

## Science News a Century Ago

### Holland's Oxy-Hydrogen Microscope

The *Times* on November 20, 1834, announced that "Mr. Holland's very entertaining and very scientific exhibition is reopened this day for the season. We were present at a private view last night of the wonders which it presents to the eye. It has undergone many improvements since it was before open to the public, and may, we believe, now be considered what its proprietor states it to be, the largest, most powerful and most distinct microscope in the world. The disc contains 254 square feet and the objects, both animate and inanimate, are variously magnified from a power of 9,000 to a power of 2,624,400 times their actual dimensions. . . . Among the most curious phenomena presented to the eye are the aquatic larvæ, in some of which, so pellucid is the whole internal structure, that the intestinal canal and the peristaltic motion are clearly perceptible. . . ."

### Darwin in the Island of Chiloe

During the whole of October 1834, Darwin was confined to his bed at the home of his old school-fellow and friend, Mr. Richard Corfield, of Valparaiso; but at the beginning of November he was able to rejoin the *Beagle*. On November 10, he records, the *Beagle* sailed from Valparaiso to the south, for the purpose of surveying the southern part of Chile, the Island of Chiloe, and the broken land called the Chonos Archipelago, as far south as the Peninsula of Tres Montes. On November 21, the ship anchored in the bay of San Carlos, the capital of Chiloe, and a day or two later Darwin hired horses to take him to Chacao at the northern extremity of the island. On November 26, he records: "The day rose splendidly clear. The volcano of Osorno was spouting out volumes of smoke. This most beautiful mountain, formed like a perfect cone, and white with snow, stands out in front of the Cordillera. Another great volcano, with a saddle-shaped summit, also emitted from its immense crater little jets of steam. Subsequently we saw the lofty-peaked Corcovado—well deserving the name of 'et famoso Corcovado'. Thus we beheld, from one point of view, three great active volcanos, each about seven thousand feet high. In addition to this, far to the south, there were other lofty cones covered with snow, which, although not known to be active, must be in their origin volcanic".

### Thomas Hawkins's *Ichthyosaurus*

The geologist Thomas Hawkins, 1810–89, was best known for his collections of fossils from Devon, Somerset and Dorset, some of which were acquired by the British Museum while others were presented by him to Oxford and Cambridge. His "Memoirs of *Ichthyosauri* and *Plesiosauri*" was published in 1834, and in the *Times* of November 21 of that year a correspondent directed attention to the delay of the authorities of the British Museum in placing on exhibition that extraordinary fossil animal "The *Ichthyosaurus Chirologostinos*" of Mr. Hawkins, or "the Vairy Dragon that stung Moses" of the Dorsetshire quarrymen. "I was informed by one of the servants in the Museum," says the writer, "that cases were ordered for Mr. Hawkins's collection and that possibly the *Ichthyos* might be exposed in February. Fully acknowledging the propriety of its being placed in an additional case, I must protest against the absurdity of its remaining concealed till

then. It is not liable to suffer from dust, or a slight touch, and to prevent persons meddling with it, for a few shillings a slight bar might be placed in front of it. . . . There seems to be a strange want of proper management, or something worse than that, on the part of some person or persons connected with the Museum, but whether it rests with Mr. Koenig or a higher authority I cannot say." Charles Dietrich Eberhard König (1774–1851) was the keeper of the Mineralogical Department.

## Societies and Academies

### LONDON

Royal Society, November 8. A. C. G. EGERTON and F. LL. SMITH: Estimation of the combustion productions from the cylinder of the petrol engine (1). An engine was fitted with a valve so that gases could be extracted at any stage during the compression and working stroke. By analysis of the gas it was confirmed that 'knock' is associated with accelerated flame velocity, but only in the last portion of the gas to burn. Some combustion occurs in the neighbourhood of the valve prior to arrival of flame. The aldehydes reach their maximum concentration (1 in 500) at the moment when flame reaches the valve, the substances behaving as peroxide (1 in 10,000) slightly earlier. Aldehydes were not responsible for the production of 'peroxide' or the 'knock'. Certain organic peroxides were found to be powerful 'pro-knocks'. A. C. G. EGERTON, F. LL. SMITH and A. R. UBBELOHDE: Estimation of the combustion products from the cylinder of the petrol engine (2). The experiments were extended to the study of the behaviour of different hydrocarbons and other kinds of fuel, the 'aldehyde'—a 'peroxide'—formed at various stages being determined by special methods. The substance behaving as peroxide is mainly nitrogen peroxide and the peak in the curve of concentration which occurred before the top dead centre is partly explained by the presence of traces of sulphur. Nitrogen peroxide alone does not act as a pro-knock, whereas organic nitrites are strong pro-knocks. Nitrogen peroxide is, however, formed in greater amounts under knocking conditions and quite early in the stroke. A. R. UBBELOHDE and A. C. G. EGERTON: Estimation of the combustion products from the cylinder of the petrol engine (3). The behaviour of various types of organic peroxides towards various reagents was investigated. By taking advantage of the different rate of reaction of the various peroxides on potassium iodide, it was possible to determine them in presence of nitrogen peroxide. Diethyl and ethyl hydrogen peroxide and acetyl peroxide were found to be violent pro-knock substances. The mol fraction needed to produce pronounced knock was  $10^{-5}$ . A peroxide of apparently similar type to ethyl hydrogen peroxide was detected in the gases from the engine cylinder when run under knocking conditions on pure paraffin hydrocarbons in much the same concentration. H. JONES: Application of the Bloch theory to the study of alloys and of the properties of bismuth. A qualitative explanation is given of the variations of the crystal parameters within the  $\epsilon$  and  $\eta$  phases observed by Owen and Pickup, and also of the electron-atom ratio at which the  $\epsilon$  phase begins (Hume-Rothery's rule). A Brillouin zone is found for bismuth containing five electrons per atom. The theory shows why bismuth

does not form a co-ordination lattice. The conductivity of alloys of Bi, Sn, and Bi Pb are considered; the observed variation with composition leads to a determination of the 'overlap' of the Fermi surface into the second zone. From this the diamagnetism of pure bismuth and of Bi Sn, Bi Te alloys are deduced, as is also the magnetostriction, in good agreement with experiment.

## PARIS

Academy of Sciences, October 15 (*C.R.*, 199, 689-744). J. COSTANTIN: The influence of high latitudes on the agricultural yields of the potato in North America. The use of phytopathological certificates (as in Canada) is a powerful factor in increasing the yields of the potato. The facts quoted tend to prove that high latitudes tend to increase the yield and reduce disease. WLADIMIR VERNADSKY: Should heavy water be looked for from the geochemical point of view? A general discussion of the possible increase in the proportion of heavy water during geological periods. EDOUARD CHATTON and ANDRÉ LWOFF: A parasitic infusorian of the secreting hairs of Edriophthalm Crustacea and the new family of the Pilisuctoridæ. ALBERT TOUSSAINT: Contribution to the study of the interactions between the sustaining wings when 'taxi-ing'. The application to the case of biplane cells. EMILE SEVIN: Waves, spin and numbers. MAURICE PAUTHENIER and LÉON AGOSTINI: The law of charge of a spherical particle in an ionised field. The theoretical expression for the limiting charge,  $3Ea^2$  ( $E$  is intensity of ionised field and  $a$  the radius of the sphere), has been tested experimentally. When the velocity of the sphere reaches half that of the ions, the expression is verified to within 3 per cent. PIERRE JOLIBOIS: The electrolysis of saline solutions with distilled water electrodes. A method of electrolysing salts is described giving a separation into basic and acid oxides without any metallic deposit. VASILESCO KARPEN: An electric battery utilising the energy of oxidation of alcohol. A modification of the Becquerel battery formed of solutions of caustic soda and of nitric acid, separated by a porous partition, with platinised electrodes. Methyl alcohol is added to the solution of caustic soda and this is oxidised to sodium formate during the action of the cell. AUREL JONESCO: The absorption spectrum of acetylene in the region 2350-2050 Å. BENJAMIN BLOCH and JACQUES ERRERA: The influence of temperature on the absorption of organic liquids in the near infra-red. AUGUSTE ROUSSET: The experimental study of the critical opalescence of binary mixtures. Measurements were made on six mixtures. The theory of Ornstein and Zernike was not found to be verified by any of the six, but the diffusion in three cases is in perfect agreement with Rocard's theory. GEORGES BRUHAT and PIERRE GRIVET: The use of naked compensators in the analysis of elliptical vibrations. HUBERT FORESTIER and GEORGES GUIOT-GUILLAIN: A new ferromagnetic variety of ferric oxide. WILFRIED HELLER: The alteration of hydrophobe sols by the action of light in relation with their natural stability. MAURICE LAMBREY: The decomposition velocity of some nitric esters at a low temperature. Experiments on gun-cotton stabilised either by prolonged boiling with water or by Muraour's method. The initial production of nitric oxide is due to traces of impurities: after the impurities have been decomposed, a measurable decomposition of the pure product takes place at 43° C. It corresponds to the destruction of a

thousandth of the gun-cotton in eleven hundred years. ANDRÉ SANFOURCHE: The oxidation of silicon at low temperature. The attack of various specimens of silicon by hydrofluoric acid has been attributed to the removal of a skin of silica formed by oxidation. Direct analysis of samples of silicon prepared by different methods supports this view. DIMITRE IVANOFF: The constitution of M. Delacré's dypnopinacone. CHRISTOPHE GAUDEFROY: The surface of double refraction and the singular property of certain crystalline plates. ADRIEN DAVY DE VIRVILLE: The principal types of shallow pools of the Atlantic shore. ANTOINE MAGNAN, CLAUDE MAGNAN and ALBERT DE VILLELONGUE: Contribution to the study of the vision of fishes. Measurements of the refractive indices of various transparent media of the eyes of fishes. Mlle. EDNA HARDE and MARCEL PHILIPPE: Observations on the antigen power of the mixture diphtheric toxin and vitamin C. CONSTANTIN LEVADITI and Mlle. YVONNE MANIN: The mechanism of the spirochaetoidal action of bismuth. C. MATHIS, J. LAIGRET and C. DURIEUX: Three thousand vaccinations against yellow fever in French Western Africa by means of living mouse virus, attenuated by age. Vaccination against yellow fever, by the method of the Tunis Pasteur Institute, has been carried out on a large scale in French Western Africa. Out of a total of more than three thousand inoculations, there were only two severe reactions and these were rapidly cured. There was a high percentage of positive immunisations.

## BRUSSELS

Royal Academy of Sciences (*Bull. Class. Sci.* Nos. 8-9). J. E. VERSCHAFFELT: The Bridgman effect. Thermodynamical theory is applied to the case of circuits containing crystalline wires differently orientated with respect to their crystal axes. Electrocaloric effects, which obey the same laws as the Peltier effect and agree with those found experimentally by Bridgman, are shown to exist. P. BURNIAT: Birational transformations of space having two isolated associated fundamental points. R. PIRARD: On an involuntary birational transformation of space. Mlle. Y. DUPONT: Electromagnetic couples and angular momenta in the gravific of Th. De Donder. J. WOUTERS: The Raman spectrum of carbon bromotrichloride. The Raman spectrum of  $\text{BrC}_2\text{Cl}_3$  consists of six lines,  $\Delta\nu = 774, 715, 425, 295, 247, 195 \text{ cm}^{-1}$ . These frequencies are compared with those of other compounds of the general formula  $\text{ZXY}_3$ , such as  $\text{HCCl}_3, \text{HSiCl}_3, \text{BrSiCl}_3$ . M. GONZE: Mechanism of the oxidation of hydrazines by iodine. The reaction between hydrazines and iodine is monomolecular with respect to hydrazine and iodine, and is independent of the hydrogen ion concentration. The observed anomalies in the velocity constant are explicable by the fact that the reaction takes place via free iodine and  $\text{I}_3'$  ions. M. GONZE: Preparation of  $m,m'$  trifluorhydrazotoluene. By preparing  $m,m'$  trifluorhydrazotoluene and  $m,m'$  hydrazotoluene, it was shown that the substitution of hydrogen by fluorine greatly increases the stability of the hydrazine. A. J. J. VANDE VELDE: The sterilisation of biological powders (5). It is possible to sterilise arable soil completely without appreciably influencing its biological properties by treating it with carbon disulphide at the boiling point (46° C.). The process is repeated three times, the liquid being removed each time by spontaneous evaporation.

## LENINGRAD

Academy of Sciences (*C.R.*, 3, No. 2). N. MUSCHELISHVILI: A discussion of new integral problems of the theory of elasticity in two dimensions. D. KRUTOV: The Picard-Landau problem. V. FESENKOV: Stability of the photometric scale for the focal images of stars. Y. KRUTKOV: Contribution to the theory of the Brownian movement. The distribution of the phases, velocities and displacements of a free particle. B. DERIAGIN: A new law of friction and gliding. A. MITKEVITCH: The effect of eddy currents on magnetic viscosity. A. SOKOLIK and K. SHCHELKIN: Change of velocity of an explosion wave with pressure. V. SHARONOV and E. KRINOV: An experimental study of the special energy distribution of daylight illumination. N. VOROZHTSOV and V. KOBELEV: Kinetics and mechanism of the catalytic exchange of chlorine for the amino-group. E. BOCHAROVA and B. DOLGOV: Synthesis of the higher alcohols from water gas under pressure. V. KHLOPIN, E. HERLING and E. IOFFE: Emission of helium by minerals and rocks. I. LICHZIER, S. ZHISLIN and Y. STUDITSKIY: Rôle of collagenic fibres in the process of osteogenesis according to data obtained from grafts transplanted on to the allantois.

## Forthcoming Events

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

## Sunday, November 18

BRITISH MUSEUM (NATURAL HISTORY), at 3 and 4.30.—F. A. Bannister: "Symmetry".\*

## Monday, November 19

ROYAL GEOGRAPHICAL SOCIETY, at 5.—Prof. Kenneth Mason: "The Study of Threatening Glaciers".

IMPERIAL COLLEGE OF SCIENCE.—ROYAL SCHOOL OF MINES, at 5.30.—Prof. P. D. Quensel: "Problems of the Archaean and Iron Ore Formations of Middle Sweden" (succeeding lectures on November 20 and 22).\*

ROYAL SOCIETY OF ARTS, at 8.—Dr. Herbert Dingle: "Modern Spectroscopy" (Cantor Lectures. Succeeding lectures on November 26 and December 3).

## Tuesday, November 20

ROYAL STATISTICAL SOCIETY, at 5.15—(at the Royal Society of Arts, John Street, Adelphi, W.C.2).—Prof. Major Greenwood: "University Education: its Recent History and Function" (Presidential Address).

KING'S COLLEGE, LONDON, at 5.30.—W. Allard: "Design of Channels and Structures—Silt—Losses—Salination".\*

## Wednesday, November 21

SOCIETY OF CHEMICAL INDUSTRY (PLASTICS GROUP), at 7.30.—K. M. Chance: "Urea Plastics" (Joint meeting with the Institute of the Plastics Industry).

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, at 8.—Miss Lucy E. Cheesman: "An Entomological Expedition to Papua".

## Friday, November 23

ROYAL ASTRONOMICAL SOCIETY.—Discussion on "Lightning" to be opened by Dr. B. F. J. Schonland.

ROYAL INSTITUTION, at 9.—Prof. M. Polanyi: "Heavy Water in Chemistry".

## Official Publications Received

## GREAT BRITAIN AND IRELAND

Eton College Natural History Society. Annual Report, 1933-34. Pp. 43+5 plates. (Eton.) 5s.

Universities Bureau of the British Empire. Report of the Executive Council together with the Accounts of the Bureau for the Year 1st August 1933 to 31st July 1934. Pp. 22. (London: Universities Bureau of the British Empire.)

Department of Scientific and Industrial Research. Report of the Forest Products Research Board, with the Report of the Director of Forest Products Research for the Year 1933. Pp. vi+67+3 plates. (London: H.M. Stationery Office.) 1s. 3d. net.

Report of the Government Chemist upon the Work of the Government Laboratory for the Year ending 31st March 1934; with Appendices. Pp. 48. (London: H.M. Stationery Office.) 9d. net.

Air Ministry: Aeronautical Research Committee: Reports and Memoranda. No. 1575: Collected Reports on British High Speed Aircraft for the 1931 Schneider Trophy Contest. Pp. iii+100+60 plates. (London: H.M. Stationery Office.) 10s. net.

Report of the Council of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne, intended to be presented at the Annual Meeting of the Society, 30th October 1934. Pp. 42. (Newcastle-upon-Tyne.)

University of London: University College. Calendar, Session 1934-1935. Pp. lxxx+12+576+28. (London: Taylor and Francis.)

Prospectus of Harper Adams Agricultural College, Newport, Shropshire. Pp. 28. (Newport.)

The Wellcome Research Institution and the Affiliated Research Laboratories and Museums, founded by Sir Henry Wellcome; and Exhibits at the Chicago Exposition, 1934. Pp. 90. (London: The Wellcome Foundation, Ltd.)

Transactions of the Royal Society of Edinburgh. Vol. 58, Part 1, No. 9: A Study of a Tectibranch Gasteropod Mollusc, *Philine aperta* (L.). By Herbert H. Brown. Pp. 179-210. 4s. Vol. 58, Part 1, No. 10: The Life-History and Structure of *Haematopota pusivialis*, Linné (Tabanidae). By Dr. A. E. Cameron. Pp. 211-250. 5s. (Edinburgh: Robert Grant and Son: London: Williams and Norgate, Ltd.)

Proceedings of the Royal Society of Edinburgh. Vol. 54, Part 2, No. 16: On a New Species of *Psygmophyllum* from the Upper Carboniferous of Scotland. By Jessie A. R. Wilson. Pp. 188-192+1 plate. (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.) 9d.

Fifth Annual Reports of the National Radium Trust and Radium Commission, 1933-1934. (Cmd. 4711.) Pp. 34. (London: H.M. Stationery Office.) 9d. net.

North-East Coast Institution of Engineers and Shipbuilders (Incorporated). Report of the Council, 1933-34. Pp. 16. (Newcastle-upon-Tyne.)

The Institute of Chemistry of Great Britain and Ireland. Register of Fellows, Associates and Students. Pp. 414. (London.)

Svenska Ingeniörsallskapet i Storbritannien: The Society of Swedish Engineers in Great Britain, 1924-1934. Pp. 104. (London.)

Air Ministry: Aeronautical Research Committee: Reports and Memoranda. No. 1601 (T. 3496): Accuracy of Performance Measurement. By J. L. Hutchinson and E. Finn. Pp. 5+4 plates. 6d. net. No. 1605 (F.M. 150): Abstract—Flow due to a Rotating Disc. By W. G. Cochran. Pp. 1. 2d. net. No. 1606 (T. 3303): Abstract—Stresses Induced by Flexure in a Deep Rectangular Beam. By D. B. Smith and R. V. Southwell. Pp. 1. 2d. net. No. 1607 (T. 3290): Abstract—A Modification of Oseen's Approximate Equation for the Motion in Two Dimensions of a Viscous Incompressible Fluid. By R. V. Southwell and H. B. Squire. Pp. 1. 2d. net. No. 1610 (E.F. 297): Abstract—Analysis of Experimental Observations in Problems of Elastic Stability. By R. V. Southwell. Pp. 1. 2d. net. (London: H.M. Stationery Office.)

Battersea Polytechnic. Report of the Principal for the Session 1933-34. Pp. 41. (London: Battersea Polytechnic.)

Department of Scientific and Industrial Research. Report of the Committee on Mechanical Testing of Timber. Pp. vi+41+6 plates. (London: H.M. Stationery Office.) 1s. net.

## OTHER COUNTRIES

Regenwaarnemingen in Nederlandsch-Indië, 1931. Pp. 113. (Batavia: Koninklijk Magnetisch en Meteorologisch Observatorium.)

Conseil Permanent International pour l'Exploration de la Mer. Rapports et procès-verbaux des réunions: Vol. 89: 1<sup>ère</sup> partie, Procès-verbaux (Juin 1934). Pp. 64. (Copenhagen: Andr. Fred. Høst et fils.) 3.50 kr.

Bulletins of Indian Industries and Labour. No. 52: Proceedings of the Sixth Industries Conference (Held in Simla on the 9th, 10th and 11th July 1934.) Pp. iii+167. (Delhi: Manager of Publications.) 2.6 rupees; 4s.

Anthropological Bulletins from the Zoological Survey of India. Bulletin No. 2: A Comparative Study of the Somatic Affinities of the Maithil and Kanaujia Brahmins of Behar. By Bajra Kumar Chatterjee. Pp. iv+69-216+plates 23-24. (Calcutta: Zoological Survey.) 4 rupees; 6s. 9d.

Memoirs of the Indian Museum. Vol. 11, No. 2: Studies on Indian Jassidae (Homoptera). Part 2: Description of the Genotypes of some of the Genera founded by W. L. Distant, with a Revision of the Genus *Moonia* Distant. By Dr. Hem Singh Pruthi. Pp. 69-99+plates 6-7. (Calcutta: Zoological Survey.) 1.10 rupees; 2s. 9d.

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