

NOTTINGHAM.—Dr. Henry L. Brose, at present reader in atomic physics, formerly Rhodes Scholar at Christ Church, Oxford, has been appointed to the chair of physics, which is about to become vacant owing to the retirement of Prof. P. E. Shaw.

ST. ANDREWS.—At a meeting of the University Court on June 23, Dr. F. L. Arnot, of Trinity College, Cambridge, was appointed lecturer in natural philosophy in the United College, St. Andrews, as from Oct. 1. Dr. George L. Montgomery was appointed lecturer in clinical pathology in the University.

The Court confirmed the acceptance of contracts for the erection of a new building for the botany and geology departments, a new lecture theatre for the zoology department, and a new laboratory for the anatomy department, to form part of the group of Bute Medical and Bell-Pettigrew Museum Buildings at St. Andrews.

DR. J. D. STIRLING has recently been appointed to the staff of the Hannah Dairy Research Institute, Kirkhill, Auchincruive, Ayr. For the past three years Dr. Stirling has been doing research work in biochemistry at the University of Glasgow under the direction of Prof. E. P. Cathcart, and later at Tübingen in Germany and Graz in Austria.

The second year's awards of the Sir James Caird Travelling Scholarships have recently been announced. The scholarships were instituted by the will of the late Mrs. Emma Grace Marryat, who was a sister of the late Sir James Caird, Bart., of Dundee. A sum of £200,000 was appointed to be held in trust for the foundation of the scholarships in engineering, electricity, aeronautics, and music. Only natives of Scotland, of either sex, who are not already holders of scholarships similar in nature to those offered, are eligible for these scholarships. Two classes, junior and senior, are offered. The value of the junior varies from £50 to £150 and the senior from £250 to £600 per annum. Each scholarship is tenable for one year; but may be extended yearly to a maximum of three years. Among the scholarships awarded for this year were the following: Engineering (junior of the maximum of £150), T. C. Inglis, W. A. Sangster; (senior of the normal amount of £400), J. Jamieson. Electricity (junior of the maximum of £150), J. C. M. Sanders, H. C. Thompson; (senior of the normal amount of £400), M. D. Kippen, J. M. Dodds. Aeronautics (senior scholarship of £300), J. A. J. Bennet.

THE Medical Research Council has made the following awards of travelling Fellowships for the academic year 1931-32 on behalf of the Rockefeller Foundation: Mr. E. T. Conybeare, Guy's Hospital, London; Mr. G. M. Dean, Department of Surgery, University of Aberdeen; Mr. M. H. Finkelstein, Department of Bacteriology, University of Edinburgh; Prof. O. S. Gibbs, formerly professor of pharmacology, Dalhousie University, Canada; Mr. E. M. Lourie, Liverpool School of Tropical Medicine; Mr. A. W. Spence, St. Bartholomew's Hospital, London; Mr. C. H. Waddington, Strangeways Research Laboratory, Cambridge; M. K. H. Watkins, Royal Infirmary, Manchester. The Fellowships awarded to Prof. Gibbs and Mr. Waddington are tenable in Europe, the others at centres in the United States. These Fellowships are awarded to graduates who have had some training in research work either in the primary sciences of medicine or in clinical medicine or surgery, and are likely to profit by a period of work at a chosen centre in the United States or, in special cases, in Europe, before taking up positions for higher teaching or research in the British Isles.

## Societies and Academies.

### EDINBURGH.

Royal Society, June 15.—A. H. Reginald Buller: (An address) Recent advances in our knowledge of the higher fungi. A mushroom is the reproductive part of the mushroom plant and is produced at the expense of the mycelium or spawn. A large mushroom may develop and liberate upwards of 10,000,000,000 spores. The basidiospores of all Hymenomycetes, all Uredineæ, the smut-genus *Tilletia*, and the yeast-genus *Sporobolomyces* are shot away by a drop-excretion mechanism, but exactly how this mechanism works is still a profound mystery. The terminal rate of fall of spores in still air varies with the size of the spores from about 0.5 to 4.0 mm. per sec. Spores are discharged from the under side of the caps of mushrooms and toadstools in a continuous stream for days or weeks. The clouds of spores escaping from a fruit-body can be made visible in a darkened room by means of a beam of light. Nocturnal excursions with an electric lamp may be made to observe spore-discharge from fruit-bodies attached to tree-trunks, etc. The organisation of the hymenium which covers the gills of mushrooms and toadstools has been worked out, and the time and space relations of the basidia which produce the spores and of the sterile elements called paraphyses are now known. The basidia come to maturity in a series of successive generations. The sexual process in mushrooms and toadstools is initiated in the mycelium with nuclear association, is continued there with conjugate nuclear divisions, and is completed in the fruit-body by nuclear fusion in every basidium.—J. Thomson: The ionising efficiency of electronic impacts in air: Experiments are described, the aim of which is the determination of the average energy required to produce one pair of ions in air by electronic impact, the initial energy of the electron being defined. The results show that the total number of ions produced is a linear function of the initial electronic energy. Hence it is shown by extrapolation that for fast-moving electrons (such as  $\beta$ -rays) the energy per ion-pair is  $37 \pm 2$  electron-volts. This result is discussed in relation to other investigations, and the extrapolation is thereby justified.

### PARIS.

Academy of Sciences, May 18.—A. Lacroix: The nepheline and leucite phonolites of the island of Ua-Pou (Marquesas Archipelago).—A. Cotton: Comparison of the magnetic rotations of crystallised quartz and fused quartz. The specific magnetic rotation of fused quartz was found to be greater than that of crystallised quartz.—L. Cayeux: The petrographic characters of the magnesian irregularities in the chalk of the Paris basin.—Charles Richet: The reflexes of acquisition (Pavloff's conditional reflexes). A claim for priority as regards the work of Pavloff.—Charles Nicolle and Ugo Lombroso: The *Bacterium granulosa* of Noguchi in its relations with the etiology of trachoma. Two strains of this bacillus (Noguchi, Olitski) proved to be devoid of pathogenic power. It is mentioned as possible that there might have been an attenuation of the virulence due to the age of the culture.—S. Finikoff: Congruences of which the two sheets of the focal surface are projectively applicable one on the other by the corresponding focal points.—Marcel Vasseur: A geometrical interpretation of Moutard's transformation.—J. Leray: A system of partial differential equations which governs the permanent flow of viscous fluids.—Mlle. Nina Bary: The representation of continued functions by means of functions with limited variation.—R. Gosse: The investigation of a category of equations of the first



class.—Stefan Kempisty: The integral (A) of Denjoy.—A. Rauch: The generalisation of theorems of Valiron on meromorphic functions of positive order.—Jean Brille: A property of functions presenting a certain complex character of resolvability.—F. E. Myard: Closed chains with four rotoid non-concurrent couples, deformable at the first degree of freedom. Toric isogram.—Henri Poncin: Cavitations (in fluids) of permanent form.—A. Lafay: The deviations of the push of the wind on a cylinder produced by very small superficial projections on the latter.—Mme. G. Camille Flammarion: Photographs of the planet Mercury. A detailed description of the markings observed is given, with a drawing. It is the first time that details of the surface of this planet have been obtained by photography.—Z. Horák: The space-time line of a material point in classical mechanics.—G. Ribaud: The distribution of the temperatures in the cross-section of a flat incandescent filament.—R. Jouaust and N. Stoÿko: The propagation of short radio-electric waves. For some time in 1930 and 1931 radiotelegraphic transmissions on 18.5-metre waves between Indo-China and France were bad; for each signal sent more than one was received. The difference of time between the two signals received has been measured on a Blondel oscillograph and found to be 0.0681 second. In the light of this figure, two hypotheses regarding the paths of the waves are discussed.—P. David: A valve generator with very stable frequency. Instead of controlling the frequency of an emitting valve with a quartz oscillator or tuning fork, the author proposes the use of a valve with two grids, and describes the arrangement of the circuit found to be most suitable. For variations in the voltages of 15 per cent the variations in the frequency do not exceed five millionths.—F. Esclançon. The theory of the discharge without electrodes. According to the theory of Sir J. J. Thomson, the electrodeless discharge in a rarefied gas placed inside a solenoid carrying a high-frequency current is to be attributed to the electric field induced by the alternating magnetic field of the solenoid. Townsend and Donaldson showed that the electrostatic changes on the turns of the solenoid produce an additional and more intense field. Experiments are described by the author by which these two effects can be separated.—Mlle. Paule Collet and G. Foëx: The influence of the field on the magnetic states of platinum. In these experiments the magnetic fields varied from 14,000 gauss to less than 3000 gauss, and the temperature from  $-180^{\circ}\text{C}$ . to  $200^{\circ}$  or  $400^{\circ}\text{C}$ . The results are summarised in two diagrams.—P. Lainé: The errors introduced by inexactitude of the half-wave plates in the analysis of slightly elliptical vibrations, and on the standardisation of half-wave and quarter-wave plates.—C. Salceanu: The natural and magnetic rotary polarisation of some organic compounds studied in the liquid state. Wiedemann's rule, that the ratio of the magnetic to the natural rotation is independent of the wave-length, holds for menthol, but not for fused camphor or carvone.—S. Takvorian: Investigation on element 61 by means of the X-rays. Starting with 14 kilograms of cerium earths, after a preliminary treatment increasing the proportions of neodymium and samarium oxides, the method of fractional crystallisation of the double magnesium nitrates was used. The fractions examined, which were those in which element 61 ought to be concentrated, and which only represented 1/200th of the weight of the initial oxides, gave no evidence of the presence of element 61, at least in a proportion higher than 1 in 10,000.—M. Schérer: The magnetic double refraction of liquid hydrocarbons.—A. Sanfourche: The electrometric titration of phosphoric acid. The results

obtained with hydrogen and quinhydrone electrodes using soda, lime, strontia, and baryta as alkalis are shown graphically.—Mlle. C. Chamie and A. Korveze: The centrifugation of solutions of polonium in the presence of various electrolytes. A solution of polonium, filtered before the experiment, gives a precipitation of 40 per cent of the polonium. This proportion is increased by the addition of electrolytes ranging from 50 per cent for sodium nitrate to 99.6 for silver nitrate.—H. Colin and Mlle. A. Chaudun: The hydrolysis of sugar by strong acids in the presence of their salts.—Barbière and Desmaroux: The solvent power of the alcohols for the nitrocelluloses.—F. Bourion and Mlle. O. Hun: The boiling point determination of the molecular equilibria of pyrocatechol in lithium chloride solutions.—A. Damiens: A new porcelain without silica, based on pure fluorspar. Starting with mixtures of finely divided fluorspar and precipitated calcium fluoride, it has been found possible to prepare a material resembling porcelain, and which is unattacked by fluorine or by hydrofluoric acid.—G. Arrivaut: The action of arsenic chloride upon nickel. The first product of the reaction between finely divided nickel and an acid solution of arsenious chloride was the compound  $\text{Ni}_3\text{As}_2$ .—J. Bougault and G. Schuster: A new triglyceride obtained from cocoa butter: a palmitostearoazelain.—Tseou Héou-Féou: The condensation of an amine and of formaldehyde with quinaldine and picoline.—J. Wyart: Study of chabase.—A. Rivière: Remarks on the stratigraphy of the base of the Eocene in central Elbourz.—Jean Lacoste: Tectonic observations on the southern Rif (Moulay Bou Chta region).—Joseph Blayac and Marcel Thorat: The discovery of Georgian Trilobites in the Montagne Noire (Hérault).—J. Thoulet: Deep submarine volcanoes.—H. Arsandaux: The morphological evolution of the dome of Montagne Pelée.—F. Roman and J. Dareste de la Chavanne: The presence of an elk (*Alces latifrons*) in the upper Pliocene of Senezé (Haute-Loire).—A. Duparque: The microscopic structure and origin of anthracite.—Alfred Carpentier: Some imprints of seeds of Pteridosperms.—Mlle. G. Py: The evolution of the cytoplasmic constituents of the nutritive layer of the pollen in *Vincetoxicum officinale*.—A. Guillaumin: The transformation of the lower portion of the axis of inflorescence into a hook in the *Uncaria*.—Paul Becquerel: The development of the male fern in a pure aseptic culture starting from the spore.—J. Chaze: Experimental proofs of the excretion of nicotine from the aerial parts of the tobacco plant. A direct proof is given that nicotine is excreted by the tobacco plant and evaporated into the surrounding air.—M. Bridel and C. Charaux: The purgative complex of elder buckthorn bark, soluble in water and hydrolysable by rhamnodiastase.—Henri Perrin: Indices of aridity and types of forest vegetation.—Charles Pérez: Statistics of infestation of hermit crabs by *Chorogaster*.—Mme. Lucie Randoin and Mlle. André Michaux: Variations in the proportion of globulin and serum in blood serum under the influence of a diet thrown out of equilibrium by the complete absence of antiscorbutic vitamine.—J. Vellard: Poison of the ray (*Taeniura*) from the Rio Araguaya (Brazil).—Emile Haas: The extent to which the central visual acuteness is altered when a very bright object is near the test to be defined. A study of the effects of dazzle.—A. Leulier and B. Drevon: Action of the blood on morphine chlorhydrate.—H. Bierry: Specificity and chemical structure.—Bunzô Hayata: The dynamic system of plants based on the theory of participation.—J. Laurin: The hypoglycæmic action of the bulbs of *Allium cepa*.—Raymond-Hamet: The mechanism of the action of the sympathomimetic amines.



## GENEVA.

Society of Physics and Natural History, Feb. 19.—**G. Dejardin**: (1) The utilisation of ultra-violet light in photoelectric cells with glass bulbs. The author exhibits photoelectric cells in which the quartz, as transparent material, is replaced by an extremely thin glass window (some hundredths of a millimetre). For ordinary cells, without the thin wall, the spectrum range can be extended considerably by depositing on the window a thin layer of a fluorescent substance such as mineral oil, vaseline, or esculin incorporated in gelatine.—(2) The extension of the spectrum sensibility of photoelectric cells under the action of oxygen. The spectrum sensibility of very thin films of the alkali metals increases considerably when the surface of the metal serving as the support (copper, silver, magnesium) is oxidised. In the case of potassium, the presence of the oxygen produces a displacement of the whole spectrum towards the red of the sensibility curve. The author shows that by this method films can be obtained with potassium which can in many cases replace those of caesium.—**E. Briner and B. Susz**: The maximum concentration of endothermic compounds at high temperatures (calculated in collaboration with E. Rod). Following on earlier researches, the authors establish by calculation the existence of a maximum concentration for endothermic compounds such as ozone and nitric oxide. For ozone the maximum concentration is very low. For nitric oxide it amounts to 3.6 per cent at 4000° Abs. in an equimolecular mixture of nitrogen and oxygen at atmospheric pressure.—**P. Balavoine**: The analytical characters of caramel regarded as a colouring matter for food. A close study of certain analytical characters of this colouring matter compared with artificial colouring matters. A new reaction is described suitable for detecting caramel in the presence of other natural colouring matters.—**G. Ladame**: The central Rhodopes and the Balkans. Geological and mining outline. After some brief geological data based on the work of Stephan Bončev, the author gives five analyses of selected specimens of sulphide ores of zinc, lead, and copper, the latter containing more or less silver. Fairly numerous researches have not resulted in extensive mining operations. There are important deposits of tertiary lignites, and mining for these is more probable.

## WASHINGTON, D.C.

National Academy of Sciences (*Proc.*, Vol. 17, No. 1, Jan. 15).—**Matilda Moldenhauer Brooks**: The penetration of 1-naphthol-2-sulphonate indophenol, *o*-chloro phenol indophenol, and *o*-cresol indophenol into *Valonia*. As with indigo sulphonates, the first does not penetrate into the sap, suggesting that the sulphonate radicle is responsible. The other dyes penetrate in a colourless form.—**Henry Borsook and Howard M. Winegarden**: (1) The work of the kidney in the production of urine. The minimum work performed by the kidney in man in the production of urine, analysed by the second law of thermodynamics, is of the order of 0.7 gm. cal. per c.c. of urine or 70 gm. cal. per gm. of nitrogen excreted.—(2) The energy cost of the excretion of urine. Production of hyper- or hypotonic urine entails work by the kidney. The energy consumed by the normal healthy kidney in man is 6.11 kgm. cal. per gm. nitrogen excreted, an efficiency of only 1.2 per cent. The healthy kidney has a great capacity for work, which is much reduced by disease, drugs, etc. The paper contains an extensive review of work on the subject.—**J. H. Hodges and E. F. Linhorst**: The thermal decomposition of nitrogen pentoxide. At 35° C., the reaction appears to be unimolecular at partial pressures of 0.12 mm. to 0.06

mm.; below 0.06 mm. pressure, specific reaction rate decreases with pressure, and below 0.004 mm. pressure it appears to be bimolecular.—**Oscar Knefler Rice**: On the transfer of energy between atoms at collision. A theoretical discussion. A modification of Born's method is outlined, taking into account the mutual kinetic energy of the particles. The method gives an upper limit to the radius of action.—**G. A. Miller**: Groups which admit five-eighths automorphisms.—**M. S. Knebelman**: Multivectorial curvature.—**Tracy Yerkes Thomas**: On the unified field theory (3). A general existence theorem is derived and the characteristic surfaces of the four-dimensional world are determined.—**E. H. Kennard**: Quantum-mechanical motion of free electrons in electromagnetic fields. Formulae are obtained by Ehrenfest's method for the motion of the centroid of a wave-packet; only the non-relativistic case is considered, based on Schrödinger's equation. The general result is that in a uniform electric or magnetic field the packet-centroid moves as an electron should according to classical theory, and in non-uniform fields its acceleration is a kind of average of the classical value.—**Carl Störmer**: Remarks on a paper: Note on the nature of cosmic rays, by Paul S. Epstein. The results for the motion of electrons in the field of an elementary magnet obtained by Epstein (*Proc. Nat. Acad. Sci.*, Oct. 1930) were derived by Störmer in 1904.—**Ernest O. Lawrence and David H. Sloan**: The production of high-speed canal rays without the use of high voltages. A series of metal tubes in line are attached alternately to the inductance of a high frequency oscillatory circuit. An ion between the first and second tubes is accelerated into the second tube, and if the length of this tube is such that the time taken to pass through it is equal to the half-period of the oscillator, the ion will be further accelerated into the third tube and so on. An apparatus containing twenty-one accelerators has been made and with it mercury ions of kinetic energies of more than 200,000 volts have been obtained with a maximum applied voltage of about 10,000 volts. The method is capable of further development.—**G. Breit**: On the interpretation of Dirac's  $\alpha$ -matrices.

## Official Publications Received.

## BRITISH.

Air Ministry: Aeronautical Research Committee: Reports and Memoranda. No. 1362 (E. 44—I.C.E. 752): Detonation, Mineral Lubricating Oils and Blended Fuels. By R. G. King and Dr. H. Moss. Pp. 11+7 plates. 9d. net. No. 1367 (Ae. 494—T. 3022): Longitudinal Control and Stability when Stalled. By E. T. Jones and R. P. Alston. Pp. 8+11 plates. 9d. net. No. 1366 (Ae. 493—T. 3021): Drag and Heat Dissipation of Three Radiator Systems. By E. T. Jones. Pp. 14+9 plates. 1s. net. No. 1368 (Ae. 495—T. 3049): Flow of Air adjacent to the Surface of a Rotating Cylinder in a Stream. By E. G. Richardson. Pp. 12+12 plates. 1s. net. No. 1359 (Ae. 490—T. 3017): Heat Transmission between Surfaces and Fluids flowing over Them. (1) The Case of Two-Dimensional Flow. By W. F. Cope. Pp. 8+2 plates. 6d. net. No. 1365 (E. 45—I.C.E. 787): The Limits of Compression Ratio in Diesel Engines. By D. R. Pys. Pp. 9+3 plates. 9d. net. No. 1373 (Ae. 500—T. 3037): Eddies behind a Circular Cylinder. By Dr. A. Thom. Pp. 8+4 plates. 6d. net. No. 1370 (Ae. 497—T. 2961): Drag of Circular Cylinders and Spheres. By A. Fage. Pp. 6+2 plates. 6d. net. (London: H.M. Stationery Office.)

Department of Public Instruction, Technical Education Branch: New South Wales. Technological Museum: Curator's Annual Report for Year ended 31st December 1930. Pp. 6. (Sydney, N.S.W.)

Annual Report of the Calcutta School of Tropical Medicine, Institute of Hygiene and the Carmichael Hospital for Tropical Diseases, 1930. Pp. 131. (Calcutta: Bengal Government Press.)

Hull Museum Publications. No. 167: Record of Additions. Edited by T. Sheppard. Pp. 43. No. 168: Record of Additions. Compiled by T. Sheppard. Pp. 43. No. 169: Bronze-Age Remains, including Beaker, Bracer, Jet Ornaments, Spear Head, and Clay Moulds for Implements, etc. Edited by T. Sheppard. Pp. 33. (Hull.)

Air Ministry: Aeronautical Research Committee: Reports and Memoranda. No. 1344 (Ae. 476; T. 2988): The Influence of a Fuselage on the Lift of a Monoplane. By A. S. Hartshorn. Pp. 14+8 plates. (London: H.M. Stationery Office.) 9d. net.

The Himalayan Journal: Records of the Himalayan Club. Edited by Kenneth Mason. Vol. 3, April. Pp. vi+172+11 plates. (Calcutta: Thacker, Spink and Co.; London: W. Thacker and Co.) 5 rupees; 8s.