

## Societies and Academies.

LONDON.

**Royal Society, February 26.**—E. H. Starling and E. B. Verney: The secretion of urine, as studied on the isolated kidney. The mechanism of urinary secretion in mammals has been studied by perfusing the dog's kidney with the heart-lung preparation. The glomeruli filter from the blood plasma its non-protein constituents. Hydrocyanic acid suspends tubular activity, while the action of hydrocyanic acid is reversible. Urea, sulphate, and, when present in the serum, phenosulphonophthalein, are secreted by the tubule cells into the glomerular filtrate. Water, chloride, bicarbonate, and glucose are re-absorbed by the tubule cells from the glomerular filtrate. Water appears to be re-absorbed lower down the tubule than chloride. Pituiratin causes a marked increase in the percentage and absolute amounts of chloride and a decrease in the amount of water eliminated. Substances of this type normally regulate the output of water and chloride in the intact animal, and the characters of the urine secreted by the isolated organ are due in large part to their absence.—F. Eicholtz and E. H. Starling: The action of inorganic salts on the secretion of the isolated kidney. Calcium working on a background of potassium leads to an increase of chloride excretion and water output, due to decreased re-absorption in the tubules. These salts, if given separately, have no definite effects. Inorganic phosphates decrease the output of water and chlorides by turning the calcium ion into a colloidal form. To this colloidal form the glomerulus membrane is impermeable. Cyanide increases the permeability of the glomerulus membrane and allows the colloidal phosphates to appear in the urine.—G. V. Anrep: A new method of crossed circulation. The method consists in an arterial anastomosis between a heart-lung preparation and the descending aorta or the brachiocephalic artery of another animal. Thus the part of the animal connected with the heart-lung preparation receives its blood supply from the latter, while the remaining part of the animal continues to be fed by its own heart. The blood flow and the blood pressure of the perfused part of the animal is therefore under complete control.—G. V. Anrep and I de B. Daly: The output of adrenaline in cerebral anæmia, as studied by means of crossed circulation. In this condition there is an increased liberation of adrenaline from the suprarenal glands, which is due to a true secretion and not to redistribution of blood, and the increased secretion disappears after denervation of the suprarenal glands.—G. V. Anrep and E. H. Starling: Central and reflex regulation of the circulation. Mechanical rise in blood pressure in the brain inhibits the vasomotor centre and stimulates the cardio-inhibitory, the two centres acting synergetically to produce lowered pressure. Asphyxia by cerebral anæmia stimulates both vasomotor and cardio-inhibitory centres, the centres acting antagonistically, not synergetically. Adrenaline (small doses) introduced into head circulation causes slowing of heart and fall of pressure in lower half of animal. Measurement of pressure in Circle of Willis shows these effects are due to increased circulation through medullary centres, and cannot be ascribed to direct excitation of centres by adrenaline itself. The effects are analogous to, and produced in the same way as, those obtained on increasing pressure in head circulation.—K. Furusawa: Muscular exercise, lactic acid, and the supply and utilisation of oxygen. Part IX. Muscular activity and carbohydrate metabolism in the normal individual. Results obtained are: On normal diet, carbohydrate only is responsible for the process of contraction and

recovery from it. As duration of exercise is prolonged respiratory quotient of excess metabolism falls slowly, indicating that some substance other than carbohydrate is being called upon. On fatty diet, short-lived muscular exercise is performed at expense only of carbohydrate, as on normal diet. In long-continued exercise, fat takes part more quickly than on normal diet. In exercise of short duration, in which no change in general metabolism of body as a whole might be expected, the human body acts as though it were an isolated muscle, in which carbohydrate is the only substance oxidised, as shown by Meyerhof. The primary fuel of contraction, therefore, in human muscle is carbohydrate, and fat or protein is presumably used to replenish carbohydrate store disappeared.—A. Hunter and J. A. Dauphinee: (1) Quantitative studies concerning the distribution of arginase in fishes and other animals. (2) An approximative colorimetric method for the determination of urea with an application to the detection and quantitative estimation of arginase.—J. J. R. Macleod and N. A. McCormick: The effect on the blood-sugar of fish of various conditions, including removal of the principal islets (isletectomy).

**Royal Microscopical Society, January 21.**—A. Chaston Chapman: The yeasts: a chapter in microscopical science (presidential address). Some new technique, such as the use of ultra-violet light, applied to the investigation of the cytology of the yeast cell, might, in the hands of expert cytologists, yield results equally valuable to industry and to general biology. The views of Cramer and others as to the dependence of intra-cellular enzymic activity on surface tension was referred to, and reasons were given for supposing these surface tension effects to be operative in connexion with some industrial fermentation processes. The yeast cell is, in fact, a chemical laboratory of the highest efficiency, and of the most remarkable character, and if the processes of building up and breaking down, which are so quietly and so regularly occurring in a single cell of yeast, could be understood and artificially imitated, we should be not only within measurable distance of a new organic chemistry, but also appreciably nearer to an understanding of that greatest of all problems, the nature of life.

**Linnean Society, January 22.**—Miss M. S. Johnston: Calcareous deposits (rhizcretions, Kindle) round roots of Canadian birches in Pleistocene sands. The concretion is considered to be due to the action of humic acid from the roots segregating the lime constituents in the sand.—R. D'O. Good: The flora of Canada. As in Britain, the largest plant families are the Compositæ, Gramineæ, Cyperaceæ, Leguminosæ, Rosaceæ, and Labiatae, and the first named is very much larger than any of the others. In traversing the country from east to west, four main vegetational types are encountered: the Eastern forest, the prairie, the mountain, and the Pacific littoral. The southern limit of the Pleistocene ice was well down in the United States, and the present flora of Canada is therefore an immigrant flora developed in the geologically short time since the retreat of the ice.—J. Munro: Canadian forests and forestry. There are four climatic belts between the east coast and British Columbia.

CAMBRIDGE.

**Philosophical Society, January 19.**—H. F. Baker: A transformation of Segre's figure in space of four dimensions; the equation of Kummer's surface. There is a figure, first studied by Stéphanos in the

theory of circles, but studied particularly by Segre as a figure in four dimensions; consisting of fifteen lines meeting by threes in fifteen points. The figure is of great interest, as being the centre of a discussion of many well-known surfaces; the cubic surface, the cyclide, Kummer's surface, and so on. In this figure there are also six sets of fives of the lines, each being taken twice over, called sets of *associated* lines. The present paper finds a transformation from the lines of the figure to the joins of six points in space of five dimensions—a set of associated lines becoming the joins of one of the six points to the other five. Intimately related therewith is the expression of the equation of a Kummer surface by a sum of five squares. The coefficients of these squares are invariants of the discriminantal equation of the primary quadratic complex.—R. Vaidyanathaswamy: On simplexes doubly incident with a quadric. The generalisation of the figure representing a double six of lines in five dimensions, wherein a hexad is both inscribed to and circumscribed about a quadric.—H. G. Green: The classification of conicoids by their generators. An actual method of reduction of the equation of a conicoid to a form showing the character of the surface.—R. Whiddington: On the positive flash in vacuum discharge tubes. Moving striations previously observed in the rare gases were reinvestigated in the case of pure argon. The bright flashes travelling from the anode with velocities depending on the pressure show no Doppler effect. The luminous radiation seems to be excited by invisible radiation given out by positive ions as they travel along the tube.—E. C. Stoner: The structure of radiation. On the assumption of conservation of energy and linear momentum, the evidence in favour of radiation being constructed of linearly directed, spatially localised quanta is held to be conclusive. Further properties, which are not physically unreasonable, must be postulated of these quanta in order that interference phenomena may be possible.—Major P. A. MacMahon: The symmetric functions of which the general determinant is a particular case.

#### MANCHESTER.

Literary and Philosophical Society, January 20.—W. Robinson: On proliferation and doubling in the flowers of *Cardamine pratensis* L. Specimens of *C. pratensis* showing two main types of abnormality were found in meadows near Cheadle Hulme, Cheshire, in June 1923, one of which was similar to the double-flowered form, arising by proliferation of the ovary, described most frequently by previous observers, and the other, a less completely double-flowered specimen. Microscopic investigation showed that, in both types, proliferation took place by the meristematic activity of a growing-point at the base of the ovary, of a flower which was otherwise normal. In one case, however, the ovary itself was carried up on a stalk produced by the growth activity of tissues immediately below the base of the ovary, but outside this; in the other specimen all the growth took place within the ovary from the base of this, and the meristematic growing-point was carried up to about the middle of the pod-like structure. The doubling seen in *C. pratensis* has recently been spoken of as a mutation from the more normal single form, but Goebel has stated that by cultivating plants of the double form in sandy soil they completely lost the character. By vegetative multiplication from the original specimens collected wild at Cheadle Hulme, it has been possible to cultivate plants showing variations, both in the character and degree of the doubling. Further work will show

whether the plasticity of *C. pratensis* is such that doubling can be produced under experimental conditions in a single-flowered form by nutritional changes as Goebel has suggested, or whether, as seems more likely, the double-flowered and single-flowered forms are two different races with distinct hereditary complexes.

#### PARIS.

Academy of Sciences, January 26.—G. Bigourdan: The propagation of Hertzian waves to great distances. The order of magnitude of the perturbations of this propagation. A table is given showing the results of the reception of the Bordeaux time signals for 1923, by Helwân (near Cairo), Washington, Ottawa, Greenwich, Paris and Uccle.—H. Vincent: The urinary elimination of the *Bacillus coli communis* and its hæmatogen origin.—P. Bazy: Remarks on the preceding communication.—Maurice Lugeon: The presence of fossilised organic bodies in the marbles of Uruguay. Fragments of echinoderms and molluscs have been recognised in marble from Nueva Carrara; this is of interest, as being the first occasion of the discovery of fossil remains in this crystalline deposit.—Bertrand Gambier: The continuous deformation of surfaces, isometry and applicability.—Mlle. Thérèse Leroy: A new method for the determination of the working costs and a tariff for railway transport. A new tariff scheme has been developed as the result of a mathematical study of data from eighty years' actual railway experience.—Andrieau: The Andrieau motor. A detailed description of the mode of working, construction, and experimental results of a new design of internal combustion motor.—Carl A. Garabedian: Solution of the problem of the heavy rectangular plate, framed or open, carrying a charge uniformly distributed or concentrated at its centre.—A. Alayrac: The theoretical study of motorless flight in a variable horizontal wind.—Ernest Esclançon: The eclipse of the sun of January 24, 1925, observed at the Strasbourg Observatory. The time of first contact, deduced from two series of independent measurements of the chord of contacts, was  $15^h 3^m 37^s$ .—L. d'Azambuja: Observation of remarkable protuberances, made at the Meudon Observatory, January 24, 1925, before the eclipse of the sun. On January 24 a series of spectroheliograms of the lines  $K_3$  (calcium) and  $H_2$  (hydrogen) was taken continuously. A photograph taken at 11.10 A.M. with the calcium line showed the existence in the N.W. quadrant, of a fan-shaped group of protuberances in the form of jets, the largest of which attained a height of one-fifth of the solar radius. Its development was very rapid, since photographs at 10.40 A.M. and 12.20 P.M. did not show it.—J. Guillaume and Mlle. M. Bloch: Observation of the partial eclipse of the sun of January 24, 1925, made at the Lyons Observatory. Clouds interfered with observations. First contact was noted at  $15^h 4^m 36^s.2$ .—P. Chofardet: Observation of the eclipse of the sun of January 24, 1925, at the Besançon Observatory. Time of first contact at  $15^h 3^m 48^s.8$ .—F. Holweck: Determination of the critical potential  $L_{III}$  of argon. Discussion of the precision of this measurement and of analogous measurements.—Ed. Friedel: Smectic bodies and X-rays. The existence of a stage (smectic state) intermediate between the solid crystal and the true liquid has been indicated in an earlier communication for certain oleates. These conclusions have been questioned, and additional experiments on the radiograms furnished by ethyl *p*-azoxy-benzoate, and ethyl azoxy-cinnamate have been made. The results confirm the conclusions previously given.—F. Baldet: The spectrum of carbon monoxide at very low pressure; the so-called comet-tail spectrum.—Ernest Bengtsson and Erik Svensson: The conditions

of the appearance and structure of the silver bands,  $\lambda_{3330}$  and  $\lambda_{3358}$ .—F. Croze: The structure of the line spectra of ionised nitrogen and oxygen.—Jean Jacques Trillat: The molecular orientation of the fatty acids.—Herbert Brennen: Chemical studies on the isotopes of lead. A partial separation of the isotopes of lead by the action of the Grignard reagent on lead chloride has been recently described by Dillon, Clarke, and Hinchy. This work has been repeated, and no evidence of separation of isotopes was obtained.—Georges Fournier: The absorption of the  $\beta$ -rays by matter. If  $\mu$  is the coefficient of absorption and  $\rho$  the density of the material, then experiments with six materials show that the relation  $\mu/\rho = a + bN$  (where  $N$  is the atomic number) is valid.—A. Bigot: Clays, kaolins, etc.—L. Blanc and G. Chaudron: The magnetic study of the stable form of the sesquioxides of iron and chromium. The magnetic susceptibility of  $Fe_2O_3$  and  $Cr_2O_3$  as a function of the temperature is given in graphical form: the results are difficult to interpret. André Graire: The reduction of the oxides of nitrogen in the presence of sulphuric and sulphurous acids.—Marcel Godchot and Pierre Bedos: The chlorination of para-methyl-cyclohexanone.—Ch. Courtot and P. Petitcolas: Syntheses of  $\alpha$ -fluorenylamines.—J. Barthoux: Description of a new mineral, dussertite. This mineral, found at Djebel Debar, is an arsenate of the composition  $(FeAl)_3(CaMg)_3(OH)_3(AsO_4)_2$ . The full chemical analysis, physical and mineralogical description are given.—Pierre Bonnet: The problem of the Trias of the Avallonnais and Auxois.—Pierre Dangeard: Limits of the submerged plant growth of Lake Annecy at varying depths.—P. Mazé: The plurality of the products of photosynthesis, deduced from the study of the gaseous exchanges between the atmosphere and the whole plant.—Mlle. Sara Bache-Wüg: The vacuome of *Erysiphe graminis*.—P. E. Pinoy: Concerning the cancer of plants or crown gall. L. Ravaz and G. Verge: A disease of the vine, excoriosis.—Mme. Jean Francois-Perey: The influence of the culture medium on protozoa counts in soil. The influence of the culture medium is marked; an extract of the earth with gelose is recommended as giving the most trustworthy results.—C. F. Muttelet: Study of the development of the pea; from the point of view of conservation for food.—Vittorio Pettinari: The toxic action of *Amanita phalloides*.—Georges Bourguignon and J. B. S. Haldane: The evolution of chronaxy in the course of the crisis of experimental tetany by voluntary hyperpnea in man.—A. Malaquin: The segregation, in the course of ontogenesis, of two primordial sexual cells; origin of the germinal descent in *Salmacina Dysteri*.—Robert Weill: Foci of formation and ways of migration of the nematocysts of *Halychistus octoradiatus*. The existence, along their path, of selective reservoirs.—J. Chaine: Remarks on the penian bone.—Armand Dehorne: The petaloid expansions of the leucocytes of the Chetopoda. The case of *Leydenia Gemmipara*.—Ph. Joyet-Lavergne: The lipoids and fats of the Sporozoa.—Edouard Chatton and André Lwoff: The physiological determinism of the phases of the cycle of the infusorian *Spivophrya subparasitica*.—A. Berthelot and G. Ramon: The agents of transformation of the toxins into anatoxins. Toxins can be converted in various ways into substances deprived of toxic power, but retaining the power of flocculation (*in vitro*) and immunising power (*in vivo*). These products are described as anatoxins, and the action of a large number of chemical compounds on the diphtheria toxin has been studied from this point of view. The most effective reagents for the production of the diphtheria anatoxine proved to be acetolein, crotonaldehyde, acetaldehyde and hexamethylenetetramine.

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## Official Publications Received.

- Department of the Interior: United States Geological Survey. Bulletin 751-E: The Scobey Lignite Field Valley, Daniels, and Sheridan Counties, Montana. By Arthur J. Collier. Pp. v + 157-230 + plates 21-23. (Washington: Government Printing Office.)
- Department of the Interior: United States Geological Survey. Professional Paper 132-F: Relations of the Wasatch and Green River Formations in North-Western Colorado and Southern Wyoming, with Notes on Oil Shale in the Green River Formation. By J. D. Sears and W. H. Bradley. Pp. ii+93-107+2 plates. Professional Paper 132-G: Discovery of a Balkan Fresh-water Fauna in the Idaho Formation of Snake River Valley, Idaho. By W. H. Dall. Pp. ii+109-115+1 plate. Professional Paper 132-H: The Resuscitation of the Teru Bryn Mawr Gravel. By F. Bascom. Pp. 117-119. (Washington: Government Printing Office.)
- "The First Five Thousand": being the First Report of the First Birth Control Clinic in the British Empire, "The Mothers' Clinic" for Constructive Birth Control at 61 Marlborough Road, Holloway, London, N. 19. By Dr. Marie Carmichael Stopes. Pp. 67. (London: J. Bale, Sons and Danielsson, Ltd.) 2s. 6d. net.
- Department of Commerce: U.S. Coast and Geodetic Survey. Serial No. 290: Precise Triangulation, Traverse and Leveling in North Carolina. By Walter D. Sutcliffe and Henry G. Avers. (Special Publication No. 101.) Pp. iv+184. (Washington: Government Printing Office.) 25 cents.
- Annuaire de l'Observatoire Royal de Belgique. Par P. Stroobant. 93<sup>me</sup> année, 1926. Pp. iii+154. (Bruxelles.)
- The Physical Society of London. Proceedings, Vol. 37, Part 2. February 15. Pp. 75-100+50 D. (London: Fleetway Press, Ltd.) 6s. net.
- Thirty-eighth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution, 1916-17; with accompanying Paper, An Introductory Study of the Arts, Crafts and Customs of the Guiana Indians, by Walter Edmund Roth. Pp. vii+745+183 plates. (Washington: Government Printing Office.) 3 dollars.
- State of Illinois Department of Registration and Education: Division of the Natural History Survey. Bulletin, Vol. 15, Art. 3: Second Report on a Forest Survey of Illinois; The Economics of Forestry in the State. By Herman H. Chapman and Robert B. Miller. Pp. vii+46-172. (Urbana, Ill.)
- Iowa Geological Survey. Vol. 29: Annual Reports, 1919 and 1920, with Accompanying Papers. Pp. xlviii+568+54 plates. (Des Moines.)
- University of Iowa Studies in Natural History. Vol. 10, No. 5: Fiji-New Zealand Expedition. Narrative and Preliminary Report of a Scientific Expedition from the University of Iowa to the South Seas. By C. C. Nutting; with Chapters on Ornithology and Entomology by Dayton Stoner, on Botany by R. B. Wylie, and on Geology by A. O. Thomas. Pp. 369+58 plates. (Iowa City.) 3 dollars.
- Royal Botanic Gardens, Kew. Bulletin of Miscellaneous Information, 1924. Pp. iv+400+50. (London: H.M. Stationery Office.) 10s. 6d. net.
- Ministry of Agriculture, Egypt: Technical and Scientific Service. Bulletin No. 50: A Third Bioclimatic Study in the Egyptian Desert. By C. B. Williams. Pp. ii+32+7 plates. (Cairo: Government Publications Office.) 5 P.T.
- Memoirs of the Department of Agriculture in India. Chemical Series, Vol. 7, No. 6: Studies in the Chemistry of Sugarcane. 2: Some Factors that determine the Ripeness of Sugarcane. By D. Viswanath and S. Kasinatha Ayyar. Pp. 123-144. (Calcutta: Thacker, Spink and Co.; London: W. Thacker and Co.) 8 annas; 9d.
- Western Australia. Annual Progress Report of the Geological Survey for the Year 1923. Pp. 58+3 plates. (Perth: Fred. Wm. Simpson.)
- Department of the Interior: Bureau of Education. Bulletin, 1924, No. 19: Schools for Adults in Prisons, 1923. By A. C. Hill. Pp. iii+33. (Washington: Government Printing Office.) 5 cents.

## Diary of Societies.

SATURDAY, MARCH 7.

- ROYAL SOCIETY OF MEDICINE (Otolaryngology Section), at 10.30.
- ASSOCIATION OF TECHNICAL INSTITUTIONS (Annual Meeting) (at Institution of Mechanical Engineers), at 11 A.M.—Lord Emmott and Ppl. W. M. Varley: The Local College and its Relation to Surrounding Education Authorities.—G. Mavor: Training and Education for Apprenticeship.—J. E. Montgomery: The Working of the Schemes for National Certificates and Diplomas in Engineering.
- INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS (Eastern and South Midland Districts) (at Town Hall, Ealing), at 2.35.—The Question of Regional Town Planning.
- ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Sir Ernest Rutherford: The Counting of the Atoms (II).
- IPSWICH AND DISTRICT NATURAL HISTORY SOCIETY (at Ipswich).—Dr. F. W. Crossley-Holland: Science and the Criminal.

MONDAY, MARCH 9.

- ROYAL SOCIETY OF EDINBURGH, at 4.30.—A. H. R. Goldie: Discontinuities in the Atmosphere.—Dr. A. P. Laurie: Stone Decay, and the Preservation of Buildings (Address).—W. H. Watson: An Investigation of the Absorption of Superposed X-Radiations.—H. W. Turnbull and J. Williamson: The Minimum System of Two Quadratic Forms.—Prof. H. S. Allen: Note on Whittaker's Quantum Mechanism.—Marion C. Gray: The Equation of Conduction of Heat.
- VICTORIA INSTITUTE (at Central Buildings, Westminster), at 4.30.—Rev. C. Gardner: Nature and Supernature.
- BIOCHEMICAL SOCIETY (at Lister Institute), at 5.—F. W. Fox: The Cholesterol Content of Bile and its Bearing upon the Metabolism of Cholesterol and the Bile Acids.—J. R. Marrack: The Total Base Content of Plasma.—D. Hoffer and I. S. MacLean: The Action of Yeast on Lactic Acid.—E. H. Lepper and C. J. Martin: (a) The Influence