

Early Science at Oxford.

June 24, 1684. Mr. Musgrave further informed the Society that if ye Jugular veins in men communicate one with ye other, in ye same manner, as they did in his Dog, we may then argue hence, that bleeding in ye jugulars, is more proper in some distempers of ye head, than severall physitians (who suppose no considerable communication between ye brain, and externall jugulars) will allow.

It was ordered, that ye Eclipse of ye Sun, on ye 2nd of July next, be strictly observed, and that all things necessary for that purpose be made ready by that day.

Mr. Walker mentioned a Barometer he has, ye tube of which, at about 27 inches from ye open end, turns in an obtuse angle, for ye better observing ye ascent of ye quicksilver. He was desired to shew it ye Society at ye next meeting.

June 26, 1688. The thanks of the Society are returned to Mr. President, for a letter communicated by him from Mr. Hillyer, being a farther account of customs and religion of ye Indians.

In consideration of the great pains and trouble Dr. Wallis has been at in the care of printing *Avistarchus*, the Society give order that their thanks be returned to the Doctor.

Ordered that an *Avistarchus* be sent to Dr. Garden, one to Dr. Middleton. To the Vniversitys of Aberdeen, and Glasgow, Edinborough and St. Andrews. To Mr. Molineux, and the Provost and Library of Dublin. To Mr. Ash. To Mr. Jessop. To Dr. Lister. To the Secretarys of the Royall Society, and the Library of the Society, and the President of the Royal Society. To Dr. Chamberlain. To Mr. Flamstead. To Dr. Pitt. To the Vice-chancellor and Publick Library. To Mr. Halley. Ordered that Mr. Charlet deliver one from the Society to Mr. President.

The Tutenage of Japan was shewed to the Society, being used for paper to wrap up goods, or make sacks: Of the same sort being thicker are made the tea-pots. It is a metall finer than lead or tin, but neither the one nor the other. The thanks are returned to Dr. Hide for his communication of the heads of some Japan matters he has communicated to ye Society.

June 29, 1686. Mr. Caswell communicated part of a letter from Mr. Halley, wherein he acquaints him that he intends to try some experiments concerning the specific gravity of the air. A discourse of Dr. Lister's read, concerning the improvement of *Agriculture*.

July 1, 1684. Mr. Walker presented his Barometer, mentioned in ye Minutes of ye praceding week, to ye Society; ye tube of it, at ye distance of (about) 27 inches from ye upper end, was bent, in an angle of 108 degrees, for ye better observing ye motion of ye quicksilver, which, in ye sloaping part of this tube, does rise, and fall, 2½ inches, for one inch in a tube exactly perpendicular.

Mr. Bernard was pleased to acquaint ye Society, that a spot in ye Sun was seen by Mr. Caswell on Thursday last, and by himself at ½ hour after 7 in ye morning, at which time it was not far from ye rim of ye Sun: it appeared to be a thick firm spot, and to take ye same course, with that observed, not long since, by Mr. Flamstead, (*vid.* Minutes of May 27, 1684;) for it passed over near ye center of ye Sun. He tells us farther, that he looked after it again on ye Monday following but could not see it; it had made its exit. We are promis'd a more full account of this matter.

Dr. Bathurst informed ye Society, of a relation he lately received out Somersetshire, concerning ye great damage done to ye beans in that county, by vast numbers of caterpillars.

Societies and Academies.

LONDON.

Royal Society, June 18.—Lord Rayleigh: Luminous vapour from the mercury arc and the progressive changes in its spectrum. This investigation deals with the luminous stream of vapour observed when mercury distils away from the arc *in vacuo*. The lines of the arc forming known spectrum series are for the most part strongly developed in the vapour stream. An exception is line 1850 *IP*—*IS*, which is strong in arc, but inconspicuous in vapour. Higher members of various series appear in greater relative intensity in vapour than in the arc. The continuous spectrum of mercury, not noticeable when the vapour first emerges, becomes more conspicuous as the vapour matures. In the limit the spectrum tends to consist simply of line 2537 and continuous spectrum. If the vapour is passed through a metal tube maintained at negative potential, the luminosity of the line spectrum in general tapers down to a sharp point, beyond which it disappears. Line 2537 behaves differently. Much of its light tapers down to a point which, however, is beyond the place where the other lines are extinguished, but a residuum is of a different origin and does not admit of extinction. The light of the band spectrum also passes on.—J. C. McLennan and G. M. Shrum: On the origin of the auroral green line 5577 Å and other spectra associated with the aurora borealis. In studying the effect of large admixtures of helium on the spectrum of oxygen, a hitherto unknown line has been photographed. The wave-length of this line has been found to be 5577.35 + 0.15 Å. It is very sharp and is subject to great fluctuations in intensity. Evidence has been produced to prove that this line is identical with the auroral green line $\lambda = 5577.350 + 0.005$ Å. This line must be attributed to some hitherto unknown spectrum of oxygen, and it is not a limiting member of the ordinary band spectrum of oxygen. Helium has been used to bring out the bands of nitrogen, with an intensity distribution similar to that found in the aurora. The possibility of metastable helium acting as the exciting agent in the auroral spectrum has been discussed.—J. C. McLennan and A. B. McLay: On the series spectrum of gold. Absorption spectra of the vapours of gold, silver and copper in the Schumann region have been investigated. The second members of principal series of doublets in the gold arc spectrum are $\lambda = 1646.71$ (I vac.) and $\lambda = 1665.75$ (I vac.). Similarity exists between the term systems gold I, copper I, and zinc II, in respect of their inverted δ terms, and the term systems of gold I and copper I in respect to certain special π terms. The term systems silver I and cadmium II have not been shown to include either inverted δ terms or the special type of π terms mentioned.—W. A. Bone, D. M. Newitt and D. T. A. Townend: Gaseous combustion at high pressures, Pt. V. The authors describe further experiments upon the explosion of hydrogen—air and carbon monoxide—air mixtures at initial pressures up to 175 atmos. It is shown, *inter alia*: That, in general, and except where N_2 -activation intervenes, as in carbon-monoxide-air explosions, time for the attainment of maximum pressure diminishes as initial pressure increases. The "corrected" P_m/P_i ratios for explosion of any and all mixtures investigated increased in notable degree with initial firing pressure, due probably to increasing opacity of the gaseous medium to the radiation emitted during explosions. There were no signs of "after-burning" in any of the explosions when P_i exceeded about 10 atmos., although it could usually

be detected when $P_i = 3$ atmos.—W. T. David: The effect of infra-red radiation upon the rate of combustion of inflammable gaseous mixtures. Two types of apparatus were employed: In one, radiation from an electrically-heated wire coil was passed into the explosion vessel through a window of fluorite or quartz. Pressure-time curves were taken during the explosion of identical mixtures, first when radiation was passed into the explosion vessel, and then when no radiation was passed in. In the other, gaseous mixtures were exploded in a vessel the interior surface of which was silver-plated, and could, therefore, be made either reflecting (by polishing) or absorbent (by coating with dull black paint); by this means it was possible to vary the radiation density of those types of radiation emitted by the burning gases during the explosion period. Pressure-time curves were taken during explosion of identical mixtures taken first when the walls of the vessel were polished, and then when blackened. For hydrogen and air, carbon-monoxide and air, and methane and air mixtures, an increased rate of combustion was found in all cases when the superimposed (first type) or increased (second type) radiation could be absorbed by the reacting gases. Absorption of radiation by reacting gases promotes combustion; intra-molecular energy (rotational and vibrational) of reacting molecules is the factor (or one factor) concerned in combustion.—R. K. Schofield and E. K. Rideal: The kinetic theory of surface films. Surface tension—concentration curves for aqueous solution of a number of capillary active organic substances give evidence in the case of dilute solutions in support of the unimolecular character of the adsorbed films. The analogy between the lowering, F , of the surface tension, and a three-dimensional gas or osmotic pressure, postulated by Traube, has been critically examined. For weak solutions when F exceeds some 10 dynes per centimetre, the surface phase is relatively highly condensed, and the equation $F(A-B) = \chi RT$, analogous to that of Amagat connecting the pressure and volume of highly compressed gases, is obeyed. In this equation, A is area occupied by a gm. mol. of active substance at interface, B is limiting area of a gm. mol. under high compression, and $1/\chi$ is a measure of lateral molecular cohesion. The values of χ for fatty acids show that at a water-air interface, lateral molecular cohesion increases with length of hydro-carbon chain. There is little or no cohesion between such molecules at a water-benzene interface. Sucrose molecules do not cohere at water-mercury interface.—H. M. Macdonald: The condition that the ratio of the intensities of the transmitted and reflected electric waves at the interface between two media is independent of their plane of polarisation. For a state of steady electrical oscillation between a closed surface separating two different dielectric media and a conductor inside this surface, the condition is that the ratio of the specific inductive capacities of the two media is equal to the ratio of their magnetic permeabilities. For a medium in which the ratio of the specific inductive capacity to the magnetic permeability is constant, the intensity is constant along a ray which cuts the surfaces of constant specific inductive capacity orthogonally; when the surfaces of specific inductive capacity are concave towards an inner surface, and the specific inductive capacity diminishes outwards, the path of any other ray is concave towards the inner surface.—C. V. Raman and L. A. Ramdas: The scattering of light by liquid boundaries and its relation to surface-tension. Parts I. and II.—H. Weiss: The application of X-rays to the study of alloys.—F. R. Weston: The flame spectra of carbon monoxide and

water gas. The results of a spectrographic study of the flame of carbon monoxide, burning in air and various other supporting atmospheres, are described. In the flame of pure (undried) carbon monoxide, two sets of independent interactions occur simultaneously:—(a) *direct* interactions between CO and O (*without any intervention of steam*), exciting radiations which give rise to the continuous and banded parts of the spectrum and to the characteristic blue colour of the flame, and (b) interactions between CO and OH₂ molecules, which originate the “steam-lines” in the spectrum. When hydrogen is gradually added to the burning gas, the relative proportions of the first-named interactions diminish rather rapidly.

CAMBRIDGE.

Philosophical Society, May 18.—J. F. Lehmann and T. H. Osgood: The passage of electrons through small apertures. The velocity distribution was investigated in a beam of electrons emerging through an aperture in an anode to which they were accelerated by potential differences varying from 200 to 1000 volts. For holes in thin sheet copper, the percentage of electrons in the beam with velocities equivalent to the accelerating field, as measured by retarding potentials, varied from 1 to 80 as the diameter of the hole was increased from 0.13 to 3.24 mms. With copper capillary tubes of the order of 1 cm. in length, the percentages were much higher for a given diameter, a 0.4 mm. tube giving an 80 per cent. beam. This was the maximum attained under the experimental conditions.

PARIS.

Academy of Sciences, May 25.—M. d'Arsonval: A new direct-current generator giving 500,000 volts. In principle this consists of a condenser charged to high potential by means of a high-tension alternating current; the alternations being separated by a two-electrode valve. With a potential of 600,000 volts (continuous) a spark passes between 50 cm. spheres, 28 cm. apart: the current is about 30 milliamperes.—Jean Perrin: Remarks on the preceding communication. If the range of the generator described can be extended to 5 million volts, it should be possible to act on the atomic nuclei and carry out transmutations on a tangible scale.—A. Desgrez, H. Bierry, and F. Rathery: Inorganic phosphates and hypoglycæmia produced by insulin. The injection into an animal of a suitable dose of a solution of sodium or potassium phosphate, with a P_H approximating to that of the blood, intensifies and prolongs the hypoglycæmia caused by injections of insulin.—C. Camichel, L. Escande, and M. Ricaud: The flow of viscous liquids round an obstacle. The effect of varying velocity of flow is shown in four photographic reproductions.—R. Kœhler and C. Vaney: A new gastropod producing galls on the spines of *Dorocidaris tiara*.—M. Gustave André was elected a member in the section of Rural Economy, in succession to the late L. Maquenne.—B. de Kerékjártó: Families of surfaces and of curves.—Bertrand Gambier: The asymptotic transformation of M. Bianchi and the curve of M. Picard of ruled surfaces the generators of which belong to a linear complex.—R. H. Gernay: Implicit periodic functions and periodic solutions of partial differential equations.—N. Lusin: The projective ensembles of Henri Lebesgue.— — Eydoux: The flow of liquids with and without velocity potential. Application to turbine buckets.—Boris Stetchkine: The determination in an incompressible fluid of the velocity potential due to a vortex tube.—P. Lecomte du Noüy: An apparatus for the rapid measurement of the surface

tension at the surface of separation of two liquids. The influence of temperature.—Stephane **Domrowsky**: The regime of concentrations established by lateral diffusion in a convection current.—M. **Lardy**: Study of the propagation of short waves (in wireless telegraphy). An account of the phenomena observed (fading, scintillation) of signals of wave-lengths of 450, 115, and 50 metres at distances between 180 and 4500 kilometres. The superiority commonly attributed to the shorter wave-lengths was not confirmed.—E. **Briner**: Remarks on the origin of radioactivity. It has been advanced as a difficulty against the acceptance of the theory of the spontaneously explosive atom, that the enormous emission of energy accompanying this change is irreconcilable with the exothermic synthesis of the elements starting with their primordial constituents, protons and electrons. The author shows by analogies drawn from the destruction of chemical molecules that there is no real incompatibility between the radioactive atom, the destruction of which frees a large amount of energy, and the exothermic formation of the atom.—Mlle. **Berthe Perrette**: Contribution to the study of the isotopy of lead. A comparison of lead extracted from a pitchblende (Belgian Congo) with an atomic weight of 206.14 and ordinary lead of atomic weight 207.2. The densities were: radioactive lead, 11.278; common lead, 11.336; and both had the same atomic volume. In the comparison of the arc spectra, the Fabry and Perot interference method was used, the diameters of the rings formed by the corresponding lines of the two isotopes being measured. All the lines have shown a difference in the same sense with an increase in the wave-length for the lead with the lowest atomic weight.—Nobuo **Yamada**: The long range particles emitted by the active deposit of thorium. The experiments described prove that the active deposit of thorium emits only one group of α particles of 11.5 cm. range, in addition to the ordinary α rays. The two other groups found by Bates and Rogers were not confirmed.—**d'Huart**: The absorption of water vapour and of some other vapours by the surface of glass. An apparatus is described and figured which can be used to measure the amount of water vapour adsorbed by glass surfaces. It can also be used to determine the vapour density of very volatile liquids.—Paul **Pascal**: Magnetochemical researches on the formation of closed chains and nuclear groups in organic compounds.—**Grandadam**: The purification of potassium and sodium cyanides. Their melting points. The purification of the alkaline cyanides can be effected by solution and recrystallisation in liquid anhydrous ammonia. The melting points were determined in a silver crucible in an atmosphere of dry nitrogen, using a gold-silver thermocouple. Sodium cyanide melts at 564° C., potassium cyanide at 634° C.—F. **Bourion** and J. **Picard**: The kinetic study of the reduction of mercuric bromide by sodium formate.—V. **Auger**: A new type of alkaline borates; the pentaborates.—Pierre **Lesage**: Inheritance of the early character and the conservation of this character in old seeds.—P. **Lavielle**: The antipodes and the chalazian region of the ovule of the Dipsacæ.—Jules **Amar**: Cellular hydration and vitality.—J. **Cluzet**, A. **Rochaix**, and Th. **Kofman**: The variations of the agglutinating power of a mixed immunoserum under the influence of a continuous electric current.—A. **Vandel**: Physiological amixia and incipient species in the isopod *Trichoniscus (Spiloniscus) provisorius*.—Phillippe **Bunau-Varilla** and Emile **Techoueyres**: Induced antiseptis or, in other words, the microbaccidial action exercised at a distance, without material contact, on a bacterial dilution by a very dilute solution of sodium hypochlorite.

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Official Publications Received.

- Bulletin of the National Research Council. Vol. 10, Part 1, No. 51, March: Radioactivity. Report of Committee on X-rays and Radioactivity, National Research Council. By A. F. Kovarik and L. W. McKeahan. Pp. 203. (Washington: National Academy of Sciences.) 2.25 dollars.
- Observatoire de Zi-ka-wei. Notes de sismologie, No. 6: Étude sur le ondes de dilatation et les ondes de condensation. Principaux sismogrammes, 1924. Par le R. P. E. Gherzi. Pp. 22+6 planches. (Zi-ka-wei, Chang-hai.)
- Annual Report of the Auckland Institute and Museum for 1924-1925, adopted at the Annual Meeting held February 27th, 1925. Pp. 37. (Auckland, New Zealand.)
- Journal of the College of Agriculture, Hokkaido Imperial University, Sapporo, Japan. Vol. 15, Part 3: An Enumeration of the Butterflies and Moths from Saghalien, with Descriptions of new Species and Subspecies. By Dr. S. Matsumura. Pp. 83-196+plates 8-11. (Sapporo.)
- Imperial Department of Agriculture for the West Indies. Report on the Agricultural Department, Grenada, January-December 1924. Pp. iv +11. (Trinidad.) 6d.
- The Science Reports of the Tôhoku Imperial University, Sendai, Japan. Second Series (Geology). Vol. 7, No. 2: A Geological Problem concerning the raised Coral-Reefs of the Riukiu Islands and Taiwan; a Consideration based on the Fossil Foraminifera Faunas contained in the raised Coral-Reef Formation and the youngest Deposits Underlying It. By Hisakatsu Yabe and Shôshirô Hanzawa. Pp. 29+6 plates. (Tokyo and Sendai: Maruzen Co. Ltd.)
- Indian Medical Research Memoirs, Memoir No. 3. Supplementary Series to the *Indian Journal of Medical Research*. Provisional List and Reference Catalogue of the Anophelini. Part 1: Provisional List of Species. Part 2: Descriptive Synopsis. By Lt.-Col. S. R. Christophers. Pp. 105. (Calcutta: Thacker, Spink and Co.) 1.12 rupees; 2s. 6d.
- Department of Commerce: Bureau of Standards. Miscellaneous Publication of the Bureau of Standards, No. 68: Report of Board of Visitors to Bureau of Standards of the Department of Commerce for the Secretary of Commerce. Pp. iv+14. (Washington: Government Printing Office.) 5 cents.
- Hundredth Annual Report of the Committee of the Bath Royal Literary and Scientific Institution for the Year 1924. Pp. 16. (Bath.)
- Aeronautical Research Committee. Reports and Memoranda, No. 960 (E. 18): Variation of Engine Power with Height. By H. L. Stevens. (B. 4. Engines 50, T. 1952.) Pp. 8+11 plates. 9d. net. Reports and Memoranda, No. 961 (E. 14): The Variation of Engine Power with Height. By H. M. Garner and W. G. Jennings. (B. 4. Engines 51, T. 1964.) Pp. 3+6 plates. 6d. net. (London: H.M. Stationery Office.)
- Proceedings of the Royal Society of Edinburgh, Session 1924-1925. Vol. 45, Part 3, No. 18: The Equation of Conduction of Heat. By Marion C. Gray. Pp. 230-244. 1s. 6d. Vol. 45, Part 3, No. 19: Note on Professor Whittaker's Atomic Model. By John A. Eldridge. Pp. 245-248. 9d. Vol. 45, Part 3, No. 20: Unilateral Vasodilatation on the Senile Male of the Domestic Fowl. By F. A. E. Crew. Pp. 249-251. 6d. (Edinburgh: R. Grant and Son; London: Williams and Norgate, Ltd.)
- The Physical Society of London. Proceedings. Vol. 37, Part 4, June 15. Pp. 195-267. (London: Fleetway Press, Ltd.) 6s. net.

Diary of Societies.

MONDAY, JUNE 29.

ARISTOTELIAN SOCIETY (at University of London Club), at 8.—Prof. W. H. Moberly: Some Ambiguities in the Retributive Theory of Punishment.

TUESDAY, JUNE 30.

ROYAL DUBLIN SOCIETY, at 4.15.
ROYAL ANTHROPOLOGICAL INSTITUTE (Indian Section), at 8.15.—H. de B. Codrington: Periods in Indian Archaeology.
INTERNATIONAL CONGRESS OF RADIOLOGY (at Royal Society of Medicine), at 8.30.—Reception.

WEDNESDAY, JULY 1.

INTERNATIONAL CONGRESS OF RADIOLOGY (at Central Hall, Westminster), at 2.30.—Official Opening.—At 9 P.M.—Duc de Broglie: Absorption of X and γ Radiations and the Secondary Radiations which accompany them (Silvanus Thompson Memorial Lecture).

THURSDAY, JULY 2.

INTERNATIONAL CONGRESS OF RADIOLOGY (at Central Hall, Westminster), at 10 A.M.

FRIDAY, JULY 3.

INTERNATIONAL CONGRESS OF RADIOLOGY (at Central Hall, Westminster), at 10 A.M.; at 9 P.M.—Sir Berkeley Moynihan, Bart.: The Relationship of Radiology and Surgery (Mackenzie Davidson Memorial Lecture).
GEOLOGISTS' ASSOCIATION (at University College), at 7.30.—Prof. W. W. Watts: The Geology of South Shropshire (Lecture).

SATURDAY, JULY 4.

INTERNATIONAL CONGRESS OF RADIOLOGY (at Central Hall, Westminster), at 10 A.M.
BRITISH MYCOLOGICAL SOCIETY (Phytopathological Excursion to Cambridge).—Prof. Sir R. H. Biffen and F. L. Engledow: The Inheritance of Disease Resistance.—F. T. Brooks and W. C. Moore: Silver-leaf Disease.—N. J. G. Smith: Helminthosporium Disease of Cereals.—D. Weston: The Control of Bunt in Wheat.—R. C. Woodward: Apple Mildew.—Mrs. M. N. Kidd: Fungal Invasion in Apples in Relation to Senescence.—S. M. Wadham: Clover Rot.—A. Smith: Perennial Rust Mycelia.—Prof. Nuttall, Dr. Hare, and Mr. Tait: Fungi Pathogenic to Man.
PHYSICAL SOCIETY OF LONDON (at Oxford).