

swept away houses along a course of more than 50 miles. The number of lives lost by the avalanche and flood was 1162. The district covered by the ashes was about 4250 square miles and the total volume about one-sixth of a cubic mile.

Aug. 7-14, 1899. West Indian Hurricane.—A hurricane of exceptional violence struck the West Indies near Guadeloupe, crossed the Leeward and Virgin Islands, Porto Rico, and the Bahamas, and continued along the east coast of the United States. There was great destruction of life and property, especially in the island of Porto Rico, where more than 3000 lives were lost, mainly by drowning, and many more died afterwards from starvation. The coffee crop, worth more than £1,400,000, was almost completely destroyed. The storm was traced from America across the Atlantic into the Mediterranean, where it finally dissipated.

Aug. 8, 1924. Transport of Insects.—The Oxford University Expedition to Spitsbergen recorded that after several days of south-westerly winds, on the morning of Aug. 8, living hover-flies and aphides were observed in considerable numbers, crawling on the ice of the glaciers. These were collected and were afterwards shown to have been carried from the forest belt of northern Europe, a distance of at least 800 miles.

Aug. 9, 1911. Heat in London.—The summer of 1911 was noted for its great heat in England. On Aug. 9 the thermometer in the Glaisher stand at Greenwich registered exactly 100° F., the highest authentic shade temperature in Great Britain. The maximum was not momentary, but was maintained almost continuously from 3 to 3.30 P.M.

Societies and Academies.

PARIS.

Academy of Sciences, June 2.—Mesnager: The optical determination of internal strains in solids of three dimensions. Remarks on a communication by Henry Favre on the same subject.—H. Deslandres: Properties of the series and abnormal lines in atomic spectra.—L. Blaringhem: The heredity of sex in *Aquilegia vulgaris*.—Louis Lapicque was elected a member of the Section of Rural Economy in the place of the late L. Lindet.—Gaston Julia: Some harmonic majorants.—Georges Bouligand; Poles, essential singularities.—Victor Vâlcovici: A mixed problem.—T. Bonneson: Inequalities between arithmetical means.—Léonidas Kantorovitch: Functions of the (U) type.—Luigi Fantappiè: The singularities of a linear analytic functional of a function of several variables.—J. Haag: The theory of the spiral.—Jean Chazy: The velocity of propagation of attraction.—N. Stoyko: The orbit of the trans-Neptunian star discovered at the Lowell Observatory.—J. Le Roux: The interpretation of Michelson's experiment.—Edgar Baticle: The problem of the wall supporting a mass of powder.—Mlle. Simone Boudin: Coloured crystalline stratifications. Study of *p*-toluidine, β -naphthylamine and diphenylamine. A modification of the technique proposed by Rene Marcelin for the study of the development of the elementary leaflet of *p*-toluidine, with application to other substances.—R. Forrer: A method of discussion of the magnetic moments of alloys, and the common measure of atomic moments.—A. Dauvillier: The realisation of integral microradiography. The radiography of microscopic objects has offered great experimental difficulties. The author uses plates similar to those devised by Lippmann for interferential photography, prepared with colloidal silver according to the

technique described by Watteville. A reproduction of a radiograph, with a magnification of 600, is given.—Mme. Pierre Curie and Mme. S. Cotelle: The average life of ionium. The method used, based on the rate of formation of radium in a mixture of ionium and thorium oxides, assumes only a knowledge of the atomic weights of ionium, thorium, and of the ionium-thorium mixture utilised in the experiments. The value obtained, 119,000 years, is intermediate between that of Soddy (110,000 years) and that of St. Meyer (130,000 years).—F. Joliot and Mme. Irène Curie: The radiations associated with the emission of the α -rays of polonium.—G. Reboul and G. Déchéne: The activation of matter by the brush discharge. The brush discharge, produced by e.m.f. of 20,000-100,000 volts, activates metallic plates, communicating an activity measurable by an electrometer, and persisting for up to 72 hours. The curve corresponds to the superposition of three superposed exponentials of periods of 3 minutes, 27 minutes, and 20 minutes. The residual activity has a period of 10.6 hours. From these measurements the activity produced would appear to be due to the disintegration of the emanations of radium and thorium.—Louis D'Or: The manometric and spectrographic study of the thermal dissociation of pyrites, FeS_2 . The thermochemical equation of the decomposition is $2\text{FeS}_2 = 2\text{FeS} + \text{S}_2 - 61,000 \text{ cal.}$ The energy of fixing the first atom of sulphur is 90,500 cal., whilst that of the second is 82,500 cal.—M. Bourguet and P. Daure: Chemical constitution and the Raman effect: the acetylene linkage.—Ch. Jovignot: Method and testing apparatus giving the extension coefficient and the breaking load of metallurgical products in thin sheets.—G. Dupont, J. Lévy, and J. Allard: The mechanism of the action of catalysts in the autoxidation of abietic acid.—Georges Darzens: The transformation by isomerisation of benzylvalerolactone into tetrahydromethylnaphthalene carboxylic acid. This transformation is effected by heating to 120°-125° C. with 64.5 per cent sulphuric acid with constant agitation for eight days. The reaction is very slow, but, allowing for recovered lactone, quantitative.—Félix François: The action of selenoxanthidrol on β -diketones and on ethyl acetoacetate.—Mlle. Marie Thérèse François: The neutralisation of castor oil. A suggestion for the use of commercial triethanolamine for the removal of acid from castor oils used for lubricating purposes.—Paul Combes and Roger Campredon: The study of a new deposit of calcite exposed during the excavations for the new entrance to the port of Saint-Nazaire.—Jacques de Lapparent: The amount of titanium in bauxites.—L. Dollé: The *marcas* of the high plateau of Artois.—A. Guilliermond: Homo- and heterothallism in the yeasts.—André Dauphin: The histological characters of roots developed separately.—Philippe Fabre: An electrical hæmodromograph.—Gordon H. Scott: The arrangement of the mineral constituents of the nucleus during mitosis.—I. I. Nitzescu and I. D. Georgescu: The amount of citric acid in some animal fluids (cephalo-rachidian fluid, aqueous humour, follicular liquid, amniotic fluid).

BRUSSELS.

Royal Academy of Belgium, Nov. 9.—G. Cesàro: Cells with minimum surface. A mathematical discussion on the form of cell made by the bee.—Th. de Donder: Affinity. (Part 2.) Discussion of open systems with osmotic pressure, surface tension, and adsorption.—G. Balasse and Mlle. G. Galet: Iodine spectra with weak excitation. The tubes giving the spectra were without electrodes and the oscillating current, of 70 metres wave-length, was maintained by two triode emission valves. Details are given of

the method of purifying the iodine. All probable impurities were sought for spectroscopically and proved absent.—F. Corin: Contribution to the study of the chloritoides. An application of the methods of Fedorow to the study of these minerals.—Marcel V. L. Homès: Observations on the structure and cell division of living *Halopteris filicina*.—Lucien Godeaux: (1) The Lie quadrics of certain surfaces.—(2) The Guichard transformation and certain quadrics considered by M. Demoulin.—(3) The united points of the cyclic involutions belonging to an algebraic surface.—Yvonne Désirant: Ethyl-difluoroacetate. Full details are given of the preparation, physical properties, and chemical reactions of the ester. The enol-ketone equilibrium was studied.—Raymond Defay: The thermodynamical study of surface tension. Affinity and adsorption velocity.

Dec. 7.—Paul Stroobant: Observations of the partial eclipse of the sun of Nov. 1, 1929. An account of results obtained at the Royal Observatory of Belgium (Uccle) and at the Astronomical Institute of the University of Brussels.—Jean P. Bosquet: Contribution to the invariant theory of the calculus of variations.—J. Jaumotte: The movement of masses of air in the atmosphere.—L. and M. Lapique and Henri Fredericq: Nerve and muscle chronaxies of the heart of *Limulus polyphemus*.—Radu Badesco: A functional equation.—Maurice Lecat: The application of azeotropism to functional chemical analysis. On the basis of extensive experimental work on the constant boiling mixtures formed by various classes of organic compounds, the author has devised a scheme for determining the class of an unknown organic compound from its azeotropic characters.—R. H. J. Germy: The application of a method of successive approximations to the solution of the Gauss equation $\sin(z - q) = m \sin^2 z$.

Jan. 4.—Th. de Donder: The photonic field.—G. Cesàro: The ellipse circumscribed round a triangle and having for its centre the centre of the inscribed circle.—J. E. Verschaffelt: Determinations of surface tension by measuring the force required to remove a flat disc.—H. Buttgenbach: The optical appearances of the cleavage plates of rhodonite.—J. Meion: The orientation of the optical ellipsoid of rhodonite.—Raymond Defay: The chemical kinetics of Th. de Donder and stable and metastable equilibria.—Jacques van Mieghem: Study of retarded potentials.—G. van Lerberghe: The calculation of the fugacities of a solution.—Th. Lepage: A characteristic property of the equations of the extremals of multiple integrals.

Feb. 1.—F. Corin: Contribution to the petrographical study of the lodes of the Bastogne region.—M. Kraitchik: The statistical study of prime numbers.—Raymond Defay: (1) The thermodynamical study of surface tension. Affinity and adsorption velocity.—(2) The chemical kinetics of Th. de Donder and stable and metastable equilibria.—M. Cosijns and R. Moens: A precision wavemeter. Details of a wavemeter capable of rapidly measuring frequencies between 3×10^4 and 3×10^6 with an accuracy of 0.001 per cent in absolute value.—J. Jaumotte: A movement quasi-equivalent to the movement of the atmosphere.

CRACOW.

Polish Academy of Science and Letters, Jan. 13.—F. Leja: The linear transformations of double and multiple series.—Mlle. A. Dorabalska: The heat yield of some radioactive minerals. Results of measurements with an adiabatic microcalorimeter of the heat in calories per hour per gram of uraninite, johannite, thorianite, Arendal orangite, thorite and monazite. Three minerals, orangite, thorite, and

monazite, give a calorific effect much greater than that calculated from their chemical composition: this requires theoretical and experimental explanation.—K. Dziewoński and J. Reiss: The oxidation of acetylnaphthalene.—F. Górski: Increase of accuracy in the method of counting the bubbles in photosynthetic researches.—E. Godlewski, jr., and Mlle. I. Latinik: The ontogenetic and regenerative growth of *Axolotl*.—A. J. Klisiecki: The movement and pressure of the blood in the arteries.

Feb. 10.—The Starunia rhinoceros. (1) J. Nowak and E. Panow: Geological characters. (2) J. Tokarski: The mineralogical characters of the diluvial mud. (3) W. Szafer: Character of the flora. (4) J. Stach: Description and reconstruction of the rhinoceros.—T. Mazewski: Some points of the theory of length.—E. S. Pearson and J. Neyman: The problem of two samples.—C. Zakrzewski and T. Nayder: The refraction of electric waves ($\lambda = 12$ cm.) in some electrolytes. No difference could be found between the index of refraction of water and those of the solutions of electrolytes used. The value found, 8.8, was identical within the limits of experimental error with the index found with long waves.—M. Lancucki: Sorption and chemical reactions in the atomic radius.—Mlle. M. Moraczewska: New absorption bands of selenium vapour in the extreme ultra-violet.—M. Centnerszwer and W. Wittandt: The velocity of solution of aluminium in alkaline solutions.—K. Dziewoński: The syntheses of ketones, derivatives of 1-benzyl-naphthalene.—M. Książkiewicz: Geological researches in the Wadowice Carpathians. Stratigraphic and tectonic relations.—J. Talko-Hrynczewicz: A contribution to the craniology of the present population and of past races of central Asia.—J. Lenartowicz: Researches on experimental syphilis.

VIENNA.

Academy of Sciences, May 2.—W. Knapp: The action of *o*-phthalylchloride on thio-phenol-methyl-ether.—R. Fischer: Testing with blood-gelatin for saponin in plants.—M. Beier: Zoological expedition to the Ionian Islands and the Peloponnesus (12). The ants of the Ionian Islands by B. Finzi.—M. Radakovic: Studies on the Raman effect (8). Calculation of simple molecular models. A system of particles bound together by elastic forces and an attempt to calculate the oscillations in a simple case.—H. Winter: The pole of inertia and its application in the graphic dynamics of plane gears.—E. A. W. Schmidt and G. Stetter: Ionisation of single α - and H-rays at the end of their range.—E. A. W. Schmidt and G. Stetter: Researches on α -reflection and disintegration effects with light elements.—A. Dadiou and K. W. F. Kohrausch: Studies on the Raman effect (9). The Raman spectrum of organic substances. Molecules of different patterns were considered, $X-CH_3$ and $X-CH_2-X$, as systems of so many points and so many degrees of freedom, with an internal oscillation of the H atom and an external oscillation of the X with regard to the methyl group. As special examples C_2H_5 , Cl_2CH_2 , Cl_3CH gave useful results.—R. Springer and H. Roth: A sort of turbulence-friction in binary mixtures of liquids.—R. Kremann, B. Korth, and E. I. Schwarz: Electrolysis of molten silver-lead alloys. With high current density a limiting value to the concentration of silver round the cathode was observed.—R. Kremann and E. I. Schwarz: The electrolysis of bronzes with added silver. Silver and copper concentrate at the cathode. The percentage enrichment of silver is less with increasing concentrations of silver.—R. Kremann, F. Bauer, A. Vogrin, and H. Scheibel: The change in direction of migration of alkali and other metals during the electrolysis of their

amalgams in relation to the concentration. There is a transformation point above which Na, K, and Ba concentrate at the cathode; Bi even from the lowest percentages moves towards the anode. Apparently the polarity of the components of the alloy determines the direction of migration.—R. Kremann and W. Piwetz: Electrolysis of bronzes with added lead. Copper migrates to the cathode, lead to the anode. For high current density the enrichment of lead is greater in the alloys that are poorer in lead.—F. Hölzl and K. Rokitsky: The mobilities of some ions containing iron (2). The influence of radicle substitution on the mobility of complex iron-ions. Comparisons were made between $\text{Fe}(\text{CN})_6$, $\text{Fe}(\text{CN})_5\text{CO}$, $\text{Fe}(\text{CN})_5\text{NO}_2$, and other groups. From conductivity measurements were calculated the radii corresponding to the apparent ionic volumes. The substitution of CO for one CN made little difference. By contrast $\text{Fe}_3(\text{NO})_7\text{S}_3$ has a very small mobility.

WASHINGTON, D.C.

National Academy of Sciences (*Proc.*, Vol. 16, No. 3, Mar. 15).—Albert F. Blakeslee and Ralph E. Cleland: Circle formation in *Datura* and *Ecnothera*. The view is adopted that segmental interchange is a possible basis of circle formation of the chromosomes of these genera.—Ralph E. Cleland and Albert F. Blakeslee: Interaction between complexes as evidence for segmental interchange in *Ecnothera*. The segmental interchange hypothesis leads to useful predictions of chromosome configuration in certain complex combinations.—J. T. Buchholz and A. F. Blakeslee: Pollen-tube growth of the primary mutant of *Datura*, rolled, and its two secondaries.—R. B. Lindsay and R. J. Seeger: Operational calculus in quantum mechanics. Some critical comments and the solution of special problems.—H. Bateman: Physical problems with discontinuous initial conditions.—F. Zwicky: On the possible influence of the mosaic structure of crystals on the determination of Avogadro's number. There is a discrepancy between the wavelength of X-rays as determined by the method of reflection from a ruled grating and by reflection from a crystal of known structure, the latter of which involves use of the density and Avogadro's number. The conception of mosaic structure leads to a correction to this method, bringing the two results into better agreement.—Everett S. Wallis: The problem of preparing optically active free radicals.—Raymond F. Blount: The implantation of additional hypophyseal rudiments in urodele embryos. Where buccal endoderm only was transplanted, the results were negative. When grafts including ectoderm and underlying neural tube were used, pigmentation was increased and body length was decreased while certain parts showed disproportionate growth and there was early sexual maturity.—Andrew Watson Sellards: The cultivation of treponemata from the blood of normal monkeys (*Macacus rhesus*) and from the blood of monkeys infected with yellow fever. Repeated inoculations with culture from yellow fever animals caused death, but the liver lesions were not always those occurring in yellow fever. Thorough immunisation with culture of treponemata from yellow fever sources produced partial to complete protection against yellow fever virus.—Marston Morse: The problems of Lagrange and Mayer under general end conditions.—R. L. Wilder: Concerning perfect continuous curves.—M. H. A. Newman: Combinatory topology of convex regions.—Tibor Radó: Some remarks on the problem of Plateau.—Eldred Currier: The problem of the calculus of variations in m -space with end-points variable on two manifolds.—Willem J. Luyten: (1) On some statistical properties of double

stars in space. (1) A formula for the estimation of the period in a relatively fixed system. The formula allows of the calculation of the period of a binary system from the angular separation, the parallax and the luminosity, the chance being 2 out of 3 that the actual period is between 0.4 and 2.5 times the computed value.—(2) On the mean period of double stars in space. Computed values agree well with those known and the equation is applied to all double stars nearer than 10 parsecs. The general conclusion is that the median-mean period is about 300 years and half of the binaries in space probably have periods between 20 and 4000 years.

Official Publications Received.

BRITISH.

Interim Report (March 1930) of the Furunculosis Committee appointed July 1929 by the Rt. Hon. William Adamson and the Rt. Hon. Noel Buxton. Pp. 65+10 plates. (Edinburgh and London: H.M. Stationery Office.) 3s. 6d. net.

Proceedings of the Edinburgh Mathematical Society. Series 2, Vol. 2, Part 2. Edited by Prof. H. W. Turnbull and Dr. E. T. Copson. Pp. 61-128. (London: G. Bell and Sons, Ltd.)

Air Ministry: Aeronautical Research Committee. Reports and Memoranda. No. 1307 (Ae. 447): On the Effect of Altitude upon the Distance required for an Aircraft to take off and climb 20 Metres, giving Generalised Curves of Weight Reduction necessary if a given Aircraft is to comply with the Requirements of A.P. 1208 under adverse Atmospheric Conditions. By K. T. Spencer. (T. 2894.) Pp. 7+5 plates. 6d. net. No. 1309 (Ae. 449): Stresses in Wing Structures—Accelerometer and Incidence Measurements in various Manœuvres. By S. Scott-Hall. (T. 2723.) Pp. 6+6 plates. 9d. net. No. 1287 (M. 67): Mechanical Properties of Pure Magnesium and certain Magnesium Alloys in the Wrought Condition (Continued). By S. L. Archbutt and Dr. J. W. Jenkin. (A. 61.) Pp. 16+8 plates. 1s. net. No. 1288 (Ae. 437): The Accelerations of a Fairey "Flycatcher" Seaplane during Aerobatic Manœuvres. By L. P. Coombes and A. S. Crouch. (S. 72, revd.) Pp. 4+6 plates. 6d. net. No. 1296 (Ae. 430): Tests on Models of High Speed Seaplanes for the Schneider Trophy Contest of 1927. Section 1: Supermarine S.5 Models. By W. L. Cowley and Dr. R. Warden. (T. 2550.) Pp. 62+45 plates. 4s. net. No. 1297 (Ae. 431): Tests on Models of High Speed Seaplanes for the Schneider Trophy Contest of 1927. Section 2: Tests on the Gloster IV Models. By W. L. Cowley and Dr. R. Warden. (T. 2550a.) Pp. 48+49 plates. 3s. 6d. net. No. 1298 (Ae. 432): Tests on Models of High Speed Seaplanes for the Schneider Trophy Contest of 1927. Section 3: Tests on the Crusader Models. By W. L. Cowley and Dr. R. Warden. (T. 2550b.) Pp. 35+26 plates. 2s. 6d. net. No. 1299 (Ae. 435): Tests on Quarter Scale Models of High Speed Seaplanes for the Schneider Trophy Contest of 1927. Section 4: Comparison with Full Scale and Conclusions. By W. L. Cowley and Dr. R. Warden. (T. 2550c.) Pp. 32+13 plates. 1s. 9d. net. (London: H.M. Stationery Office.)

The Organization of Mosquito Control Work. By John F. Marshall. Pp. 10+8 plates. (Hayling Island: British Mosquito Control Institute.) 9d.

FOREIGN.

Ministry of Agriculture. A Brief Account of the Research Work of the Sections of the Ministry at Giza: Drawn up on the Occasion of the visit of H.M. King Fouad I. to those Sections (April 27, 1929). Pp. 15. (Cairo: Government Publications Office.)

Bulletin of the Imperial Earthquake Investigation Committee. Vol. 11, No. 4: Re-Survey of the Kwantó District after the Great Earthquake of 1923. By Rikuti Sokuryobu. Pp. 6+80+7 plates. (Tokyo.)

Proceedings of the Imperial Academy. Vol. 6, No. 5, May. Pp. xv-xviii+187-215. (Tokyo.)

Bulletin of the Michigan College of Mining and Technology. New Series, Vol. 3, No. 4: Announcements of Courses, 1930-31. Pp. 128. (Houghton, Mich.)

New York Zoological Society. Report of the Director of the Aquarium. Pp. 21. (New York City.)

Bulletin of the Geological Institution of the University of Upsala. Vol. 22. Pp. iii+308+4 plates. (Upsala: Almqvist and Wiksells Boktryckeri A.-B.)

Memoirs of the College of Science, Kyoto Imperial University. Series A, Vol. 13, No. 3, May. Pp. 175-280. (Tokyo and Kyoto: Maruzen Co. Ltd.) 1.50 yen.

Scientific Papers of the Institute of Physical and Chemical Research. Nos. 244-253: On the Physiological Role of Carotin and Allied Substances, by Kozo Kawakami and Ryang-ha Kimm; The Determination of the Helium Content of some Japanese Minerals, 2, by Jiró Sasaki; The Chemical Nature of Cypridina Luciferin, by Sakyo Kanda; The Band Spectra of OsO_4 in Gaseous State and in Solution, by Sechi Kato; An Attempt to prepare Higher Unsaturated Alcohols from certain Drying Oils, by Sin'iti Kawai; 4-iodo-biphenyl-4-isocyanate as a Reagent for Alcohols, 1: Corresponding Urethanes derived from Fatty Unsaturated Alcohols, by Sin'iti Kawai; 4-iodo-biphenyl-4-isocyanate as a Reagent for Alcohols, 2: Corresponding Urethanes derived from C_1 - C_{18} Normal, Saturated, Primary Alcohols, by Sin'iti Kawai and Kunisaburo Tamura; Study on the Corona Discharge at Large Gap Lengths in Air (Abridgment), by Takeshi Nishi and Yoshitane Ishiguro. Pp. 231-282. (Tokyo: Iwanami Shoten.) 80 sen.

Bulletin météorologique de l'Observatoire météorologique de Beograd. 1: Observations diurnes en Serbie, juillet-décembre 1905, et résumés annuels 1905. Publié sous la direction de P. Vujević. Pp. 43. (Beograd.)