

Societies and Academies

LONDON

Royal Society, November 9. SIR ARTHUR EDDINGTON: The masses of the proton and electron. The mass m of an elementary particle (proton or electron) is given by the quadratic equation

$$10 m^2 - 136 m m_0 + m_0^2 = 0,$$

where $m_0 = h\sqrt{N}/2\pi cR$; N being the number of particles in the universe and R the 'de Sitter radius' of empty space-time. The ratio of the roots is 1847.60; and the resulting value of \sqrt{N}/R gives a speed of 780 km. per sec. per megaparsec for the recession of the nebulae. Apart from a change in the identification of N and R , the above formulæ agree with those suggested in preliminary papers. The principle of the theory is that, since we can only observe relations, the wave-packets created by our observations are formed in the double wave function of the two bodies related, and are artificially analysed into separate wave packets in the single wave functions. The conditions governing this analytical separation lead to a quadratic equation that must be satisfied by the mass (or coefficient of dispersal) of the simple wave packet; when the reference body is the ideal uniform system presupposed in the current equations defining the mass, the quadratic takes the above form. In order that quantities occurring in microscopic physics (quantum theory) and macroscopic physics (relativity theory) may be expressed in the same measure, the same comparison system must be used for both. W. T. ASTBURY and H. J. WOODS: X-ray studies of the structure of hair, wool and related fibres. (2) The molecular structure and elastic properties of hair keratin. The X-ray photograph of stretched hair (β -keratin) is analogous to that of silk fibroin, whether stretched or unstretched. Stretched hair is therefore built up of extended polypeptide chains, while unstretched hair (α -keratin) must consist of the same chains in a folded state. The limiting extensibility of hair is about 100 per cent of its unstretched length. By linking this fact quantitatively with the X-ray data, a reasonable stereochemical arrangement can be found for the folds in the main-chains of α -keratin. These folds appear to be transverse to the general direction of the side-chains, which are roughly co-planar and serve to unite neighbouring main-chains by a variety of cross-linkages. The structure of β -keratin is thus one of flat polypeptide 'grids'. During the hydrolytic modification of β -keratin by steam or dilute alkalis, spacing disturbances occur in the direction of the side-chains. These disturbances are the intramolecular basis of the phenomena of 'set' and 'supercontraction' (see NATURE, Nov. 4, p. 709). J. M. ROBERTSON: The crystalline structure of naphthalene. A quantitative X-ray investigation. The structure is refined by a double Fourier analysis carried out for the zones of the three chief crystal axes, and the results expressed in absolute units. Naphthalene differs from anthracene chiefly in the larger inclination of the long axis of the molecule to the (010) plane. The interatomic and intermolecular distances are very nearly the same as in anthracene, but the electron distribution does not show any marked falling off in the peak values on passing out from the centre of the molecule as in anthracene. The electron count is again in good agreement with the chemical structure.

PARIS

Academy of Sciences, October 2 (C.R., 197, 661-720). GABRIEL BERTRAND and GEORGES BROOKS: The latex of the lac tree of Cambodia. The lac examined was obtained from *Melanorrhæa laccifera*. A preliminary examination of the latex showed that its composition and general properties resemble those of latex from lac trees of the genus *Rhus*, but that the oily phenol substance named moreacol is different, the latter possessing an additional CH_2 group. D. V. JONESCO: The generalisation of an equation of E. Goursat. J. C. VIGNAUX: A generalisation of a summation of Borel. J. SOLOMON: The effect of internal conversion. CHARLES DUFRAISSE and RENÉ CHAUX: The mechanism of shock, or knocking, in internal combustion motors. Discussion of a recent communication by Dumanois, with reference to a question of priority. E. O. LOVETT: The problem of two bodies of variable masses. MICHEL ANASTASSIADÉS: A new rectifier with a stopping layer. Studies of the electrical behaviour of the system CuS , Cu_2S . LÉON and EUGÈNE BLOCH: The spark spectrum of iron in the extreme ultra-violet. The lines tabulated extend over the range 1350-300 Å. Comparison with the data published by Millikan, Bowen and Sawyer shows anomalies, especially as regards intensities, which require elucidation by further research. Mlle. Y. CAUCHOIS and HORIA HULUBEI: The characteristic X-emission of elements in the gaseous state. Weak lines in the K -spectrum of krypton. J. E. VERSCHAFFELT: The displacement of equilibrium by variation of mass. Discussion of a recent note by Etienne on the same subject. F. HAMMEL: Manganous sulphate. Contrary to the views expressed by J. H. Krepelka and B. Rejha, the author finds that the properties of solutions of manganous sulphate do not depend on the mode of preparation of the salt employed or on its hydration. P. RUMPF: The electrometric titration of sulphurous, selenious and α -oxyalkylsulphonic acids. R. RAMBAUD: The action of PBr_3 on the ethylenic α -oxynitriles. Under the action of phosphorus tribromide, the nitrile $\text{CH}_2 = \text{CH}.\text{CH}(\text{OH}).\text{CN}$ is converted into the isomeric compound propionyl cyanide, $\text{C}_2\text{H}_5.\text{CO}.\text{CN}$. Analogous results were obtained with the higher homologue $\text{CH}_3.\text{CH} = \text{CH}.\text{CH}(\text{OH}).\text{CN}$. ENDERLIN: Researches on the dissociable organic oxides. A second isomer of oxytetraphenylrubene. V. AGAFONOFF: The red Mediterranean soils of France and their mother rocks. Researches in the field and in the laboratory show that the typical red Mediterranean soils of France are formed on pure limestones and dolomites under the influence of the Mediterranean climate. R. DUGHI: The formation and the rôle of *papilles scortéales* in lichens. ALPHONSE LABBÉ: The Oncidiaceæ, molluscs with silica. The presence of silica, often up to one-tenth of the weight, is characteristic of this group of molluscs. ESCHER DESRIVIÈRES, ROBERT FAILLIE, JONNARD and VIAL: Visual psychomotive reactions in relation with dazzling by a motor head-light. It is stated that a yellow tinted glass gives effective protection against dazzling. EMILE F. TERROINE and Mlle. GERMAINE BOY: The distinctive characters of the specific minimum nitrogenous consumption and of exogenous protein metabolism. The method is based on the study of the distribution of the urinary nitrogen, especially in the forms of creatinine and creatine. Data are obtained for nitrogen as urea, ammonia, amino-acids, allantoin,

purins, creatinine and creatine. Mlle. GERTRUDE PARISSET: The synthetic formation of creatine at the expense of the tissue proteins. Mlle. ANNA RAJZMANN: The comparative biological value of the proteins in various species of animals. The biological value of a protein or of a mixture of proteins, calculated by the formula of Martin and Robison in the form given by Terroine, from the results of the experiments described, appears to be the same for all the species considered (rat, rabbit, pig). H. TRIMBACH: The liability of various species of animals to ketonuria and ammonuria. The ketone production, reduced to unit weight, is extremely variable in various species of mammals under the same food regime. For a milk diet, most extensively studied, the ketonuria varied between 1 for the calf to 10 for the rat. Similar variations were shown for ammonuria. A. POLICARD: The fixed mineral matters of the seminal elements in the course of spermatogenesis. Results of the method of micro-incineration applied to the testicle of the rat. MICHEL VOLKONSKY: The assimilation of sulphates by the Fungi: euthiotrophy and parathiotrophy. Most species of moulds and yeasts are able to synthesise their organic sulphur compounds starting with the sulphate. The Saprolegniaceæ, however, cannot utilise the sulphate ion as a source of sulphur (parathiotrophy) and form an exceptional group. H. VIOLLE: The bactericidal power of sodium ricinoleate. Sodium ricinoleate possesses a high antiseptic power, greater than that shown by oleates, stearates, palmitates or laurates. But this action is specific towards certain micro-organisms only. Bacilli found in the alimentary canal are not destroyed, but bacilli developed in the pharynx, nasopharynx, the bronchials and in pulmonary tissue show, *in vitro*, a remarkable sensibility towards this soap. It would appear that solutions of this soap could be used as a reagent in microbial diagnosis. ANDRÉ SERGENT: A new agent for the natural transmission of recurrent Spanish-African fever: the dog tick, *Rhipicephalus sanguineus*. J. REENSTIERN: First results of the treatment of leprosy by an experimental serum. Description of the mode of preparation of the serum and of its application to two cases of advanced leprosy. The results are promising.

Forthcoming Events

[Meetings marked with an asterisk are open to the public.]

Monday, November 20

UNIVERSITY COLLEGE, LONDON, at 5.30.—Prof. Bernard Ashmole: "The Place of Art in the Study of Man".*

ROYAL SOCIETY OF ARTS, at 8.—Hesketh Hubbard: "Colour Block Prints" (Cantor Lectures. Succeeding lecture on November 27.)

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—J. Hackin: "Through Persia and Afghanistan with the Citroen Central Asian Expedition".

Tuesday, November 21

ROYAL INSTITUTION, at 5.15.—Sir William Bragg: "Liquid Crystals" (succeeding lectures on Nov. 28, Dec. 5 and 12).

Wednesday, November 22

ROYAL SOCIETY OF ARTS, at 8.—V. E. Pullin (Director of Radiological Research, Woolwich): "The Radiographic Use of Radium".

Thursday, November 23

BRITISH SCIENCE GUILD, at 4.30—(in the Goldsmiths' Hall, Foster Lane, London, E.C.2).—Prof. E. V. Appleton: "Empire Communication" (Norman Lockyer Lecture).

Friday, November 24

UNIVERSITY OF LONDON, at 5.30—(at University College).—Prof. Othenio Abel: "Palaeobiology and Evolution" (succeeding lectures on Nov. 27 and 29).*

INSTITUTION OF PROFESSIONAL CIVIL SERVANTS, at 5.30—(at the Royal Society of Arts, John Street, Adelphi, W.C.2).—Prof. S. Chapman: "The Sun's Magnetism".*

ROYAL INSTITUTION, at 9.—Sir William Bragg: "Liquid Crystals".

SOCIETY OF CHEMICAL INDUSTRY (FOOD GROUP), Nov. 23-24.—Symposium on "Bread and Milk" to be held in the hall of the British Medical Association, Tavistock Place, London, W.C.1.

Official Publications Received

GREAT BRITAIN AND IRELAND

Proceedings of the Royal Irish Academy. Vol. 41, Section A, No. 8. On Composite Surfaces in Higher Space. By J. G. Semple. Pp. 69-93. 2s. Vol. 41, Section A, Nos. 9-10: On some Permanent Arrangements of Parallel Vortices and their Points of Relative Rest, by W. B. Morton; Characteristic Properties of certain Systems of Paths in a Riemannian Space, by C. H. Rowe. Pp. 94-110. 1s. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) University College of North Wales. Calendar for Session 1933-34. Pp. 454. (Bangor.)

Imperial Bureau of Plant Genetics: Herbage Plants. Bulletin No. 10: Grazing; Papers read at the Meeting of the British Association for the Advancement of Science at Leicester on September 11th, 1933. By P. F. Astill, William Davies, M. G. Jones and A. Bridges. Pp. 22. 1s. 6d. Bulletin No. 11: Technique employed in Grassland Research in New Zealand. Pp. 49+11 plates. 3s. (Aberystwyth: Agricultural Buildings.)

OTHER COUNTRIES

Report of the Twenty-first Meeting of the Australian and New Zealand Association for the Advancement of Science, Sydney Meeting, August 1932. Edited by Dr. A. B. Walkom. Pp. xlviii+550+5 plates. (Sydney: Government Printer.)

Memoirs of the Geological Survey of India. Vol. 62, Part 1: The Pyu Earthquakes of 3rd and 4th December 1930, and subsequent Burma Earthquakes up to January 1932. By Dr. J. Coggin Brown and P. Leicester. Pp. v+140+ix+6 plates. (Calcutta: Central Book Depot.) 4.2 rupees; 7s.

Census of India, 1931. Vol. 1: India. Part 1: Report. By Dr. J. H. Hutton; to which is annexed an Actuarial Report by L. S. Vaidyanathan. Pp. xv+518+13 plates. (Delhi: Manager of Publications.)

Annual Report for the Year 1932 of the South African Institute for Medical Research, Johannesburg. Pp. 71+2 plates. (Johannesburg.)

Conseil Permanent International pour l'Exploration de la Mer. Rapports et proc.-verbaux des réunions. Vol. 85. 1^{ere} partie: Procès-verbaux (Mai). Pp. 60. (Copenhagen: Andr. Fred. Høst et fils.) 3.00 kr.

Science Reports of the Tokyo Bunrika Daigaku, Section B. No. 12: A New Genus and some New Species of Crabs from Simoda. By Tame Sakai. Pp. 137-144. 25 sen. No. 13: On the Parallelism between the Distribution of Lizards and of Anurans in the Japanese Empire. By Yaichirō Okada. Pp. 145-153. 25 sen. No. 14: Some Observations of Japanese Crayfishes. By Yaichirō Okada. Pp. 155-158. 10 sen. (Tokyo: Maruzen Co., Ltd.)

Scientific Papers of the Institute of Physical and Chemical Research. No. 448: Röntgenographische Untersuchung des Konnjakumannans. Von Ichiro Sakurada und Heiroku Hutino. Pp. 287-301. No. 449: One Method of Tune-Marking in Cathode-Ray Oscillogram. By Shumpei Watanabe. Pp. 302-309. No. 450: A Study on the Effect of Fatty Acids on Nutrition, 2: Experiments with Diets composed of Rice, Oil and Lipoid containing Linoleic or Linolenic Acid. By Ume Tange. Pp. 14. No. 451: Untersuchungen über Umesterung. Von Ryohei Oda. Pp. 15-46. No. 452: Zur Kenntnis über den Ort der Spaltung der chemischen Bindung bei ungesättigten Verbindungen. Von Ryohei Oda. Pp. 47-58. No. 453: On the Physiologically Active Isomer of Brendt's 5-Oxo-Camphor. By Kunijiro Takeuchi and Yoshikazu Sahashi. Pp. 59-68. (Tokyo: Iwanami Shoten.)

Smithsonian Miscellaneous Collections. Vol. 89, No. 7: Evidence of Indian Occupancy in Albemarle County, Virginia. By David I. Bushnell, Jr. (Publication 3217.) Pp. 24+11 plates. (Washington, D.C.: Smithsonian Institution.)

University Observatory, Oslo. Publication No. 7: On the Relative Intensity of Bands in a Sequence and the Temperature of the Upper Atmosphere. By S. Rosseland and G. Steensholt. Pp. 17. (Oslo: A. W. Brogers Boktrykkeri A.-S.)

U.S. Department of Agriculture. Leaflet No. 101: Injury to Buildings by Termites. By Thos. E. Snyder. Pp. 8. 5 cents. Technical Bulletin No. 400: Observations on the Thermal Death Points of *Anastrepha ludens* (Loew). By Hugh H. Darby and E. M. Kapp. Pp. 19. 5 cents. (Washington, D.C.: Government Printing Office.)