

Societies and Academies

LONDON

Physical Society, Dec. 16.—Allan Ferguson and J. T. Miller: A method for the determination of the specific heats of liquids, and a determination of the specific heats of aniline and benzene over the approximate range 20° to 50° C. The specific heats of aniline and benzene are determined by measuring the electrical power E^2/R necessary to hold the temperature of a calorimeter and its contents steady at various temperature-excesses.—E. V. Appleton and G. Builder: The ionosphere as a doubly refracting medium. In a previous communication the occurrence of wireless echo doublets was described and was provisionally attributed to the influence of the earth's magnetic field on the dispersive properties of the ionosphere. A more extended study of the subject, which has included an experimental determination of the polarisations of the doublet components, has confirmed this hypothesis. In south-east England, for ionospheric reflection at vertical incidence, the echo component of lesser delay is in general of right-handed, and the component of greater delay of left-handed, circular polarisation, but this temporal sequence should be reversed in the southern hemisphere and in certain special circumstances in the northern hemisphere.—M. Taylor: The Appleton-Hartree formula and dispersion curves for the propagation of electromagnetic waves through an ionised medium in the presence of an external magnetic field. (1) Curves for zero absorption. The curves are drawn to show the value of the squares of the indices of refraction and attenuation as functions of the electron density for a series of twelve frequencies, which are chosen to illustrate the various classes of curve and the boundary curves separating the classes and, in the case of frequencies of more than 1.321 megacycles per second, the various regions of short and ultra-short waves. The derivation and general properties of the Appleton-Hartree formula and the various possible modes of propagation are also discussed. The dispersion curves are classified according to the infinities they contain and a diagram is given to show how the classes of curve holding for any angle of inclination of the direction of propagation to the magnetic field H depends on the ratio of the longitudinal component of H to H itself.—L. F. Bates: A new apparatus for the measurement of the earth's magnetic field. A small cylinder of mumetal is wound with fine wire, the ends of which are connected to wires forming a torsional suspension. This cylinder is placed with its centre at the mid-point of a Helmholtz coil system with its axis adjusted to coincide with the direction of the component of the earth's field which is to be measured, the suspension being perpendicular to the component. The current through the coil system can be adjusted so that there is no deflection of the suspended cylinder when the current in the solenoid wound upon it is reversed, in which case the calculated field produced by the coils is equal to the required component.—E. G. Richardson and E. Tyler: The flow of liquid suspensions. Measurements of the velocity from point to point in a liquid rotating in the space between two concentric cylinders, of which the outer rotates while the inner is still, have been made by means of a hot-wire anemometer. In a suspension, the velocity gradients are abnormal but can be explained in

terms of a variable viscosity, which is a function of the velocity gradient.—Lewis Simons and E. H. Smart: A model to illustrate the motion of a diatomic rotator with two degrees of freedom. An arm 5 in. long is pivoted at one end and carries at the other end a small electric lamp which is thus capable of moving on the surface of a sphere about the pivot as centre. The two angular velocities $\dot{\Phi}$ and $\dot{\theta}$ can be independently controlled by two hand-regulated motors: $\dot{\Phi}$ is the azimuthal and $\dot{\theta}$ the co-latitudinal angular co-ordinate of the arm. If $\dot{\Phi}$ and $\dot{\theta}$ are commensurable, the resulting figure traced out by the lamp remains stationary in space. This path represents the motion of one of the atoms of the rotator, which has two degrees of freedom.

PARIS

Academy of Sciences, Nov. 7.—J. Costantin: The secret of Java. An account of the methods used to combat the sugar cane disease (Sereh) of Java, with special reference to the favourable effects of growing the young shoots at high altitudes.—Bertrand Gambier: Ruled algebraic surfaces and their singularities.—Potron: Certain conformal transformations in a Riemann space.—Vignaux: Riemann's method of summation.—Nikola Obrechhoff: The summation of the Fourier trigonometric series and conjugated series.—P. Papcovitch: General expressions for the components of stresses, containing as arbitrary functions only harmonic functions.—J. Haag: The improvement of the isochronism of pendulums by the use of elastic stops. The method is not new, but has hitherto been based empirically on experiment. A theoretical study is given, defining the characteristics of the best arrangement.—R. Thiry and L. Sackmann: A special arrangement of the stream lines in front of an obstacle. Outline of an experimental method with a hydrodynamic tunnel, with some preliminary results.—P. Idrac: Ultra-sensitive recorders of variation of altitude and temperature for aeroplanes.—Kiveli-ovitch: Some particular cases of the problem of three bodies with impacts.—Th. V. Ionescu and C. Mihul: Ionised gases in the magnetic field: pressures below 0.001 mm. mercury. Continuation of experiments on the influence of pressure and of water vapour on the conductivity of ionised gases. Curves are given showing the conductivity as a function of the magnetic field.—G. Athanasiu: The sensibility in the spectrum of photo-cells with electrodes of copper covered with cuprous oxide. It is concluded that, in general, a copper electrode covered with a thin layer of cuprous oxide and dipped into neutral or alkaline electrolytes gives a negative E.M.F. on illumination. The effect commences at about 6500 Å., increases as the wavelength diminishes, reaches a maximum and diminishes again towards the extreme violet of the visible spectrum. The method of preparing the film affects the results.—E. Carvallo: The effect observed by Miller at Mount Wilson was the Esclangon effect. The author gives another interpretation of Miller's experiments. He regards them as confirming and generalising Michelson's law, that the earth's velocity introduces no difference of path between the two rays of the interferometer.—Yves Rocard: The theory of critical opalescence.—S. Y. Sze: The β -rays emitted by the active deposit of actinium.—Francis Perrin: The average life of activated atomic nuclei. Probable cases of the impossibility of the γ -emission.—G.I. Costeanu: The measurement of electromotive forces in liquid ammonia. Details of the experimental

method and data for two cases.—B. Bogitch : The use of diaphragms in the commercial electrolysis of metals. Advantages are claimed for the use of impermeable diaphragms. High purity of the anodes is less necessary; the cathodes can be as pure as desired and the volume of electrolyte in circulation is considerably reduced. There is one disadvantage: there is an increase in the electrical energy used—about twenty per cent in the apparatus described.—Mlle. Suzanne Veil : Rhythmic phenomena observed in the electrolytic precipitation of colouring matters.—Mme. Ramart-Lucas and M. Trivédi. Colour and chemical behaviour in the cinnamic series.—E. Darmois and R. Chalin : The cryometry of some electrolytes in the fused hydrate $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$.—E. Vellinger : The superficial properties of india-rubber.—A. Demolon and E. Bastisse : The influence of the anions on the flocculation of colloidal clay by potassium salts.—André Chrétien and Pierre Laurent : A method of physico-chemical analysis in organic solution by measuring the specific inductive power. Variations of the dielectric capacity can serve to detect acid and basic characters in the absence of water. Thus in benzene solution, mixtures of quinoline and phenol give indications of the formation of a combination of equal molecules.—Pierre Jolibois and Louis Cloutier : The basic salts of lead.—Firmin Govaert : The determination of the halogens in organic substances by the sodammonium method.—P. Carré and D. Libermann : The chlorides of the arylsulphurous acids and mixed aryl and alkyl sulphites. Thionyl chloride and aryl sulphite react according to the equation $\text{SO}(\text{OAr})_2 + \text{SOCl}_2 - 2\text{ArO}\cdot\text{SOCl}$. The chloride thus formed cannot be distilled without decomposition, but its existence is proved by its reactions, notably with formic acid and with alcohols. Mixed aryl alkyl sulphites are formed in the latter reaction.—Georges Lévy : Some derivatives of β -ethylnaphthalene.—Pierre Bedos and Adrien Ruyer : Some reactions of cyclohexadiene.—A. Demay : The existence of an antestephanian arc and on the continuity of the apparent thrusts towards the exterior of the arc from the Lyonnais to Correze.—Jean Goguel : The tectonic of the Luberon (Provence).—Jacques Fromaget : The structure of the indosinides.—A. Rivière : Contribution to the study of the Palæozoic of the central Elbourz.—Jean Legrand : The utilisation of observations of height indicators on rivers for the purpose of research on climatic cycles.—J. Lacoste : An earthquake with a Mediterranean epicentre.—Jean Lugeon : The solar eclipse of August 31, 1932, and investigation by atmospherics.—St. Jonesco : The movements of the flowers of *Ipomœa purpurea*. The flowers of this species are continually in motion from the bud stage to the formation of the fruit.—P. Martens : Alternation of phases and sexuality in a conidian cycle in *Pholiota aurivella*.—F. Obaton : The presence of saccharose in the branches and leaves of *Euonymus europæus*.—Jean Chaze : The existence of a new active principle in *Bryonia dioica*.—Raoul Lecoq : The B vitamins and the utilisation of the lipides. The assimilation of lipides by the organism, like proteins and glucides, requires the presence in the ration of sufficient quantities of B vitamins.—J. Giaja and Ilija Dimitrijevič : The influence of the surrounding temperature on the effect of pyretic substances.—Marcel Florin : The dissociation curve of oxyhæmerythrin in the cœlomic liquid of *Sipunculus*.—Charles Dubois : The specificity of the allergic reaction as a method of diagnosis of ovine melitococcia.

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GENEVA

Society of Physics and Natural History, Nov. 17.—E. Friedheim : Two accessory respiratory ferments of animal origin. The tegumentary pigments of *Halla parthenopea* and of the sea urchin, *Sphærechinus granulatus*, possess the function of very considerably increasing the respiration of non-impregnated eggs of sea urchins and of non-nucleated red blood corpuscles. It is a case of catalysis due to the reversibility of the oxidation and reduction of the pigments. The *Halla* pigment can be titrated electrometrically.—P. Rossier : (1) Spectrophotographic photometry. The author gives a second approximation of the coefficients of experimental formulae established before.—(2) The rôle of atmospheric humidity in astronomical photography. Certain coefficients of the formulae studied in the preceding paper vary with the vapour pressure of atmospheric moisture.—(3) The refraction correction to be applied to differential astronomical observations. Micrometric observations of precision are vitiated by atmospheric refraction if the two stars observed are of different colours. The constants of spectral sensibility of the eyes now appear to be sufficiently well known to render it possible to calculate the effect. These systematic errors may be too large to be neglected.—J. Weigle : The orientation of non-polar molecules by a dipole. The author shows that a molecule with a permanent electric moment placed in a medium the molecules of which are non-polar but anisotropic, produces an orientation of these molecules. This orientation of the neighbouring medium should affect either the measurement of the permanent electric moment or the refractive index of the medium. By measuring the latter the author shows that interesting information on the form and structure of the molecules can be obtained.—Ch. H. Wakker and B. Susz : A rapid method of quantitative spectroscopic analysis. The method consists in carrying out a photometric measurement of a selected line of the spectrum emitted by the element to be determined. The measurement is made by direct observation with the spectroscope without making use of photography.—E. Briner and H. Biedermann : Ozone the only persistent allotropic form of oxygen produced in appreciable quantity by the silent electric discharge. The products resulting from the action of the silent discharge on oxygen, working with different forms of apparatus both at low and high frequency, were submitted to fractional distillation. No allotropic modification of oxygen other than ordinary ozone could be found.—R. Wavre : The polydromes of potentials.—H. Lagotala and Ch. Couchet : Note concerning the tectonic of the cupriferos region of the middle Congo. The authors have proved the mylonitised zones in the grits, limestones and at the contact of the grits and limestones. They have remarked the frequency of the sub-horizontal movements and the presence of laminations some of which are mineralised. In certain cases a single layer is separated for a considerable distance. The age of these separations appears to be earlier than the formation of the faults.—G. Tiercy : The hypothesis of continental drift: the chronological succession of the first upholders. The order given is as follows: 1668, Le R. P. Francois Placet; 1858, Antoine Snider Pelegrini; 1889, R. Mantovani; 1890, J. A. Boulanger.

WASHINGTON, D.C.

National Academy of Sciences (*Proc.*, 18, 609-632, Oct. 15, 1932).—Thomas Wayland Vaughan : The fora-

miniferal genus *Orbitolina* in Guatemala and Venezuela.—Thomas Wayland Vaughan and W. Storrs Cole: Cretaceous orbitoidal Foraminifera from the Gulf States and Central America. A new type of orbitoid from the Upper Cretaceous of the Gulf coastal plain and another specimen, both from oil well cores, are described and illustrated.—Robert Balk: Structure and correlation of metamorphic rocks in south-eastern New York. The older view, due to Dana and Merrill, following Mather, regarded the metamorphic sediments of this area as equivalents of the fossiliferous Cambro-Ordovician sequence north-west of the Hudson Highlands. Later, Berkey tentatively regarded the highly metamorphic series as Pre-Cambrian. Detailed field work over the area, of which a long abstract with map and diagrams is given, supports the older view.—Sterling Emerson: Chromosomes rings in *Aenothera*, *Drosophila* and maize. It is suggested that the postulates of 'inverted section' and 'differential segments' are not in accord with published data and are unnecessary to account for the small amount of crossing-over observed.

Forthcoming Events

CONFERENCE OF EDUCATIONAL ASSOCIATIONS, Jan. 2-9. At University College, Gower Street, W.C.1.

The Right Hon. the Earl of Athlone: Presidential Address on Jan. 4, at 3.

Joint Conference on "The Trend of Education". Speakers: H. Ramsbotham, Miss W. Mercier and J. E. Barton, on Jan. 2, at 5.

PHYSICAL SOCIETY, Jan. 3-5. Twenty-third annual exhibition of scientific instruments and apparatus at the Imperial College of Science and Technology, South Kensington, S.W.7, at 3-6 and 6-10.

Dr. Allan Ferguson: "Surface Tension and its Measurement", on Jan. 3, at 8.

R. A. Watson Watt: "Cathode Ray Oscillography", on Jan. 4, at 8.

F. Hope-Jones: "Time Measurement: Old and New", on Jan. 5, at 8.

SCIENCE MASTERS' ASSOCIATION, Jan. 3-6. Annual Meeting at the University of Bristol.

Prof. A. M. Tyndall (Presidential Address): "Gaseous Ions".

GEOGRAPHICAL ASSOCIATION, Jan. 4-6. Annual Conference at the London School of Economics and the Imperial Institute.

Dr. H. R. Mill (Presidential Address): "An Approach to Geography", on Jan. 4.

MATHEMATICAL ASSOCIATION, Jan. 5-6. Annual Meeting at the Institute of Education, Southampton Row, London, W.C.1.

Prof. G. N. Watson (Presidential Address): "The Marquis and the Land Agent: a Tale of the Eighteenth Century", on Jan. 5, at 3.45.

Discussion on "The Study of Statistics in a School Course", to be opened by F. Sandon, on Jan. 6, at 2.15.

The Salters' Institute of Industrial Chemistry. Pp. 28. (London: The Salters' Institute.)

The Journal of the Institution of Electrical Engineers. Edited by P. F. Rowell. Vol. 71, No. 432, December. Pp. 837-992+xii. (London: E. and F. N. Spon, Ltd.) 10s. 6d.

Proceedings of the Royal Irish Academy. Vol. 41, Section B, No. 7: Some Noteworthy Plants found in or reported from Ireland. By Dr. R. Lloyd Praeger. Pp. 95-124. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) 1s.

Air Ministry: Aeronautical Research Committee: Reports and Memoranda. No. 1475 (T.3264): Arithmetical Solution of Problems in Steady Viscous Flow. By Dr. A. Thom. Pp. 6+3 plates. 6d. net. No. 1477 (T.3260): Slotted R.A.F. '34 Bristol Fighter—Forces on Slat in Flight. By A. Ormerod. Pp. 6+15 plates. 1s. net. No. 1490 (T.3270): Aerodynamic Characteristics of a Semi-Rigid Wing. By A. G. Pugsley. Pp. 11+4 plates. 9d. net. (London: H.M. Stationery Office.)

Dove Marine Laboratory, Cullercoats, Northumberland. Report for the Year ending June 30th, 1932. Edited by Prof. Alexander Meek. Pp. 42. (Cullercoats.) 5s.

University College of the South-West of England, Exeter. Proceedings of the College Field Club and Natural History Society, 1930-31. Pp. 23. (Exeter.)

OTHER COUNTRIES

University of Wisconsin Studies in Science. No. 5: Root Nodule Bacteria and Leguminous Plants. By Edwin Broun Fred, Ira Lawrence Baldwin and Elizabeth McCoy. Pp. xxii+343+47 plates. (Madison, Wis.) 3 dollars.

Proceedings of the United States National Museum. Vol. 81, Art. 12: Report on the Hexactinellid Sponges collected by the United States Fisheries Steamer *Albatross* in the Northwestern Pacific during the Summer of 1906. By Yaichiro Okada. (No. 2935.) Pp. 113-6 plates. Vol. 82, Art. 2: A New Paleocene Mammal from a Deep Well in Louisiana. By George Gaylord Simpson. (No. 2943.) Pp. 4. Vol. 82, Art. 3: The Chinese Lizards of the Genus *Gekko*. By Leonard Stejneger. (No. 2944.) Pp. 8. Vol. 82, Art. 4: Description of a Tick, *Dermacentor halli*, from the Texas Pecary, with a Key to the North American Species of *Dermacentor*. By Allen McIntosh. (No. 2945.) Pp. 6+1 plate. (Washington, D.C.: Government Printing Office.)

The Journal of the Astronomical Society of South Africa. Edited by Dr. H. Spencer Jones. Vol. 3, No. 2, November. Pp. 61-100. (Cape Town.) 2s.

Smithsonian Institution: Bureau of American Ethnology. Bulletin 106: Ethnographical Survey of the Miskito and Sumu Indians of Honduras and Nicaragua. By Eduard Conzemiun. Pp. vii+191+10 plates. (Washington, D.C.: Government Printing Office.) 25 cents.

U.S. Department of the Interior: Office of Education. Bulletin, 1931, No. 20: Biennial Survey of Education in the United States, 1928-1930. Chapter 6: Statistics of Public High Schools, 1929-30. By Emery M. Foster and Russell M. Kelley; with the co-operation of Carl A. Jessen. Pp. 95. (Washington, D.C.: Government Printing Office.) 10 cents.

Cornell University: Agricultural Experiment Station. Bulletin 539: An Economic Study of Agriculture in Northern Livingston County, New York. By Stanley Whitson Warren. Pp. 244. (Ithaca, N.Y.)

Bulletin of the American Museum of Natural History. Vol. 63, Article 6: The Vertebral Columns of Ricochetal Rodents. By Robert Torrens Hatt. Pp. 599-738+plates 11-20. (New York City.)

Collection des travaux chimiques de Tchecoslovaquie. Rédigée et publiée par E. Votoček et J. Heyrovský. Année 4, No. 11, Novembre. Pp. 473-520. (Prague: Regia Societas Scientiarum Bohemica.)

U.S. Department of the Interior: Office of Education. Pamphlet No. 32: Institutions of Higher Education in Sweden. By Alina M. Lindgren. Pp. v+45. 10 cents.

Smithsonian Miscellaneous Collections. Vol. 87, No. 13: The Functions of Radiation in the Physiology of Plants. 1: General Methods and Apparatus. By F. S. Brackett and Earl S. Johnston. (Publication 3179.) Pp. 10+1 plate. Vol. 87, No. 14: The Functions of Radiation in the Physiology of Plants. 2: Some Effects of near Infra-red Radiation on Plants. By Earl S. Johnston. (Publication 3180.) Pp. 15+4 plates. Vol. 87, No. 15: An Improved Water-Flow Pyrheliometer and the Standard Scale of Solar Radiation. (Roebling Fund.) By C. G. Abbot and L. B. Aldrich. (Publication 3182.) Pp. 8+1 plate. (Washington, D.C.: Smithsonian Institution.)

Division of Fish and Game of California: Bureau of Commercial Fisheries. Fish Bulletin No. 37: The California Barracuda (*Sphyrna argentea*). 1: Life History of the California Barracuda; 2: A Bibliography of Barracudas (*Sphyrnidae*). By Lionel A. Walford. (Contribution No. 112 from the California State Fisheries Laboratory.) Pp. 120. (Terminal, Calif.: California State Fisheries Laboratory.)

Census of India, 1931. Vol. 2: The Andaman and Nicobar Islands. Part 1: Report; Part 2: Tables. By M. C. C. Bonington. Pp. viii+119. (Calcutta: Government of India Central Publication Branch.) 5 rupees; 7s. 6d.

CATALOGUES, ETC.

Degussa Products for Stringent Chemical and Thermal Requirements. Pp. 12. (London: Bush, Beach and Gent, Ltd.)

Mercury Switches and Relays for Industrial and Laboratory Control. (List No. M.1132.) Pp. 32. (London: Isenthal and Co., Ltd.)

Calendar for 1933. (Newcastle-on-Tyne: C. A. Parsons and Co., Ltd.)

Calendar for 1933. (London: F. E. Becker and Co.)

The X-Ray Metallurgical Crystallograph for the X-Ray Examination of the Effects of Heat and Mechanical Treatment on Metals. (Publication 173/2.) Pp. 5. Bulletin No. 4: Spectrum Analysis. (Publication No. 183.) Pp. 12. (London: Adam Hilger, Ltd.)

A Catalogue of Books on Botany, Agriculture, Forestry, Fruit Culture, Gardens and Gardening, Herbs. (No. 467.) Pp. 98. (London: Bernard Quaritch, Ltd.)

Official Publications Received

GREAT BRITAIN AND IRELAND

Proceedings of the Royal Society. Series A, Vol. 133, No. A836, December 1. Pp. 479-722. (London: Harrison and Sons, Ltd.) 12s.

Proceedings of the Royal Irish Academy. Vol. 41, Section B, No. 6: Observations on the Cytology of *Opalina ranarum* and *Nyctotherus cordiformis*. By Ruth Patten. Pp. 73-94+plates 6-7. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) 1s.

The Journal of the Ipswich and District Natural History Society. Edited by Henry Ogle. Vol. 1, Part 3, November. Pp. 141-196. (Ipswich.)

Proceedings of the Linnean Society of London. Session 1931-32, Part 6. Pp. 167-220. (London: Linnean Society.) 2s.