the quotient CA/T (where C is the specific heat, A the atomic mass, and T the absolute temperature). An examination of the values for silicon, boron, rhombic sulphur, thallium, magnesium, and chromium shows that these substances are not in accordance with M. Michaud's rule. (2) The density and refractive index of mixtures of aldehyde with water or ethyl alcohol.—C. **Servais**: Quadratics of revolution conjugated to a tetrahedron.—

E. **Henriot**: The variation of the refractive index of liquids with density.

April 9.—M. G. **Cesàro**, president, in the chair.—G. **Cesàro**: Some new forms of orpiment from Balìa, Asia Minor.—C. **Servais**: A curve of the third order associated with a triangle.—P. **Stroobant**: Observation of a shooting star at Brussels.

May 3.—M. G. **Cesàro**, president, in the chair.—M. **Stuyvaert**: An element analogous with a curvature at a point external to a plane algebraic curve.—L. **Godeaux**: Some linear congruences of skew cubics considered by M. Stuyvaert.—P. **Bruylants**: The action of the organo-magnesium compounds on glutaric nitrile. This nitrile behaves as a pseudo-acid, and on acidifying the reaction product nearly the whole of the nitrile is recovered. There is a secondary reaction producing a very small quantity of a ketone, probably $C_2H_5.CO.(CH_2)_3.CN$.—H. **Vanderlinden**: The *gravific* field of an electrified sphere.

ROME.

Reale Accademia nazionale dei Lincei, May 8.—F. D'Ovidio, president, in the chair.—Papers by fellows:—C. **Somigliana**: Depth of glaciers, i. The equations of motion are found for a glacier, and are identical in form with those of a viscous liquid moving slowly in a tube inclined to the horizon. This very natural conclusion is justified by the property that the velocity of the glacier is considerably less than the critical velocity at which fluid motion becomes turbulent. It might be suggested, however, to Prof. Somigliana that the cracking of the ice substitutes another effect limiting the applicability of the equations in this case.—F. **Severi**: Integrals of first species, v.—O. M. **Corbino**: Thermal analogue of Oersted-Ampère effect, ii.—Papers communicated through a fellow:—G. **Abetti**: Astronomical determinations of latitudes and longitudes in Central Asia. These were carried out in De Filippi's expedition in 1913-14 by the author and Comdr. A. Alessio, the longitudes being referred to the meridian of the transit circle of Dehra Dun by wireless signals from the Trigonometrical Survey of India. The observations were made at the following stations: In Baltistan at Tolti, Wazul Hadur, Scardu, and Càrghil; in Ladak at Lamairu and Leh; in Caracorùm at Depsang and the front of the Rimu glacier (altitude 4912 metres); and in Turkestan at Sughèt Carol, Jàrcand, and Càshgar.—C. **Perrier**: Presence of zinc in the malachite of Chessy. A comparison of malachite and the new mineral rosasite is given.—C. **Gorini**: Proteolitic activity of lactic ferments, v. Phenomena of rapid physiological mutation.—D. **Maestrini**: Enzymes, vi. Protective power of starches and other substances on phthalin in acid media.—J. **Pérés**: "Transformations qui conservent la composition." A sequel to the author's previous contributions in the *Annales de l'École normale supérieure* and *Bulletin de la Société mathématique de France*, published in 1919.

SYDNEY.

Royal Society of New South Wales, June 1.—Mr. E. C. Andrews, president, in the chair.—A. R. **Penfold**: The occurrence of a new phenol in the essential oils of the Leptospermum. In the course of the examination of the essential oils obtained from *Leptospermum flavescens* growing in various parts of New South Wales, a phenolic body was found to occur in amounts varying from 0.75 to 8 per cent., the latter being obtained from material growing in the Lane Cove (Sydney) district. It has been named "Leptospermol."