

hydrography of the shores of the Channel, and which will be followed by that of the Mediterranean. . . . A word will be sufficient to enable us to appreciate the magnitude of the undertaking. Two hundred thousand pounds, thirty years labour of the hydrographical corps, one half the life of its chief, and four hundred and fifty quarto volumes of observations and calculations, have been necessary to accomplish the hydrographical surveys of the coasts of France, to complete them in their two-fold relation to commerce and the naval interests, and to adapt them to the preparation of the grand atlas of the 'Pilote Français'".

"The application of the mathematical sciences to those which are designated the natural ones—to the wants of the productive arts—to public works, of which we have presented such fine examples from works over which the Academy presides, forms the most remarkable characteristic in the actual progress of human knowledge. . . . The theory of heat promulgated by Fourier still excites attention. It has been made the subject of a large work by M. Poisson. . . . Effects which the reduction of heat by chemical means cannot produce are now accomplished by mechanical agency. In 1830 the Academy rewarded the gas compressing machine of M. Thilorier. A corresponding member of the Academy, M. Melloni, has communicated to us new facts relating to radiant heat."

From the midst of those philosophers devoted to electricity, "M. Becquerel has opened a path for himself. He has attacked chemistry with weapons of his own preparation, to subdue her to the dominion of mathematical laws. . . . Gifted by nature with extreme delicacy of the organs of sense, and exquisite power of observation, we may justly entitle him the Wollaston of France".

In other branches of investigation, "M. Majendie has borrowed from mechanical laws his explanation of the sounds of the human heart. . . . M. Flourens seeks in the mechanical pressure exercised upon the brain, an explanation of the condition of those persons who undergo the operation of trepanning . . . and M. Dutrochet who has communicated to us so many facts, the fruit of his ingenious observations on the internal dynamics of vegetables, has pushed his investigations into the mechanism of the respiration of insects, both aquatic and aerial".

In concluding his discourse, Baron Dupin said: "I am far from having enumerated all the recent modes in which mathematics have been applied to natural science. I have not even hinted at its application to that of politics, and of social economy, nor to the subject of population. Having individually taken a part in these discussions I shall pass them unnoticed".

"But in this sketch rapid, incomplete, imperfect, I ask with confidence, Do you not recognise the ever-increasing utility of science, the extent of her benefits, the sublimity of her titles, even during the short, embarrassed and turbulent period to which I have confined myself? The sciences must have therefore of necessity, a vital energy peculiar to themselves; a progressive power, superior to the obstacles of time, of things, and of man. Human passions, vulgar ambitions, and party-interests, pass away, but the labours of science, the sacrifices made for her sake, the victories borne off in her name, remain, and contribute to the enlargement of that splendid and profitable heritage on which, at the present day, is based her real grandeur."

Societies and Academies

PARIS

Academy of Sciences, November 25 (*C.R.*, 201, 997–1072). LUCIEN DANIEL: An accidental crossing of the bean. A detailed account of a hybrid bean, the descendants of which do not appear to be in agreement with the Mendel scheme. DIMITRI RIABOUCHINSKY was elected *Correspondant* for the Section of Mechanics in the place of the late M. de Sparre. NICOLAS KRYLOFF and NICOLAS BOGOLIOUBOFF: Some theorems of the general theory of measure. PAUL VINCENSINI: The curvature of congruences of spheres. ENRICE BOMPIANI: A system of curves of a surface invariant by projectivities. D. VAN DANTZIG: The idea of the derivative of a functional. DAVID WOLKOWITSCH: The theoretical problem of balancing rotating parts. ALFRED ROSENBLATT: Certain classes of movements symmetrical with respect to an axis of an incompressible viscous liquid. ANDRÉ AURIC: A cosmogonic hypothesis. CHARLES VALLOT: A new map of the Mont Blanc massif by Henri, Joseph and Charles Vallot on the scale of 1:20,000. PIERRE MARTI: A gravimetric cruise of the submarine *Fresnel* in the north-west part of the Mediterranean basin in 1933–34. Work done with the Vening-Meinesz apparatus for the determination of g at sea on the coasts of France, Spain, Corsica and the Balearic Islands. An outline of the results, with a chart, is given: a full account of the results will be published elsewhere. REZA RADMANECHE: The action of the ultra-violet rays on the electrical conductivity of quartz. The experimental results are summarised in a diagram. MAURICE LAMBREY: A system of transformation with logarithmic argument for continuous current. JEAN LAGRULA: An error in photographic photometry. Discussion of the effect of the inequality of the surfaces of the photographic plates and means of avoiding the errors thus produced. LOUIS D'OR: The absorption spectra of sulphur vapour. The author concludes from his experiments that sulphur vapour contains at least four species of molecules, excluding S_1 . The spectrum described by Graham, Dobbie and Fox, and by Rosen is not due to S_8 (Graham) or S_2 (Rosen) but to an intermediate molecule, probably S_4 . JEAN TERRIEN: The rotation structure of the D and E systems of bands of cuprous chloride. MICHEL KANTZER: The influence of pressure and of foreign gases on the optical absorption of chromyl chloride. A. VILA and F. TESSON: The measurement of the mechanical properties of plastic films. JACQUES BANCELIN and YVES CRMAIL: Substances inhibiting the corrosion of iron by acids. A comparison of the effects produced by the addition of rhodamine and of thiourea to the acid solution showed that whilst the anti-corrosion effect of rhodamine increased with the concentration, there was a certain concentration of thiourea for which the corrosion of the iron was a minimum. O. BINDER: The decomposition of pentahydrated copper sulphate by heat. Crystallised copper sulphate heated to 650°C . gives a basic sulphate $2\text{Cu}_2\text{O}\cdot\text{SO}_3$, proved by chemical analysis and by a study of the X-ray spectrum to be a definite compound. EMILE CARRIERE and Mlle. LUCY FAYSSÉ: The comparative action on sodium thiosulphate of oxygen compounds of chlorine and of the corresponding oxygen compounds of iodine. JOSEPH MAGROU: Attempts at the culture of mycorrhizal fungi. ANTOINE DE CUGNAC: Remarks

on the meaning of certain polymorph species in the Gramineæ. PH. JOYET-LAVERGNE: The relations between vitamin A and the plastids. The author concludes that vitamin A is an essential constituent of the chondriome, and this is verified for plastids in the course of their evolution. Mlle. GILBERTE MOUROT: Nitrogenous metabolism in protein starvation. DAVID BROUN and HERMANN SCHEINER: The physico-chemical state of acetylcholine in the blood. E. LÉVY-SOLAL and M. SUREAU: Graphical study of the work of accouchement. RAYMOND HAMET: A new true sympatricolytic: Koepfli's rauvolfine. BERNARD TROUVELOT and GRISON: Variations of fertility of *Leptinotarsa decemlineata* with the tuber producing *Solanum* consumed by the insect. Experiments with six species of *Solanum* showed that the fertility of the insect varied considerably with the species of plant. ETIENNE WOLFF: The experimental transformation of genetic females into intersexuals, produced by the injection of male hormone into fowl embryos. Intersexuality can be obtained regularly in the embryo of the fowl by androsterone injection of genetically female individuals. A. GUILLAUME and G. TANRET: The hydrolysis of the glucosides and of some organic compounds by ultra-violet rays. The ultra-violet rays possess a clear hydrolysing action, especially marked with glucosides and esters. ROBERT BONNET and Mlle. BERTHE NATAF: The destruction of certain hydrolysing diastases in the course of their action. Seven diastases were studied, and all showed decreased activity with time. It is concluded that there is a real autodestruction of the enzyme. ANDRÉ PAILLOT: A new ultra-virus parasite of *Agrostis segetum* causing a proliferation of the infected tissues. AUGUSTE TRILLAT: Attempts at vaccination for fowl cholera. MAURICE LEMOIGNE, PIERRE MONGUILLON and ROBERT DESVEAUX: The characterisation of hydroxylamine in autolysed green leaves.

CAPE TOWN

Royal Society of South Africa, October 16. W. J. COPENHAGEN: Variation in the phytoplankton of Table Bay, October 1934–October 1935, with a note on the chemical analysis of *Chaetoceras*. The quantitative catch was estimated in terms of 'colour units' (plant pigments): Harvey's method. It would appear that *Chaetoceras* was dominant on over more than seventy per cent of the occasions when catches were obtained. A suggestion is tentatively made that the available energy of a cubic metre of sea-water be expressed in terms of calories. D. B. HODGES and B. F. J. SCHONLAND: Relation between thunderstorms and atmospheric in South Africa. A short description was given of the cathode ray direction finder, as installed at the University of Cape Town. The results obtained with the instrument during part of September and October 1935 have been compared with meteorological maps for the same period. The results show close agreement between the bearings of thunderstorms within a distance of about 1,000 miles as recorded on the maps, and directions of arrival of signals at the apparatus at corresponding times. Variations in the amplitude of atmospheric with distance, and with time of day or night, have been studied. A satisfactory correlation of atmospheric from sources over the sea with depressions in the same areas has been made, particularly in the case of depressions off the south-west coast. The experiments indicate the value of this device both for

meteorological forecasting and for information on disturbed weather areas for aircraft. B. F. J. SCHONLAND, D. J. MALAN and H. COLLENS: Recent progress in the study of the lightning discharge. The leader–return stroke sequence is present in practically every case. The effective velocity of the stepped leader is that to be expected from electron-avalanche drift in the critical field for breakdown (2×10^7 cm./sec.). It is suggested that an actual pilot streamer, carrying too small a current to be photographed, provides the necessary ionisation for the luminous heavy-current step which follows it with a velocity of about 5×10^9 cm./sec. The latter catches up the pilot streamer, and the absence of further ionisation ahead of the step then causes a pause in which the high conductivity leader streamer is reorganised and during which the pilot forges ahead. D. J. MALAN: Intensity variations in the main return lightning stroke. The variation in intensity in return lightning strokes was determined by examining photographs obtained with a Boys camera by means of a recording microphotometer. The main stroke intensity fluctuates in such a manner as to cause the return channel luminosity to be divisible into a series of component discharges, all apparently passing upwards from the ground. A maximum of six such component discharges comprising a complete return stroke has been observed (see NATURE, Nov. 23, p. 831). J. L. B. SMITH: Several new Gobioid and fresh-water fishes from South Africa. Five new species are described and figured. A. V. DUTHIE and S. GARSIDE: Studies in South African Ricciaceæ. (1) Three annual species. This paper is the first of a proposed series dealing with South African Ricciaceæ. It includes a discussion of the taxonomic history of the family, and a detailed account of three annual species which are common in the Cape and Stellenbosch Divisions, but have hitherto been confused. One of the above, *R. crystallina*, is cosmopolitan, another, *R. Curtisii*, is fairly abundant in parts of America, but has not previously been known to occur in South Africa, while the third, *R. cupulifera*, is here described as new.

GENEVA

Society of Physics and Natural History, November 7. E. BRINER, B. SUSZ and E. ROD: The maximum concentration of ozone and of nitric oxide at high temperatures of endothermic bodies. Calculations based on the most exact data have given for the maximum concentrations: ozone 2.2×10^{-5} per cent at $3,500^\circ$ C., nitric oxide 5.9 per cent at $3,500^\circ$ C. These are lower values than those previously obtained. J. and L. DESHUSSES: The presence of *Ceratitis capitata* (fruit fly) at Geneva. J. and L. DESHUSSES: The noxious insects of Switzerland: statistics. Considering only as noxious well-known insects which have caused important economic losses, it is shown that 35 per cent of these parasites are Coleoptera, 25.9 per cent Lepidoptera, 14.1 per cent Hymenoptera, 12.1 per cent Hemiptera, 11.8 per cent Diptera and 1.1 per cent Orthoptera. The proportion of the insects enumerated in the various types of cultivation depends on the state of our knowledge, and may not be exact. P. ROSSIER: The analytical representation of the chromatic sensibility of ordinary photographic plates. The author compares a certain function with the sensibilities observed. The sensibility curves obtained for a given plate by different methods differ between themselves

more than the differences between the results of calculation and observation. VUAREMBON: The influence of ethyl alcohol on maltase.

November 21. A. AMSTUTZ: Preliminary note on the structure of the Pennides to the south of Aosta. E. PAREJAS: The organism of *B. de Joukowsky* and Favre. DON ZIMMET: A nickel-nitroprusside reaction for reduced glutathione. B. SUSZ and PERROTTET: The Raman spectra for the eugenol and estragol groups.

LENINGRAD

Academy of Sciences (*C.R.*, 3, No. 5; 1935). I. VINOGRADOV: New calculations of the Weyl sums. S. A. TCHOUNIKHIN: Some problems of the group theory. B. V. NUMEROV: The photographic meridian circle. L. S. LEIBENSON: The flexural centre of closed thin-walled sections. A. V. MITKEVITCH: The separation of magnetic viscosity and eddy current lag. N. A. and V. A. PREDBRAZHENSKIY: Alkaloids of the leaves of *Jaborandi* (*Pilocarpus*). (7) The splitting up of the unstable ethyl-paraconic acid (racemic pilopic acid) into optical isomers. A. E. FERSMAN: The geochemical characteristics of protocristallisation. V. T. MALYSHEK and A. A. MALIANG: Sulphur bacteria in the 'pink' waters of the Surukhani oil-fields and their significance in the geochemistry of water. B. A. RUBIN and V. E. TRUPP: (1) Variations in keeping qualities of different varieties of vegetables, and the reasons for them. (2) Characteristics of the amylase of cabbage. N. ANNENKOVA: On *Dyspohetus pygmaeus*, Levinsen, and *Euzonus arcticus*, Griebe (Polychaeta). S. S. SMIRNOV: The occurrence of *Acartia tonsa* (Copepoda) in the Bay of Finland.

ROME

Royal National Academy of the Lincei, June 16. TH. MOTZKIN: Some characteristic properties of limited, non-convex ensembles. V. BEHNSTEIN: Observations on a theorem of Fabry. F. CONFORTO: The calculation of a particular functional for the functions which render it stationary. G. POMPILI: Algebraic surfaces with plane hyper-elliptic sections of the species $p \geq 2$. L. TOSCANO: Permutable operators with the power of a special linear operator. MARIA PASTORI: Tensors linked to a system of geodetics. G. BOZZA: Decantation of crystalline suspensions (3). Continuous cylindrical decantors. L. MAZZA: Magnetic susceptibility of mixed oxides of the rare earths: mixtures of neodymium with praseodymium or samarium (1). With mixtures of Nd_2O_3 and Sm_2O_3 , the magnetic susceptibility varies linearly with the composition. With Pr_6O_{11} - Nd_2O_3 , however, the susceptibility is greater than that calculated additively for 0-25 per cent of Pr_6O_{11} and less for higher proportions. G. DEVOTO: The structure of antipyrin in aqueous solution. The results of measurements of the dielectric constants of antipyrin and pyramidon in aqueous solutions are not in accord with amphoteric polar formulæ for these compounds, and do not confirm the classical formulæ with double linkings. V. FAMIANT: The action of bromine on the growth and metamorphosis of the larvæ of *Bufo vulgaris*. Suitable small proportions of bromine cause the metamorphosis to begin earlier; but also render it distinctly out of adjustment. Indeed, if no corrective is applied, the life of the animal may be endangered.

Forthcoming Events

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

Sunday, December 29

BRITISH MUSEUM (NATURAL HISTORY), at 3 and 4.30.—M. A. Phillips: "Fossil Reptiles".*

Monday, December 30

BRITISH MUSEUM (NATURAL HISTORY), at 11.30.—M. Burton: "Microscopic Animals and Man".*

Tuesday, December 31

BRITISH PSYCHOLOGICAL SOCIETY (EDUCATION SECTION), at 2.30.—(at University College, Gower Street, W.C.)—Sir Philip Hartog: "Some Aspects of the Validity and Reliability of Examinations".

Wednesday, January 1

ROYAL SOCIETY OF ARTS, at 3.—Prof. David Katz: "Animal Intelligence" (Dr. Mann Juvenile Lectures. Succeeding lecture on January 8).

GEOGRAPHICAL ASSOCIATION, January 1-3. Annual Conference to be held at the London School of Economics, Houghton Street, Aldwych, London, W.C.2.

J. Fairgrieve: "Can We Teach Geography Better?" (Presidential Address).

SCIENCE MASTERS' ASSOCIATION, January 1-4. Thirty-sixth annual meeting to be held in the Chemistry Department, Imperial College of Science and Technology, South Kensington, London, S.W.7.

Sir William Bragg: "School Science after School" (Presidential Address).

Official Publications Received

Great Britain and Ireland

Fire Offices' Committee. Testing Station, Boreham Wood, Elstree, Herts. Pp. 32. (London: Fire Offices' Committee.) [312]
The Scientific Proceedings of the Royal Dublin Society. Vol. 21 (N.S.), No. 27: On a Recent Bog-Flow in the County Clare. By G. F. Mitchell. Pp. 247-251. 6d. Vol. 21 (N.S.), No. 28: The Application of the Catalase Test to Butter. By George Cruess-Callaghan. Pp. 253-255. 6d. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) [312]
Technical Publications of the International Tin Research and Development Council. Series A, No. 23: Striations in Tin Coatings on Copper. By Dr. Bruce Chalmers and Dr. W. D. Jones. Pp. 8. (London: International Tin Research and Development Council.) Free. [412]
The Royal Technical College, Glasgow. Annual Report on the One Hundred and Thirty-ninth Session, adopted at the Annual Meeting of Governors held on the 15th October 1935. Pp. 84. (Glasgow: Royal Technical College.) [412]

Other Countries

Society of Biological Chemists, India. Influence of Light on some Biochemical Processes. By Dr. N. R. Dhar. Pp. iv+73. (Bangalore: Indian Institute of Science.) 1 rupee. [912]
Beiträge zur Erforschung der baulichen Struktur der Backenzähne des Hausrindes (*Bos taurus* L.): Die Prämolare- und Molarenentwicklung auf Grund röntgenologischer, histogenetischer und morphologischer Untersuchungen: Die gegenseitigen Beziehungen der einzelnen Gebisskonstituenten und ihre Heranziehung zur physiologischen Leistung. Von Max Küpfer. (Denkschriften der Schweizerischen Naturforschenden Gesellschaft, Band 70, Abh. 1.) Pp. ix+218+78 plates. (Zürich: Gebrüder Fretz A.-G.) [912]
The Academy of Natural Sciences of Philadelphia. Monographs, No. 1: The Scrophulariaceae of Eastern Temperate North America. By Francis W. Pennell. Pp. xiv+650. (Philadelphia: Academy of Natural Sciences.) [1212]
The Rockefeller Foundation: International Health Division. Annual Report, 1934. Pp. iv+235. (New York: The Rockefeller Foundation.) [1212]
Ministry of Agriculture, Egypt: Technical and Scientific Service. Bulletin No. 161: Sugar Cane Breeding in Egypt; a Progress Report. By Arthur H. Rosenfeld. Pp. 21+3 plates. (Cairo: Government Press.) 3 P.T. [1212]
The Nucleus of the Atom and its Structure. (Sigma XI Symposium, Ohio State University.) Pp. 104. (Columbus, Ohio: Ohio State University.) 1 dollar. [1212]
Thalès: recueil annuel des travaux de l'Institut d'Histoire des Sciences et des Techniques de l'Université de Paris. Année 1, 1934. Pp. xix+184. (Paris: Félix Alcan.) 30 francs. [1212]