

Early Science at Oxford.

April 20, 1686. Dr. Plot read an account of making brasse, as it is practised in Holland.

April 22, 1684. Dr. Smith communicated some abstracts of letters, he lately received from beyond Sea.

From Paris: Monsieur Auzout affirms, that no great Loadstone, tho capped, will take up above 12, or 15, times its weight, but, he says, that in Italy he has seen little Loadstones, which have rais'd 80 times their weight, and some 140 times their weight.

In a certain province of Nova Francia, there is so great a quantity of salt peter in ye feilds, that ye oxen there are so salt that they cannot eat their flesh, for 3 or 4 months in ye year, ye steams of salt peter falling in that abundance upon ye grass.

Sheep in Affrick, that have teeth with *auræa armatura*.

Bees in ye West Indies which have no sting; which place ye young ones in their honey; and their faces in separte cells: their honey is as clear as water.

From Liège: On ye 4th of February S.N. severall Colliers were imprisoned in a Colepit at Herstol, half a league from Liège through a vein of water gushing in very violently upon them. Twenty four days were spent in drawing off ye water, and upon ye 25th, they were taken up all alive, not haveing had one morsell of bread during all that space; and subsisting onely upon a spring that flowed near them: a great quantity of this water was evaporated, to try, if they could discover any thing of nourishment in it, more than in common water, but they found nothing but a scarce perceptible calx remaining.

From Paris: A New Mathematicall Instrument lately invented at Paris, made very comodious for travelling, and so light, that it may be carried in one's pocket; it serves for a semicircle, sector, square, measuring all sorts of angles whatsoever, takeing ye weight of bullets, ye declination from ye North, ye inclination, or reclination, of any wall, or whatever it be, and many other uses it hath, which seem to be demonstrable.

Dr. Plott brought in an account of ye effects of ye late hard frost on ye vegetable kingdom, drawn up by Mr. Bobart, Gardiner to ye University. Capt. Ralph Sneyd of Bradwell in Staffordshire, sais that a great oak at Chebsey in that County, vallued at 12d. ye last Autumn, was splitt quite thro by ye frost this Winter. Dr. Plot also informed ye Society, that both resinous and gummy, trees have suffered very much by ye last Frost; but ye latter much more than ye former: likewise he shewed ye Society a lamp, whose wick was made of Salamander's wool, in order to a Discourse of sepulchrall lamps now under his hands. A letter was lately received from Mr. King of Ingestre, in Staffordshire, concerning an equinoctiall Diall in that Country, representing a booke opened, ye edges of ye booke were Gnomons, casting a shade on ye opposite side, where ye hours were express by parallel lines.

April 23, 1686. Being St. George his Day, ye day of Election, Dr. Wallis was chosen President, Dr. Plott Director of Experiments, Mr. Caswell Treasurer, Mr. Bainbrig and Mr. Walker Secretaries.—Ordered that ye payments be sunk down to 2s. 6d. a quarter, for ye year ensuing.

1690. Ordered by the Society, that all members of the Society who have paid their arrears on Lady Day, 1688, are to receive six books of Aristarchus, printed at the charge of the Society.

Officers for the ensuing year: Dr. Bathurst President, Mr. Pit and Mr. Hans Secretaries, Dr. Musgrave, Director of Experiments, Mr. Pullen, Treasurer.

Societies and Academies.

LONDON.

Physical Society, March 13.—Jas. P. Andrews: The variation of Young's modulus at high temperatures. The variation is found for zinc, silver, phosphor-bronze, lead, and soda glass by a static method, to within about 150° of the melting-point. It varies exponentially with temperature, so that q (Young's Modulus) = $q_1 e^{-b_1 t}$ (where q_1 and b_1 are constants) up to a temperature roughly half-way from absolute zero to the melting-point, and $q = q_2 e^{-b_2 t}$ for the remainder.—E. G. Richardson: The critical velocity of flow past objects of aerofoil section. By observations of the "Æolian tones" of vibrators of aerofoil section, critical values for flow past an object of aerofoil section have been obtained of a fluid incident at various angles. The minimum value of VL/v for unsteady flow falls from 60 at 0 incidence to 45 at 20, and then more rapidly.—J. Brentano: A focussing method of crystal powder analysis by X-rays. For any given angle of reflection, a surface of double curvature can be found, such that it will reflect X-rays coming from one point, to any other definite point. For an element of this surface, situated so as to be distant from the two points by lengths a and b respectively, the relation $\sin \alpha / \sin \beta = a/b$ must be satisfied, where α and β are the glancing angles of incidence and of emergence of the X-rays with respect to the surface. An arrangement for crystal analysis based on this relation is discussed.

DUBLIN.

Royal Irish Academy, March 16.—J. J. Nolan, R. K. Boylan, and G. P. de Lachy: The equilibrium of ionisation in the atmosphere. The large ions in the atmosphere carry single electronic charges. They constitute a constant fraction of the nuclei of the atmosphere, and the ratio of the uncharged nuclei to the large ions of one sign is approximately 1.28. The equilibrium between small ions (n) and large ions (N) is determined by the equation $q = an^2 + 2\eta_2 Nn$, η_2 being the recombination coefficient between small ions and large ions of the opposite sign. Where large ions are plentiful, $q = 2\eta_2 Nn$. The value of η_2 is 9.7×10^{-6} . The large ions exert a marked effect on the atmospheric potential gradient.

PARIS.

Academy of Sciences, March 2.—G. Koenigs: The differential equations of movements with two doubly decomposable parameters.—Maurice Hamy: The photography of the stars in full daylight. A modified Lindemann method is described which permits of the determination of the magnitude of the stars photographed.—Roland Thaxter was elected corresponding member for the section of botany in succession to the late M. De Toni.—R. H. Germaÿ: A method of integrating by successive approximations of systems of partial differential equations of fixed form.—Mandelbroit: The analytical prolongation of monogen functions in the sense of Cauchy into isogen functions in the sense of Volterra.—René Lagrange: The quadratic integrals of the equations of mechanics.—St. Kempisty: Approximative (asymptotic) limits.—Harald Bohr: Nearly periodic functions with one complex variable.—Salet: The independence of the velocity of light and of that of the source of light.—E. Delcambre, Ph. Wehrlé, and L. Gouton: The variability of true astronomical refractions. A description of an experiment from which it is concluded that on a single angular measurement of isolated stars, the approximation to 0.01" is illusory,

even for small zenithal distances, and this is also the case for the approximation to $0.1''$ for zenith distances higher than 45° .—E. **Henriot** and R. **Moens**: The action of light on the thermionic phenomenon. The light of an arc lamp, interrupted 1000 times per second by a toothed wheel, is focussed on an incandescent tungsten filament. Under these conditions, a telephone interposed in series with the high-tension battery in the filament-plate circuit gives the sound corresponding to the 1000 frequency. If the current through the filament is too small, the sound is not heard, and it is only apparent within a narrow range of current. The phenomenon appears to be purely thermal, and is not really photo-electric.—C. G. **Bedreag**: Physical system of the elements.—A. **Boutaric** and Mlle. F. **Demora**: The phenomena of diffraction presented by a network composed of alternative transparent and opaque sectors.—F. **Holweck**: Exact measurements of spectral frequencies in the domain of the radiations comprised between light and the X-rays (the L III discontinuities of Cl, S, P, Si, Al).—J. **Salauze**: The electrolysis of the alkaline acetates in solution in methyl alcohol. Comparing the effects in the two solvents, water and methyl alcohol, in the latter, oxidation phenomena are absent, and the yield of ethane is higher (95 per cent. against 85 per cent.). The nature of the anode has a much smaller influence on the course of the reaction in methyl alcohol than in aqueous solution.—Paul **Pascal**: The magneto-chemistry of polymers. Measurements of the magnetic susceptibility of the metaphosphates. Conclusions can be drawn from the data concerning the complexity of the various forms of metaphosphate.—A. **Bigot**: Clays, kaolins, light silicas; density, porosity, occluded gases.—B. **Cabrera**: The rare earths and the magneton question.—H. **Wuyts**: General method for the preparation of the ether oxides. To the alcohol 10 per cent. of sulphuric acid is added, and the mixture slowly distilled through an efficient fractionating column. The alkyl oxide, alcohol, and water distil as azeotropic mixtures, from which the alkyl oxide (ether) can be separated.—Louis Jacques **Simon**: The relations between sulphochromic oxidation and structure.—Lespieau and Charles **Prévost**: Diacetylene. By the action of excess of alcoholic potash on erythrene tetrabromide, a gas was obtained which liquefies at -35°C . and boils at about 10°C . It was not analysed, but its physical properties and chemical reactions correspond with those of diacetylene $\text{CH}_2\text{C}=\text{C}:\text{CH}$.—R. **Fric**: The presence of methane in various outflows of gas observed in the Limogne d'Auvergne. The gas from a trial boring was collected and analysed, and found to contain carbon dioxide, sulphuretted hydrogen, oxygen, nitrogen, and methane (19.8 per cent.).—Alphonse **Berget**: A marine refractometer with double deviation. This instrument consists of two hollow prisms, one inside the other. The outer one is filled with a liquid of known refractive index, the liquid of which the refractive index is required being placed in the inner prism. Both liquids are necessarily at the same temperature, and the accuracy of the differential measurement is one in the fifth place of decimals.—A. **Gruvel**: Remarks on the salinity curve of the waters on the western coast of Morocco.—P. **Bugnon**: Leaf homologies in the sweet violet: vegetative leaves, pre-leaves and bracts.—Henri **Coupin**: The peroxidases in dry seeds. The benzidine-hydrogen peroxide reagent serves well to detect peroxidases in dry seeds.—Mlle. G. **Bonne**: The presence of internal phloem in some Rosaceae.—Lisbonne: The activation of the pancreatic juice by acidification.—Jean **Saidman**: The photo-electric effect produced

by ultra-violet light in man. Normally a man exposed to ordinary daylight loses negative electricity, and the rate of loss is unchanged by exposure to a 2000-candle half watt lamp. But submitted to ultra-violet light (quartz mercury lamp), a rapid discharge is produced.—A. **Dognon**: The biological action of monochromatic X-rays of different wavelengths on the egg of *Ascaris*.—Pierre P. **Grasse**: Cysts of *Prowazekella* and *Blastocystis*.—A. **Henry** and Ch. **Leblois**: Attempt at the classification of the *Isospora*.—H. **Penau** and H. **Simonnet**: Prolonged insulin treatment and survival of the dog without pancreas.

WASHINGTON, D.C.

National Academy of Sciences (Proc. Vol. 11, No. 1, January 1925).—W. **Lindgren**: (1) The cordierite-anthophyllite mineralisation at Blue Hill, Maine, and its relation to similar occurrences. The Ellsworth schists here contain mainly quartz, biotite, and chlorite, and the ores form lenticular replacements in them. The type of mineralisation described is recorded for the first time in America, and appears to be due to emanations from the granite outcrop nearby. The deposit is similar to those of Fenno-Scandia. (2) Gel replacement, a new aspect of metasomatism. Gel replacement in solid rocks operates in general at medium to low temperatures, probably not above 300°C . Solutions or sols attack the matrix and the space is filled by a gel of high concentration. If crystallisation takes place slowly, concentric fibrous texture results; if it is almost simultaneous with deposition, there may be apparent continuity. The theory is applied to replacements by silica gel, sulphides, and to the veins of Cobalt, Ontario.—J. W. **Gowen**, H. W. **Leavitt**, and W. S. **Evans**: Mortar strength, a problem of practical statistics. The correlation coefficients for tests after 7-day and 28-day curing respectively are high, so the behaviour of mortar can be safely predicted on the data from 7-day tests.—Raymond **Pearl** and L. J. **Reed**: Skew-growth curves.—J. H. **Mueller**: Chemical studies on tuberculin. The active principle of tuberculin may be a protein or a protein degradation product; on the other hand, the specific precipitable material of tuberculin is resistant to the action of proteolytic enzymes.—S. K. **Allison** and W. **Duane**: On scattered radiation due to X-rays from molybdenum and tungsten targets. X-ray tubes of small diameter and a multiple slit system were used. With a narrow beam of primary rays the ionisation curves show a narrow peak beside the unshifted peak, and with a wide beam, a broad shelf, both of which were in agreement in position, for several radiators, with Compton's theory.—C. M. **Blackburn**: An application of the quantum theory of band spectra to the first negative Deslandres group of carbon. The bands lie in the ultra-violet between 2100 and 2900 Å.U. The emitter seems to be a dipole molecule in simple rotation about a non-precessing axis perpendicular to the line joining the nuclei.—W. W. **Coblentz** and C. O. **Lampland**: New measurements of planetary radiation and planetary temperatures. By means of a series of transmission screens, the radiations were separated into spectral groups and the radiation intensity of each determined by new radiometers. The unilluminated part of the disc of Venus emits much infra-red radiation, suggesting a short rotation period (1-10 days). Illuminated regions of Mars seem to be at $5-15^\circ\text{C}$.; polar regions, perhaps -70°C .; dark phase on sunrise side, perhaps -60°C . Surface temperature of Jupiter and Saturn appears to be -60° or -80°C .—E. H. **Hall**: The number of free

electrons with a metal. The relation between the atoms, free electrons, and ions within a metal are essentially those of dissociation equilibrium. The free electrons may be 2-3 per cent. of the number of atoms and increase with temperature. This gives an ionising potential of the solid metal of $\frac{1}{8}$ volt for cobalt to $\frac{1}{4}$ volt for iron at 0° C.—F. G. Keyes and F. W. Sears: Recent measurements of the Joule effect for CO_2 . A glass bomb containing the gas is broken in a vacuum and the temperature change measured by a platinum resistance wire.—H. B. Lemon: The comet tail spectrum and Deslandres' first negative group. Helium pumped through activated carbon gives a brilliant comet tail spectrum. The spectrum is also given by a hydrogen tube containing carbon cooled to liquid air temperature and with a hot cathode, but is feeble.—W. F. Meggers: The periodic structural regularities in spectra as related to the periodic law of the chemical elements. The spark spectrum (from ionised atoms) resembles in structure the arc spectrum (from neutral atoms) of the preceding element (Displacement Law). Even and odd structures, *i.e.* doublets and triplets, etc., characterise the arc spectra of alternate elements in columns I.-VIII. of the periodic classification, and even and odd structures their spark spectra (extension of Rydberg's Alternation Law). Experimental verification.—E. L. Nichols: Notes on neodymium oxide. The oxide in bulk or in a bead gives a band spectrum of two identical sets, though the bands are generally in different places. There are two absorption spectra: the reversal of the band spectrum and the spectrum of an aqueous solution. The same two sets of bands appear together with a third.—A. H. Pfund: Halogen isotopes and infra-red reflection spectra. Potassium salts of the halogens have as many bands of selective reflection in the infra-red as there are isotopes. Plotting wave-numbers ($1/\lambda$) against atomic weights gives two parallel straight lines, the lighter isotopes, together with iodine, falling on one line.—P. A. Ross and D. L. Webster: (1) The Compton effect with no box around the tube. The apparatus was so arranged that radiation from any light element other than the secondary radiator had to travel a distance by which, according to the inverse square law, its intensity would be made negligible. Compton's predicted shift is confirmed, but no trace is found of the tertiary radiation suggested by Duane. (2) Compton effect: evidence on its relation to Duane's box effect. The intensity of scattered radiation from a box enclosing the X-ray tube and secondary radiator as calculated using Barkla's mass-scattering coefficient is inadequate to explain the peak observed by Duane in the box experiments.—H. Boschma: The nature of the association between Anthozoa and Zooxanthellæ. Coral polyps containing algæ are substantially parasitic on them, apparently owing to lack of organic food. Given organic food, they cease to ingest the algæ.—T. L. Davis: The mechanism of reactions in the urea series. The mechanism in many cases is the reversible combination of molecules: the urea derivatives de-arrange or break down in a predictable manner analogous to the de-arrangement of urea into ammonia and cyanic acid.—L. J. Gillespie: An equation for the Haber equilibrium.—G. Glocker: A critical potential of methane and its absorption in the ultra-violet. The maximum in the current-potential curve of three- and four-electrode methane tubes is not due to a resonance potential.—H. W. Underwood, Jr.: Studies in catalysis. Negative catalysts or "stabilisers" seem to act by the formation of loosely combined molecular compounds.—W. J. Crozier and H. Federighi: On the measurement of critical thermal increment for biological processes. The logarithm of

frequency of heat-beat in the silk-worm bears a linear relation to the reciprocal of the absolute temperature; elaborate precautions are necessary to eliminate chance variations.—P. Bailey and Harvey Cushing: Micro-chemical colour reactions as an aid to the identification and classification of brain tumours.—S. Flexner: Virus encephalitis in the rabbit. The contents of febrile herpes vesicles and allied substances from man set up this inflammation of the brain in the rabbit. The virus appears to have at times a general distribution throughout the human body.—W. J. Luyten: Notes on stellar statistics: II. The mathematical expression of the law of tangential velocities.—G. C. Evans: Economics and the calculus of variations.—E. Kasner: Separable quadratic differential forms and Einstein solutions.—D. N. Lehmer: On a new method of factorisation. Legendre's method of factorisation, which makes use of the fact that all numbers having a given quadratic residue contain only such prime divisors as belong to certain linear forms, is to be utilised to construct stencils. The combination of any number of sets of these forms can then be accomplished by piling the corresponding stencils one on top of the other.—A. D. Michal: Functionals of curves admitting one-parameter groups of infinitesimal point transformations.—E. C. Jeffrey: (1) Resin canals in the evolution of the conifers. Contrary to current opinion in Europe, it is concluded, from the evidence of wound resin canals in fossil coniferous woods, that the Abietinæ (pines) represent the parent stock of the group. (2) The origin of parenchyma in geological time. Storage parenchyma has been derived from tracheids; it appeared first at the end of the annual ring, being related to the extra supplies required by the cambium in spring, and often shows every gradation towards tracheary elements.

Official Publications Received.

- University of Illinois Engineering Experiment Station. Bulletin No. 145: Non-Carrier Radio Telephone Transmission. By Hugh A. Brown and Charles A. Keener. Pp. 26. (Urbana, Ill.) 15 cents.
- Shirley Institute Memoirs. Vol. 3, 1924. Pp. vi+362+iv. (Manchester: British Cotton Industry Research Association, Didsbury.)
- State of Illinois Department of Registration and Education: Division of the Natural History Survey. Bulletin, Vol. 15, Art. 4: A Preliminary Report on the Occurrence and Distribution of the Common Bacterial and Fungous Diseases of Crop Plants in Illinois. By L. R. Tehon. Pp. viii+173-325. (Urbana, Ill.)
- Records of the Botanical Survey of India. Vol. 10, No. 2: The Botany of the Abor Expedition. By I. H. Burkill. Pp. 115-420+10 plates. (Calcutta: Government of India Central Publication Branch.) 5.3 rupees; 8s. 6d.
- Statens Meteorologisk-Hydrografiska Anstalt. Årsbok, 5, 1923. V: Hydrografiska mätningar i Sverige. Pp. 36+4 plates. (Stockholm.) 5 kr.
- Meddelanden från Statens Meteorologisk-Hydrografiska Anstalt. Band 3, No. 1: Meteorologiska Resultat av en Sommarseglats runt de Brittiska Öarna (Meteorological Results of a Summer-Cruise round the British Isles). With an English Summary. Av Carl-Gustaf Rosby. Pp. 16. (Stockholm.) 1 kr.
- Abisko Naturvetenskapliga Station. Observations météorologiques à Abisko en 1917. (Meteorologiska fakttagelser i Abisko år 1917.) Rédigées par Bruno Rolf. Pp. 75. (Stockholm.)
- Board of Education. Vacation Courses in England and Wales, 1925. Pp. 18. (London: H.M. Stationery Office.) 6d. net.
- The Quarterly Journal of the Geological Society. Vol. 81, Part 1, No. 321, March 25th. Pp. xlviii+112+9 plates. (London: Longmans, Green and Co.) 7s. 6d.
- Reports of the Progress of Applied Chemistry. Issued by the Society of Chemical Industry. Vol. 9, 1924. Pp. 700. (London: The Society of Chemical Industry.) 7s. 6d.; to non-members, 12s. 6d.

Diary of Societies.

SATURDAY, APRIL 18.

- MINING INSTITUTE OF SCOTLAND (Annual Meeting) (at Royal Technical College, Glasgow), at 3.—Prof. H. Brigg: Sinclair's Treatise on Coal-mining, 1672 (Seventeenth Century Mining in East Lothian).—J. H. Coekburn: The Principles and Operation of the Mines (Working Facilities and Support) Act, 1923, Part 1.—C. N. Kemp and W. M'Laren: Demonstration on Coal Washing.
- INSTITUTE OF BRITISH FOUNDRYMEN (Lancashire Branch, Junior Section) (at Municipal College of Technology, Manchester), at 7.—A. Hill: Foundry Materials.