

Societies and Academies.

LONDON.

Royal Society, June 14.—C. Chree: Magnetic phenomena in the region of the south magnetic pole. Magnetographs were in simultaneous operation from April to October 1912, at the base stations of the British and Australasian Antarctic expeditions on opposite sides of the south magnetic pole. A comparison is made of the regular diurnal inequalities and the amplitudes of the absolute daily ranges of the magnetic elements at the two stations. The data show the remarkable sensitiveness of the regular diurnal variations in high latitudes to the presence of magnetic disturbance. The results are also applied to the question of a suitable criterion for the daily activity of magnetic disturbance.—O. R. Howell: The catalytic decomposition of sodium hypochlorite by cobalt peroxide. The rate of decomposition of sodium hypochlorite solution by cobalt peroxide is directly proportional to the amount of peroxide present. It is accelerated by sodium salts and (in the case of sodium chloride) is directly proportional to the square root of the concentration of sodium ions present. The mechanism of the reaction probably consists in the linkage of hypochlorite ions to the positive oxygen, and sodium ions to the negative oxygen of the peroxide, with immediate decomposition of the quadrivalent oxygen compound. With a fixed amount of hypochlorite the rate is then proportional to the degree of adsorption of the sodium ions. The rate is retarded by alkali and the retardation is proportional to the adsorption of hydroxyl ions. The average temperature coefficient of the reaction between 25° and 50° is 2.37 and the Arrhenius activation coefficient E is 16,574. The catalyst is not affected by any of the common catalytic poisons.—N. M. Hosali: On seismic waves in a visco-elastic earth. Seismic waves are subject to damping and dispersion dependent on the period. For each type of wave—dilatational, distortional, or surface—there exists a minimum period below which a wave cannot be transmitted, and for any period above the minimum two distinct waves can be propagated, one heavily damped and slow travelling and one lightly damped and quick travelling. Observations indicate that if the material in the outer layers of the earth obey the theory here developed it should have a viscosity of order 10^8 or 10^9 C.G.S. units. This would have no appreciable effect on the velocity of propagation of earthquake waves.—J. W. Landon and H. Quinney: Experiments with the Hopkinson pressure bar. With a bar of uniform diameter the pressure wave produced by detonation of gun-cotton is considerably distorted as it is propagated, but the rate of distortion decreases as the wave travels along the bar. Pressure falls away rapidly as distance from the axis of the bar increases. To determine the maximum pressure produced in the detonation of gun-cotton the bars were submitted to special heat treatment in the hope that overstrain might be reduced. A substantial improvement was observed except in so far as the life of the bars was increased. The highest maximum pressures recorded were 117 tons per square inch for a 1-ounce gun-cotton primer in contact with the end of the bar, and 82 tons per square inch with the primer $\frac{3}{8}$ inch away from the end. These results were obtained with a short bar of $\frac{3}{8}$ -inch diameter. With concrete bars the phenomena exhibited are the same in general as with steel bars, except that the front of the wave appears to be entirely obliterated, and only the part in which

pressure is less than the crushing stress of the concrete is propagated along the bar.—S. F. Grace: Free motion of a sphere in a rotating liquid at right angles to the axis of rotation. The density of the sphere is equal to that of the liquid, and the motion like a rigid body. The motion of the centre of the sphere is wholly in a plane perpendicular to the axis of rotation, and the disturbed motion of the liquid is symmetrical with respect to this plane. The path of the centre of the sphere is a spiral with a definite pole. The sphere winds round the pole in a direction opposite to that of the rotation of the liquid, the motion being such that the time of a complete turn tends to become constant and equal to one-half the time of a revolution of the undisturbed liquid. At points along the prolongation of the polar axis of the sphere the motion is parallel to the equatorial plane and is a maximum at the sphere. Parts of the solution are not applicable for large values of time.—B. F. J. Schonland: The passage of cathode rays through matter. The absorption of cathode rays of velocity 6×10^9 – 1.2×10^{10} cm./sec. in various metals has been studied with an arrangement designed to eliminate interference from secondary rays and to measure both the fraction of the beam passed through and that actually absorbed in the foil. The latter fraction varies with thickness and velocity in the same manner for all elements; the nature of the variation of the former depends upon the absorbing material. The results are explained by applying the theory of absorption due to Bohr, with which they are in quantitative agreement.

Association of Economic Biologists, April 27.—C. M. Wenyon: Recent observations on parasitic Protozoa in animals and plants. Certain parasitic Protozoa, such as the Coccidia, and some Hæmogregarines, which are inhabitants of the intestinal canal or wall of the intestine of vertebrates, and pass from host to host in the encysted form which escapes in the dejecta, have become so modified in the course of evolution, that they are no longer transmitted by means of cysts but are carried by bloodsucking invertebrates. It is probable that the well-known parasites of malaria are modified Coccidia. Intestinal flagellates, such as Trichomonas, which are normally inhabitants of the lumen of the intestine, may occasionally enter the blood stream. Reichenow has shown that in the lizard the entry of the intestinal flagellate Eutrichomastix into the blood may lead to infection of the mites, which again give rise to an intestinal infection of lizards which devour them. Similarly flagellates of insects like the flea or flies which usually live only in the invertebrate, may establish themselves in the intestines of vertebrates which eat them. Thence they may invade the blood of the vertebrate and are undoubtedly ingested by blood-sucking insects. It is possible that the parasite of the disease "Kala azar" of man may be an insect flagellate which enters man by way of the mouth, gains access to his intestine, and thence invades his tissues. Plants may be infected in like manner, for flagellates of the typically insect type have been found in various species of Euphorbia and other plants, and it has been shown by Franca that they are derived from bugs which feed upon the plants. M. S. G. Breeze: Some causes of sterility in Solanaceous plants due to Protozoa and Chytridiaceous parasites. The plants investigated were varieties of potato and petunia, and the following points were noted: (1) An Amœba, similar to *Amœba gleba*, attacks potato flowers virulently though without

any outward sign. The tissues are hypertrophied and turgid. (2) Chytridiaceous zoospores (probably synchytrian) occur in anthers in half-grown buds of Up-to-Date potatoes damaged by the *Amœba*; and some of the *Amœbæ* may migrate to the adjacent ovarian tissue; the zoospores swim to and fro by an anteriorly directed flagellum. Associated with the above is a spore-bearing bacillus with rounded ends, probably a saprophyte. (3) "Bird's eye" bodies in petunia and potato ovaries are regarded as possibly a phase of (2), and therefore synchytrian parasites.

Zoological Society, May 29.—Dr. A. Smith Woodward, vice-president, in the chair.—C. Tate Regan: (1) Some deep-sea fishes taken by the *Dana* Expedition, under the leadership of Dr. Johannes Schmidt. The fishes belong to the very rare and little-known genera *Gigantena* and *Stylophorus*, which agree in having telescopic eyes placed close together and directed forwards. (2) The skeleton of *Lepidosteus*, with remarks on the origin and evolution of the lower neopterygian fishes.—C. F. Sonntag: The comparative anatomy of the tongues of the mammalia.—IX. Edentata, Demoptera, and Insectivora.—S. Maulik: New cryptosome beetles.

PARIS.

Academy of Sciences, May 28.—M. Albin Haller in the chair.—Charles Moureu, Charles Dufraisse, and Ph. Landrieu: The principle of a general method for determining the calorific capacity of solids and liquids. Application to the determination of the water equivalent of calorimetric bombs.—P. Villard: A hydrate of iodine. Iodine and water, compressed with oxygen or nitrogen to 150 atmospheres, give crystals of a hydrate of iodine. The crystals are crimson-violet, strongly contrasting with the brown colour of the aqueous solution of iodine.—M. Wallerant: Extract from a note of M. Astbury. The structure of the crystal of tartaric acid, determined by the X-ray method, is in agreement with the views expressed by Pasteur in 1860.—Charles Depéret: The glaciations of the valleys of the French Pyrenees, and their relations with the fluvial terraces. From observations in the Ariège, Garonne, Neste, Aure, Gare de Pau, and Gare d'Ossau, there is complete identity between the Alps and Pyrenees for the number and periods of extension of the quaternary glaciers.—M. Henri Villat was elected a corresponding member for the section of mechanics in the place of the late R. Ariès.—René Garnier: Uniform functions of two independent variables defined by the inversion of an algebraic system of total differentials of the fourth order.—N. Saltykow: The methods of integration of partial equations.—M. Angelesco: Certain biorthogonal polynomials.—H. Milloux: Infinite series of functions and meromorphic functions with asymptotic value.—Charles N. Moore: The generalised Fourier series of non-integrable functions.—J. Haag: The problem of Schwarzschild in the case of a curved universe.—F. Gossot and R. Liouville: The principles of internal ballistics.—Jean Chazy: The secular effects of the theory of relativity in the planetary movements.—J. Le Roux: The field of gravitation.—A. Luthy: The ultra-violet spectrum of glyoxal. In hexane solution, this substance gives a series of narrow absorption bands in the ultra-violet; no compound of the aliphatic series has hitherto been known to give narrow absorption bands in the ultra-violet.—Guillaume C. Lardy: The ultra-violet absorption spectrum of diacetyl. In alcoholic solution previous

observations have shown only a band in the violet and another in the middle ultra-violet. In hexane solution the author has found narrow bands. These bands are not so clearly separated as the narrow bands shown by glyoxal in the same region.—F. W. Klingstedt: The ultra-violet absorption spectrum of paraquinone. This substance shows in hexane solution fourteen narrow bands in the visible part of the spectrum between the green and the violet. In addition, in the middle ultra-violet there is one large band, and in the extreme ultra-violet ($\lambda = 2410$) there is one very strong band.—Albert Colson: Contribution to the laws of solubility.—A. Ch. Vournazos: The bismuthamines, a new class of bodies. These substances are obtained by the interaction of bismuth chloride (bromide or iodide) and an ammonia (or amine) salt in an organic solvent. As a typical example, the compound $\text{BiCl}_3 \cdot \text{I}(\text{NH}_4)$ is obtained by the action of BiCl_3 on a cold solution of ammonium iodide in acetic acid. It forms silky transparent needles, decomposed by water.—Alfred Gillet and Fernand Giot: An application of the antioxygen power of the polyphenols: increase of fastness to light of dyes on the fibre. All the acid azo dyes, both on wool and on cotton, are relatively protected against the action of air under the influence of light by the *o*- or *p*-diphenol function, whether the latter is, or is not, a part of the molecule of the dye. Some eosin dyes behave similarly, but the nitro dyes, triphenylmethane derivatives, and basic colours are not protected.—Paul Corbin and Nicolas Oulianoff: Certain characters of the Hercynian fold in the Servoz-Les Houches region (Arve valley).—Conrad Kilian: The folds of the crystalline schists of Ahaggar; the Saharides.—René Souèges: The embryogeny of the Geraniaceæ. Development of the embryo in *Erodium cicutarium*.—G. Hamel: The limit of vegetation in the Channel according to the dredgings carried out by the *Pourquoi-Pas*? No algæ were found at depths greater than forty-five metres, and it concluded that at greater depths than this all vegetation, with the exception of diatoms, and plankton, is absent.—Jules Stoklasa: The origin of the nitrate deposits of Chili. According to one hypothesis, the nitrate deposits result from the accumulation of excrements and bodies of animals: another view (C. Noellner) is that the nitrates arise from the accumulation of submarine plants, since these plants contain iodine, and iodine is an invariable constituent of "caliche." The author gives reasons for regarding a volcanic origin as more probable than either of the preceding hypotheses.—J. Lopez-Lomba and Mme. Randoïn: The state of scurvy produced by a complete regime in biochemical equilibrium, deprived only of the factor C.—W. Kopaczewski: Surface tension, swelling, and narcosis.—R. Argaud: The sclerogenic rôle of the giant cells.

WASHINGTON.

National Academy of Sciences (Proc. Vol. 9, No. 4, April).—R. L. Moore: Concerning the cut-points of continuous curves and of other closed and connected point-sets.—J. Belling and A. F. Blakeslee: The reduction division in haploid, diploid, triploid, and tetraploid *Daturas*. During the first division in the pollen-mother-cells of diploid, triploid, and tetraploid *Daturas*, homologous chromosomes are usually connected by their ends. Non-reduction occurs generally only in haploid plants. The volume of cytoplasm in the pollen-mother-cells is nearly proportional to the number of haploid groups present.—T. Ellinger: The variation and inheritance of milk characters. The records of a herd of 700 cows at Tranekjaer

Castle, Denmark, which consisted originally of Red Danish dairy cattle and Jersey cattle, are discussed. The yield during the first 10-week period of milking appears to be the most trustworthy measure of a cow's milk-yielding qualities. The records of the cross-bred cattle (F_1) show no indication of any single Mendelian factor in the inheritance of milk characters.—A. R. Olson and G. Glockler: The critical and dissociation potentials of hydrogen. A heated platinum filament covered with calcium oxide in a vacuum tube containing purified dry hydrogen at 0.1 mm. of mercury pressure was used as the source of electrons. The beam of electrons passed through platinum stops to which varying accelerating and retarding potentials could be given, and fell on an ionisation cylinder connected with a quadrant electrometer. The dissociation potential of hydrogen appears to be 3.16 volts; eight breaks occur in the current-potential curves, five of which correspond with lines of the Lyman series.—G. L. Clark and W. Duane: (1) The reflection by a crystal of X-rays characteristic of chemical elements in it. Crystals of the compounds KI, KI_3 , CsI, CsI_3 , and $CsIBr$ have been investigated and X-rays characteristic of iodine, caesium, and bromine have been identified which obey the regular laws of crystal reflection. The method used is to determine the position of peaks in the ionisation curve by rotating the crystal (corresponding to reflections from the various planes), and, setting the ionisation chamber at one of these peaks, to move the crystal and the ionisation chamber, the latter at twice the rate of the former. A series of peaks are obtained referring to one set of planes alone. For KI, wave-lengths of these correspond with the $K\alpha$ and $K\beta$ wave-lengths of iodine. The distance between the 100 planes is 3.53×10^{-8} cm. KI_3 is found to be a cube slightly distorted with the edge 4.70×10^{-8} cm. long. CsI_3 appears to be a rhombic crystal with caesium atoms at each corner and iodine atoms at the centre and at points equidistant from the centre along the body diagonals. $CsIBr_2$ is also a rhombic crystal. (2) On the abnormal reflection of X-rays by crystals. Reflections of X-rays have been obtained from potassium iodide which are not in accord with the usual laws of crystal-reflection. The peaks caused in the ionisation curve are termed "X-peaks." For small deviations of the X-ray beam, the X-peak is outside that due to the 130 planes; for larger deviations, it is between those due to the 100 and 130 planes. The X-peak does not appear unless the incident beam contains X-rays of shorter wave-length than those in the K-series of iodine.—G. L. Clark: The significance of the experimentally determined crystal structures of the alkali polyhalides. It appears from X-ray analysis of the polyhalides KI_3 , CsI_3 , $CsIBr_3$, $CsICl_2$, that the three halogen atoms lie a diagonal of the crystal lattice, the heaviest in the centre; the metal atoms are at the corners. Other polyhalides are closely related chemically and crystallographically, and probably have similar structures, apparently closely related to the simple halide unit cubes, the halide group replacing a halogen atom. The size of the metal atom determines the dimensions of the unit cell and thus the relative stabilities of the polyhalides of the group.—E. B. Wilson: Electric conduction: Hall's theory and Perkins' phenomenon. Perkins has shown that the addition of a negative charge to a conducting strip of graphite decreases the conductivity. This is contrary to what might be expected on a free electron theory of conduction, but can be explained on Hall's theory of conduction by streams of electrons and ions, the latter taking a predominant part.

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Official Publications Received.

- Report of the Director of the Royal Observatory, Hongkong, for the Year 1922. Pp. 17. (Hongkong.)
- Department of Commerce: U.S. Coast and Geodetic Survey. Serial No. 225: Reconnaissance and Signal Building. By Jasper S. Bilby. (Special Publication No. 93.) Pp. v+77. (Washington: Government Printing Office.) 30 cents.
- Smithsonian Institution: United States National Museum. Bulletin 100: Contributions to the Biology of the Philippine Archipelago and Adjacent Regions: Ophiurans of the Philippine Seas and Adjacent Waters. By Prof. Rene Kœhler. Pp. x+486+103 plates. Bulletin 124: The Type Species of the Genera of Chalcidoidea or Chalcid-Flies. By A. B. Gahan and Margaret M. Fagan. Pp. iii+173. 15 cents. (Washington: Government Printing Office.)
- Report of the Aeronautical Research Institute, Tôkyô Imperial University. No. 1: Hikôki ni taisuru Kaze no Hôkô to Hayasa wo kirokurusu Kikai (An Instrument to measure the Direction and Speed of Wind relative to an Aeroplane). By Tamaru-Takurô. Pp. 23. Y. 0.50. No. 2: A New Air Velocity Calculator. By Toyotarô Suhara. Pp. 25-31. Y. 0.70. No. 3: On the Diurnal Variations of Winds in different Coastal Stations of Japan. By Torahiko Terada and Tatsu Kobayasi. Pp. 33-85. Y. 1.10. No. 4: On the Decay of Vortical Motion in a Viscous Fluid. By Kwan-ichi Terazawa. Pp. 87-135. Y. 0.90. No. 5: On the Distribution and Variation of Temperature in the Cylinder and Piston of an Aircraft Engine. By Toyotarô Suhara and Naoto Sato. Pp. 137-170. Y. 1.20. (Tôkyô: Maruzen Kabusiki-Kwaisha.)
- Neue Denkschriften der Schweizerischen Naturforschenden Gesellschaft (Nouveaux Mémoires de la Société Helvétique des Sciences Naturelles). Band 53. Pp. xx+402+54. Band 54. Pp. iv+291+32 Tafeln. Band 55. Pp. viii+149. Band 56. Pp. vi+126+28 Tafeln. Band 57. Pp. xi+325. Band 58. Pp. viii+251. (Basel, Genf and Lyon: Georg and Co.)
- Statens Meteorologisk-Hydrografiska Anstalt. Årsbok, 4, 1922. 2: Nederbörden i Sverige. Pp. 173. (Stockholm.)

Diary of Societies.

MONDAY, JUNE 25.

- SOCIETY OF BIOMETRICIANS AND MATHEMATICAL STATISTICIANS (at University College), at 8.—Dr. T. H. C. Stevenson: The Social Distribution of Causes of Death in England and Wales.
- ROYAL SOCIETY OF MEDICINE (Odontology Section), at 8.—L. E. Claremont: Case of Fibro-Cystic Disease of the Lower Jaw.—Dr. A. Hopewell-Smith: Two Ootomes; Some Observations on the Histology and Pathology of the Dental Pulp.
- ROYAL INSTITUTE OF BRITISH ARCHITECTS, at 8.30.—Presentation of the Royal Gold Medal.

TUESDAY, JUNE 26.

- IMPERIAL EDUCATION CONFERENCE (at Institution of Mechanical Engineers), at 8.—Miss L. De Lissa: Recent Developments in Infant Education and their Connexion with the Work of the Elementary Schools.
- ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—de Balfi Crawshaw: Exhibit of Eoliths from the South Ash Pit on the Kentish Chalk Plateau, and of Stone Implements from Mesopotamia.—S. Hazzledine Warren: The Palaeolithic Succession of Stoke Newington.
- SOCIOLOGICAL SOCIETY (at Royal Society), at 8.15.—Dr. E. Jenks: The Function of Law in Society.

WEDNESDAY, JUNE 27.

- ROYAL SOCIETY OF ARTS, at 4.—Annual General Meeting.
- ROYAL SOCIETY OF MEDICINE (Surgery Section), at 5.30.—Dr. W. Mayo, Sir Berkeley Moynihan, J. Sherren, G. Grey Turner, and A. J. Walton: Discussion on the Surgery of the Hepatic and Common Bile Ducts.
- IMPERIAL EDUCATION CONFERENCE (at Institution of Mechanical Engineers), at 8.—Lt.-Gen. Sir Robert S. S. Baden-Powell, Bart.: The Boy Scout and Girl Guide Movement.

THURSDAY, JUNE 28.

- ROYAL SOCIETY, at 4.30.—Prof. V. H. Blackman, A. T. Legg, and F. G. Gregory: The Effect of a Direct Electric Current of very Low Intensity on the Rate of Growth of the Colicottile of Barley.—Miss R. M. Tupper-Carey and Prof. J. H. Priestley: The Composition of the Cell Wall at the Apical Meristem of Stem and Root.—L. J. Harris: The Titration of Amino- and Carboxyl-Groups in Amino-Acids, Polypeptides, etc.—Dr. M. S. Pembrey, N. W. MacKeith, W. R. Spurrall, E. C. Warner, and H. J. Westlake: Observations on the Adjustment of the Human Body to Muscular Work.—F. A. E. Crew: Studies in Intersexuality. II. Sex-Reversal in the Powl.—Prof. W. Finkler: Analytical Studies on the Factors causing the Sexual Display in the Mountain Newt (*Triton alpestris*).—Prof. G. A. Schott: The Scattering of X- and γ -Rays by Rings of Electrons.—The Effect of Damping of the Incident Radiation.—Major P. A. MacMahon: A Class of Transcendents of which the Bessel Functions are a Particular Case.—Dr. L. C. Martin: The Photometric Matching Field.—Prof. G. P. Thomson: Test of a Theory of Radiation.—Dr. A. Ll. Hughes and P. Lowe: Intensities in the Helium Spectrum.—A. A. Dee: The Effect of Quenching from above the Carbide Transition Temperature upon the Magnetism of Steel.—T. S. P. Strangeways and H. E. H. Oakley: The Immediate Changes observed in Tissue Cells after Exposure to Soft X-Rays while growing *in vitro*.
- INSTITUTION OF ELECTRICAL ENGINEERS (at British Museum (Natural History)), at 8.30.—Annual Conversations.
- ROYAL SOCIETY OF MEDICINE (Urology Section), at 8.30.—Prof. C. G. Chinnston: Certain Points in Connexion with Nephritis.

FRIDAY, JUNE 29.

- SOCIÉTÉ DES INGÉNIEURS CIVILS DE FRANCE (British Section) (at Institution of Mechanical Engineers), at 8.30.—M. Barrillon: The Port of Rouen and the Lower Seine.