

1790, he was the only son of a bombasine weaver. His father died in 1795, and at the age of seven years he was placed with a shawl weaver, but from the age of fourteen for ten years he worked with a manufacturer of bombasines and camelots. His taste for reading was stimulated by his employer, and he became a teacher in both evening and Sunday schools. In 1814 he obtained a clerk's place in the Norwich Union Fire Office, and in 1820 a similar post in Gurney's (now Barclay's) Bank at Norwich and this he retained for the remainder of his life. Devoting his leisure to the study of the history of his native county, he wrote on its churches, its antiquities and its geology. In 1830 he published "A Synoptical Table of British Organic Remains" in which for the first time all the known British fossils were enumerated, and in 1833 his work "An Outline of the Geology of Norfolk". One of his sons, Bernard Bolingbroke Woodward (1816-69), became librarian in ordinary to Queen Victoria at Windsor Castle, and another, Samuel Pickworth Woodward (1821-65), in 1845 became the first professor of geology and natural history at the Royal Agricultural College, Cirencester, and from 1848 until his death was an assistant in the department of geology and mineralogy of the British Museum.

## Societies and Academies

### Edinburgh

Royal Society of Edinburgh, December 6.

H. J. BHABHA : Production of electron showers by cosmic rays. Blackett and Occhialini showed in 1932 that cosmic rays produce showers. The quantum theory is capable of explaining these showers. Very high energy electrons lose practically their whole energy by emitting a few high energy quanta. Each high energy quantum is chiefly absorbed by the creation of a pair of positive and negative electrons. When, therefore, a very high energy electron passes through matter, it emits a few hard quanta, each of which in turn produces an electron pair, which again emit quanta and so on. Thus, if the initial energy be high enough, many hundred particles may be created, forming a shower.

R. S. BARCLAY and W. O. KERMAK : The decline of the birth-rate : regularities revealed by an analysis of the rates observed in certain European countries. An analysis of the birth-rates in Sweden, Denmark and Finland has been made by a method analogous to that previously employed by Kermack, McKendrick and McKinley in connexion with the death-rates of Scotland, England and Wales, and Sweden. As in the latter case, regularities of a somewhat simple type are revealed. The results are applied in the calculation of specific fertility rates for England and Wales for the past six decades.

J. SMALL : Quantitative evolution (4, 5 and 6). (4) The effect ( $K$ ) of an organismal factor depresses the apparent  $Dp$ -ages of Compositæ in direct proportion to time. This rectilinearity indicates that species in Compositæ have a limited life-time, and that genera are similar. (5) The  $K$  values give 'free'  $Dp$ -ages which do not depart significantly from a rectilinear series in time. (6) The  $Dp$ -age unit is 2 million years for angiosperms. Their normal species life-time is 12 million years, with generic life-times at 24 million years. Consequential data are given

for residual doubling in numbers, also present rates for origins and extinctions. It is concluded that the presence or absence of eliminative natural selection is a matter for statistical inquiry.

T. M. MACROBERT : Induction proofs of the relations between certain asymptotic expansions and corresponding generalized hypergeometric functions. The formulæ are established for simple cases by contour integration, and are then deduced for the general cases by induction. They are then employed to evaluate integrals involving Legendre functions and hypergeometric functions.

### Paris

Academy of Sciences, November 22 (*C.R.*, 206, 941-1020).

CLAUDE CHABAUTY : The units of a body of algebraical numbers which are submitted to algebraic conditions.

PAUL VINCENSINI : A characteristic property of conformal transformations of the plane.

FERNAND AIMOND : Some properties of surfaces deduced from the conditions of equilibrium of convex surfaces.

MARCEL DECUYPER : Series of Laplace any four consecutive radii of which form a quadrilateral.

A. P. DIETZMANN : Infinite groups.

ARMAND RAUCH : Certain integral functions of the order  $\rho < 1/2$ .

ALEXANDRE FAVRE : The study of the Toussaint-Carafoli hydrodynamic tunnel with the view of obtaining bidimensional movements. Flow with circulation.

ROBERT SILBER : The influence of the blast from the propelling screw on the carrying power of an aeroplane, and the method to be followed for utilizing the results of tests of carrying power of a wing submitted to an air current from a screw.

PAUL MULLER : A new double image astronomical micrometer. A modification of the method used in the Rochon telescope. The instrument has been in use in the 16 cm. equatorial of the Strasbourg Observatory since January 1937, and has proved satisfactory.

JEAN MERCIER and JEAN DUBOIS : Contribution to the study of solid friction. Preliminary studies on the variation of the coefficient of friction caused by changes in the pressure and the velocity.

P. L. VIOLLE : Concerning Dewar flasks. The earliest description of a high vacuum and silvered surface in a glass flask for the purpose of reducing radiation appears to be that of J. Violle in 1882.

HENRI MOREAU : A preliminary study of precision mercury thermometers in fused quartz.

LEONID GABRILOVITCH : Sorting waves by periodically variable resistance systems.

WILFRIED HELLER : The influence of the size of colloidal particles on their optical anisotropy.

MAURICE COTTE : The orthogonal systems of electronic optics and their application to spectroscopy.

PIERRE BARCHEWITZ : The (CH) absorption bands of saturated and ethylene hydrocarbons between 6000 and 9500 Å.

MAURICE LAMBREY : New observations on the disengagement of nitric oxide by various nitrated products at a low temperature. From a study of the gases evolved from crystallized tetranitropenterythrite, it would appear that the true decomposition velocity is not measurable below a temperature

of 50° C. This conclusion is confirmed by applying the same method to nitrocellulose powders stabilized with diphenylamine.

EDOUARD RENCKER: Dilatometric researches on tempering and annealing of boric anhydride glass.

C. ZENGHELIS and EL. STATHIS: The formation of colloids by hydrogen. Salts of gold, silver, platinum and palladium are readily reduced by zinc in acid solution or by aluminium in alkaline solution; but the reduced metals are not colloidal. By the addition of a little gum to such solutions the metals are readily produced in a stable colloidal condition.

ANDRÉ BOBOCCO: The comparative study of the dissociation pressures of sodium and potassium hydrides and deuterides. Measurements made by a differential method show that the deuterides have higher dissociation pressures than the corresponding hydrides.

MARTIAL FÉLIX TABOURY and ELIE GRAY: The corrosion of zinc in distilled water alone or in the presence of a gaseous atmosphere.

SIEGFRIED HALBERSTADT: The exact conditions of the formation of the compound of tungstic acid and *o*-oxyquinoline. The precipitation is quantitative when the pH of the solution is 3.5: in the presence of phosphoric acid, none of the latter is coprecipitated.

CHARLES COURTOT and ANDRÉ BERNANOSE: Phenomena of chemico-luminescence, in the visible spectrum, of molecules containing the amide group.

DANIEL BODROUX and RENÉ THOMASSIN: Syntheses of paracyclohexylbenzyl aldehyde and of paracyclohexylbenzoic acid.

ANTOINE WILLEMART: Homologues of paranthracene: polymers of 9-methylanthracene and of 9-ethylanthracene.

JEAN KANDEL: The catalytic hydrogenation of  $\beta$ -ionone: dihydro- $\beta$ -ionone, dihydro- $\beta$ -ionol. Some derivatives of  $\alpha$ - and  $\beta$ -ionol.

PAUL GAUBERT: Liquid crystals obtained by sublimation.

PIERRE BELLAIR: The sandy formations of eastern lower Provence.

GEORGES DÉJARDIN and ALBERT ARNULF: The ultra-violet absorption spectrum of atmospheric ozone. Except for the effect of temperature, there is no appreciable difference of structure between the spectrum of atmospheric ozone and the spectrum observed in the laboratory.

THÉODORE SOLACOLU and DÉMÈTRE CONSTANTINESCO: The modifications undergone by seedlings after remaining a relatively short time in solutions of  $\beta$ -indolyl-acetic acid.  $\beta$ -indolyl-acetic acid is capable of stimulating the plant cell after a short time of contact (15 minutes). The effects last a long time, even if the plant continues to develop in ordinary water.

MILLE ANNE RAFFY and MAURICE FONTAINE: Determinations of flavin in the course of development in cultures of *Eremothecium Ashbyi*.

ANDRÉ GORIS: The atisine of *Aconitum heterophyllum* and the anthonine of *Aconitum anthora*. Anthonine is identical with atisine (Jowett), and it is suggested that the latter name be retained for the alkaloid.

HENRI BERRIER: Substances of the type of plant auxines in the course of the evolution of *Bombyx mori*.

JEAN ROCHE and RENÉ COMBETTE: The reversibility of the denaturation and coagulation of methemoglobin.

GUSTAVE GUITTONEAU and MILLE MARIE BEJAMBES: Chromo-resistance and calcium phosphate coating of micro-organisms heated in milk.

RAYMOND HOVASSE: The Zooxanthellæ are dinoflagellates.

CONSTANTIN LEVADITI, ANDRÉ GIRARD, ARON VAISMANN, ANDRÉ RAY and GUY RICHARD: 4-Nitro-4-aminodiphenylsulphoxide and its action in the experimental toxi-infection of mice.

### Copenhagen

Royal Danish Academy of Sciences and Letters

October 22.

OTTO NEUGEBAUER: Babylonian theory of eclipses.

November 5.

KNUD JESSEN: Contributions to the late glacial flora of Ireland.

November 19.

NIELS BOHR: Mechanism of nuclear reactions. A discussion of the applications of thermodynamical analogies for the analysis of nuclear reactions.

December 3.

HARALD BOHR and DONALD A. FLANDERS: Algebraic equations with almost periodic coefficients.

December 3.

G. HEVESY and LADISLAV HAHN: Origin of egg phosphorus.

December 3.

G. HEVESY and HILDE LEVI: The artificial radio-activity of hafnium and some other elements.

### Moscow

Academy of Sciences (*C.R.*, 16, No. 8, 1937).

V. A. FLORIN: Determination of instantaneous stresses in skeletons of soils.

G. S. LANDSBERG and S. A. UKHOLIN: Frequency of oscillations of the hydroxyl group in methyl alcohol and its dependence on the density.

S. A. UKHOLIN: Dependence of the spectrum of an aqueous compound on the density and the pressure.

V. L. LEVŠIN and S. N. RŽEVKIN: Mechanism of luminescence in liquids under ultra-sonic treatment.

A. T. AKIMOV: Specific electrical resistance of frozen soils.

L. GINDIN and F. ŠEMIÁKIN: Linear corrosion of metals. Selective corrosion of iron according to the system water-sulphuric acid-propyl alcohol, at the boundary of three phases.

L. GINDIN, I. I. TORSUJEV and V. A. KAZAKOVA: Relation to metals of sulphur solutions and of a series of organic sulphur compounds in saturated hydrocarbons. The relation to iron of ethyl- and butyl-mercaptan solutions in cyclohexane.

M. I. KNIAGINIČEV and T. M. GORELKINA: New solvents of gluten proteins.

L. A. DREMLIUG: A frost-resistant triple potato hybrid, *Solanum acaule*  $\times$  *S. tuberosum* (Fürstenerkone)  $\times$  *S. tuberosum* (*Centifolia*).

M. V. FAVORSKIJ: New fixatives for chromosome morphology.

G. V. GERŠHUNI, A. M. ANDREEV and A. A. ARAPOVA: Concerning the cochlear potentials in man.

V. S. SHARDAKOV: Salt resistance of the cotton plant. Localization of salts in the leaf tissues.