

Calendar of Scientific Pioneers.

April 21, 1793. John Michell died.—A fellow of Queens' College, Cambridge, Michell became a clergyman, and in 1762 was appointed Woodwardian professor of geology in the University of Cambridge. Magnetism, electricity, and astronomy all engaged his attention, and shortly before his death he devised the apparatus afterwards used by Cavendish to measure the density of the earth.

April 21, 1825. Johann Friedrich Pfaff died.—The friend of Schiller and the rival of Gauss, Pfaff studied mathematics under Kästner and worked at astronomy with Bode. His original researches were mainly in the domain of the calculus and differential equations. Pfaff was born in 1765. From 1788 to 1810 he was professor of mathematics at Helmstadt, and from 1810 onwards held the chair of mathematics at Halle.

April 23, 1874. John Phillips died.—In his youth the constant companion of his uncle, William Smith, the geologist, Phillips held the chairs of geology at King's College, London, at Dublin, and at Oxford. For his contributions to geology and palæontology he received the Wollaston medal from the Geological Society, which he served as president during 1859-60.

April 25, 1840. Siméon Denis Poisson died.—Poisson all his life—first as student, then as professor and examiner—was connected with the Ecole Polytechnique, where he gained the friendship of Lagrange, Laplace, and Legendre. Besides his separate works he published some three hundred memoirs, the chief of which are on the theory of electricity and magnetism and on celestial mechanics. Always working, he replied to one who urged him to rest: "La vie: c'est le travail."

April 25, 1882. Johann Carl Friedrich Zöllner died.—Well known for his investigations in photometry, spectrum analysis, and the constitution of the sun, Zöllner from 1872 was professor of physical astronomy at Leipzig.

April 25, 1914. Eduard Suess died.—Born in London in 1831, Suess was educated at Prague and at Vienna, where at the age of twenty he entered the Imperial Museum. In 1867 he became professor of geology in Vienna University. His great treatise, "Das Antlitz der Erde," which occupied him twenty-five years, was a comprehensive survey of all that had been accomplished in elucidating the geological structure of the earth. He held various public offices, and served as president of the Academy of Sciences of Vienna.

April 26, 1835. Henry Kater died.—Joining the Army as an ensign in 1794, Kater for a time assisted Lambton on the Trigonometrical Survey of India. Placed on half-pay in 1814, he devoted himself to scientific pursuits, and was especially known for his pendulum experiments, his work on weights and measures, and his invention of the floating collimator.

April 26, 1920. Srinivasa Ramanujan died.—Distinguished for his researches in pure mathematics, Ramanujan was the first Indian fellow of the Royal Society. A Brahmin by caste, he was born at Erode in 1887, became a student at Madras University, and was enabled to spend the years 1914-19 in England, where his brilliant work led to his being elected F.R.S. in 1918. He died at Chetput, Madras.

April 27, 1521. Ferdinand Magellan died.—The contemporary of Columbus and Vasco da Gama, Magellan—or Magalhães—came of a noble Portuguese family. Sailing from Portugal in September, 1519, towards the end of 1520 he discovered the strait that bears his name and so reached the Pacific. He met his death in a fight with natives in the Philippines.

E. C. S.

Societies and Academies.

LONDON.

Royal Microscopical Society, March 16.—Prof. John Eyre, president, in the chair.—J. H. Pledge: The use of light-filters in microscopy. The advantages gained are: control of contrast in the stained and the coloured preparations from both the visual and the photographic points of view; aid in resolution of fine structure; improvement in the definition given by ordinary achromatic objectives; modification of the unpleasantness to the eye of artificial-light sources by "equivalent daylight" filters; and the possibility of moderating the intensity of illumination of the microscopic field by light-filters of neutral tint of suitable density. Forms of light-filters mostly in use are chiefly dyed gelatine cemented between protecting cover-glasses, but dye solutions in glass-cells are also used. To obtain maximum contrast a light-filter complementary in colour to that of the preparation should be used.

Faraday Society, March 22.—Prof. A. W. Porter, president, in the chair.—Prof. A. W. Porter: Presidential address: Some aspects of the scientific work of the late Lord Rayleigh. The experimental part of Rayleigh's work could be divided into that requiring elaborate apparatus and laborious application, and investigations in which the apparatus was of the simplest kind. The latter was a type of investigation in which Rayleigh specially delighted. His mathematical work was always looking forward to its applications. Illustrations were given of the great use he made of the method of dimensions when problems (especially those in hydrodynamics) cannot be yet solved in any other way. His work on intrinsic pressure was outlined and contrasted with more recent work of the Dutch school of physicists. Finally, his mentality was further characterised by references to his excursions into problems dealt with by the Society of Psychical Research. His position was summed up by saying that although Rayleigh founded no school, yet he so advanced knowledge of physics in all its branches as to stand out as one of the leaders in scientific achievement.—S. Field: The electrolytic recovery of zinc. Abundant supplies of low-grade and complex ores are available in Great Britain which are not amenable to distillation, but respond readily to electrolytic treatment. Sulphide ores are calcined to oxide and a predetermined proportion of sulphate. The calcine is leached with acid zinc sulphate liquors from the electrolytic cells. Special treatment avoids gel formation, and admits of high extraction and easy filtration. The zinc sulphate solution is too impure for efficient deposition. The methods of purification worked out are given in some detail. Ni and Co constitute two commonly met and insidious impurities. The purified liquors containing not more than 3 to 5 parts Co and 0.2 part Ni per 1,000,000 are acidified and electrolysed between lead anodes and aluminium cathodes. The cells, arranged in cascade, absorb 3.35 volts and give a current efficiency of 90 per cent., representing about 3200 k.w.h. per ton of zinc cathodes. Subsidiary power is amply covered by 800 k.w.h. per ton; 4000 k.w.h. covers all power. At 0.33d. per unit, power costs are 5l. 11s. per ton of cathode zinc. The cathodes are melted and yield ingots assaying at least 99.95 per cent. of zinc.—Prof. A. Findlay and V. H. Williams: Note on the electrolytic reduction of glucose. The authors have studied the electrolytic reduction of glucose under varying conditions of temperature, current density, and current concentration, and using both graphite and lead electrodes. No appreciable amount of hexa-

hydric alcohol was obtained, the reduction being apparently interfered with by the production of formic acid and a pentose.—W. E. **Hughes**: The forms of electro-deposited iron and the effect of acid upon its structure. Part i.: Deposits from the chloride bath. Structures found in iron deposits formed in chloride baths are varieties of two general types, the normal and the fibrous. The type obtained depends upon conditions prevailing during deposition, the fibrous type being characteristic of deposits formed in (a) acid and (b) agitated solutions. Macroscopic features correspond to definite microscopic structure.

Zoological Society, April 5.—Prof. E. W. MacBride, vice-president, in the chair.—G. J. **Arrow**: A revision of the Melolonthine beetles of the genus *Ectinohoplia*.—J. H. **Lloyd**: Abnormalities in the common frog (*Rana temporaria*).—S. **Hirst**: Some new and little-known Acari, mostly parasitic in habit. The author illustrated his paper by exhibiting under microscopes (1) a preparation of a Sarcoptid mite (*Otodectes cynotis*, var. *cati*) showing the well-developed system of tracheal tubes, and (2) a preparation of the mite (*Tarsonemus Woodi*) from bees affected with Isle of Wight bee disease.—Dr. C. F. **Sonntag**: The comparative anatomy of the tongues of the Mammalia. III., Fam. 2, Cercopithecidae: with notes on the comparative physiology of the tongues and stomachs of the Langurs.

Linnean Society, April 7.—Dr. A. Smith Woodward, president, in the chair.—H. W. **Monckton**: The distribution of *Taraxacum erythrospermum*, Andr., in the south-east of England. The author explained that he had for some years noticed a small form of dandelion with deeply cut leaves and red seed growing abundantly on a football ground at Wellington College, Berkshire. It belongs to the group of varieties named *erythrospermum*. The geological formation is Upper Bagshot Sand (Barton Beds). He had seen the same variety on the similar sandy soil of Puttenham Heath, Surrey (Lower Greensand), on the Thames Gravel near Old Windsor, Berkshire, and on walls at West Drayton and other places. It is not confined to areas of sand or gravel, for the author exhibited specimens from the London Clay of Ashted Common, near Epsom, Surrey.—R. A. **Malby**: A miniature alpine garden from January to December. Amongst the subjects shown in lantern-slides by the lecturer may be mentioned *Saxifraga Burseriana*, *S. Grisebachii*, *S. Striburyi*, *S. longifolia*, *S. Cotyledon*, var. *islandica*, *Anemone vernalis*, *A. sulbhurea*, *Nymphaea Mooreana*, *Primula frondosa*, *P. denticulata*, *P. marginata*, *P. Juliae*, *Iris sibirica*, *I. gracilipes*, *Campanula Allionii*, *C. pusilla*, *C. garganica*, *Shortia galacifolia*, *S. uniflora*, *Petrocallis pyrenaica*, *Crocus speciosus*, *Narcissus Johnstoni*, *N. monophyllus*, *N. triandrus*, *N. minimus*, *Oxalis enneaphylla*, and *O. lobata*.

Physical Society, April 8.—Mr. W. R. Cooper in the chair.—Dr. W. J. H. **Moll**: A new registering micro-photometer. A diminished image of a slit, on which the filament of a half-watt lamp is focussed, is projected by a microscope objective on the photographic plate or other object of which the absorption is to be measured. A second similar objective focusses an image of the slit, magnified up to its original size, on a second slit behind which is mounted a sensitive thermopile of the author's own design connected to an improved D'Arsonval galvanometer. The photographic plate is given a slow motion at right angles to the beam of light, and the spot from the galvanometer is focussed on a rotating drum of photographic paper. The arrangement is dead beat and so quick in response that intensity curves of close spectrum

lines, Zeeman triplets, etc., are accurately recorded.—Sir W. H. **Bragg**: Application of the ionisation spectrometer to the determination of the structure of minute crystals. Crystals in the form of powder can be examined by the ionisation method. The powder is pasted on a flat surface and placed on the spectrometer table in the position ordinarily occupied by the face of a single crystal. A bulb current of 1 milli-ampere is sufficient to give satisfactory records.—H. **Parry**: A balance method of using the quadrant electrometer for the measurement of power. The method involves the use of a potential-divider across the supply circuit, and a standard non-inductive resistance in series with the load. An ammeter and a voltmeter are employed to measure the supply voltage and the load current.

DUBLIN

Royal Dublin Society, March 22.—Dr. F. E. Hackett in the chair.—H. A. **Lafferty**: The "browning" and "stem-break" disease of cultivated flax caused by *Polyspora lini*, n. gen. et sp. In the "stem-break" phase of the disease the stems of affected plants become partially or entirely broken across a little above ground-level comparatively early in the season, and affected plants generally fall over and die prematurely. In "browning" the upper portions of the plants in particular exhibit numerous diseased areas; this takes place about pulling time. A fungus, *Polyspora lini*, n. gen. et sp., was isolated, and proved to be the cause of both phases of the disease. The seed is also attacked, and transmission of the disease occurs by sowing infected seed. The fungus is widely distributed. No means of carrying out seed disinfection on a practical scale have been devised.—H. H. **Poole**: The electrical conductivity of some dielectrics. A large, steady potential difference obtained by thermionic rectifying valves was applied to the opposite faces of a thin sheet of the dielectric which was kept at a constant known temperature in an oven. The potential difference was measured by a rotating contact-maker, alternately charging a small condenser and discharging it through a dead-beat galvanometer. The conduction current was measured by a sensitive galvanometer. The logarithm of the electrical conductivity when plotted against the potential gradient gave a set of right lines, corresponding to different temperatures, in the case of glass. With mica a greater range of gradient was available, and the lines exhibited slight curvature.

PARIS.

Academy of Sciences, March 29.—M. Georges Lemoine in the chair.—M. **Hamy**: The approximation of functions of large numbers.—C. **Depéret** and P. **Fallot**: The age of the lignite formations of the Island of Majorca.—C. E. **Guillaume**: The compulsory adoption of the metric system by the Japanese Empire. The metric system has been legal in Japan since 1893, and is now compulsory. The system will also be adopted shortly in China and Siam.—C. E. **Traynard**: Certain singular hyper-elliptic surfaces.—J. **Andrade**: The optical determination of rolling resistance.—P. **Le Rolland**: The movement of a pendulum with elastic suspension.—L. and E. **Bloch**: Some spark spectra in the extreme ultra-violet. The ultra-violet spark spectra of zinc, cadmium, and lead are given for wave-lengths between the limits 1850 and 1400.—M. **de Broglie**: Corpuscular spectra. The laws of photo-electrical emission for high frequencies.—L. **Bull**: The brightness of the electric spark. The photometric method based on the photographic comparison with an electric arc is used, taking the duration of the spark exposure as 1/500,000 second. The actinic

intensity of the spark is not less than 160 times that of the electric arc.—**M. Dussaud**: An apparatus for projecting an image of any object on a screen 3 metres square in a lighted room, with a current of 3 amperes.—**P. Jolibois**: A photographic method of registering chemical reactions accompanied by a variation in pressure. The mercury manometer tube has a fine platinum wire stretched throughout its length, and the variations in the resistance of this wire serve as a measure of the height of the manometer. The temperature at which the reaction under study is proceeding is measured by a thermo-couple, and the double galvanometer of Le Chatelier and Saladin is employed to record the temperature and pressure simultaneously. Some possible applications are described.—**H. Joly**: The geology and physical geography of the Rio Guadiato depression (Sierra Morena, Spain). This depression is due to the tectonic structure of this part of the Sierra Morena, which recalls that of the Franco-Belgian coal basin.—**A. Carpentier**: Discovery of the genus *Plinthotheca* in the Westphalian in the north of France.—**J. de Vilmorin**: The crossing of peas with coloured pods.—**A. A. Mendes-Corrêa**: Some sexual differences in the skeleton of the superior limbs. A discussion of the problem of determining the sex of a skeleton.—**M. Doyon**: The physiological properties of the nucleic acids of the lymphatic ganglia and of the thymus. The conditions for obtaining a thymo-nucleic acid very active on blood. The lymphatic ganglia of the ox and the thymus glands of the calf are specially recommended as sources of nucleic acids. Full details of the technique of extraction are given.—**J. Legendre** and **A. Oliveau**: The rôle of the domestic rabbit in the attraction and nutrition of *Anopheles maculipennis*. This *Anopheles* during its period of activity in the spring seeks the blood of mammals as food, with a marked preference for the blood of the domestic rabbit. In the presence of man, cattle, horses, pigs, fowls, and rabbits, the preference for the rabbit amounts to protection for man and other animals.

ROME.

Reale Accademia nazionale dei Lincei, January 2.—**Prof. V. Volterra**, vice-president, in the chair.—**G. Ciamician** and **C. Ravenna**: Influence of organic substances on plant development. The substances experimented on include pyrocatechin, guaiacol, morphine, codeine, theobromine, caffeine, atropine, and cocaine.—**B. Grassi**: Can *Anopheles* propagate malaria directly? At Fiumicino a baby a few months old caught malaria in a house visited eight days previously by an infected youth. In another case a woman recovering from the fever was visited by two friends, who stayed only a few hours in the house, but developed symptoms on returning to Rome. From examinations of the *Anopheles* in the district the author considers it doubtful whether infection could have taken place otherwise than by direct transmission, and hopes to test the matter by experiment with some individual who is willing to undergo the necessary tests.—**F. Bottazzi**: The posterior salivary gland of the Cephalopod, iv. Secretive activity of the gland under various experimental conditions.—**O. Lazzarino**: Equations of rotation about a fixed point of a solid with cavities filled with viscous liquids.—**C. Severini**: Integral equations.—**L. Tonelli**: Two propositions of Lindeberg and Levi in the calculus of variations, i.—**V. Sabatini**: Unity of the Vulsinio system. This system consists principally of two large craters, one of Latera and the other of Bolsena, the latter having no equally large counterpart in Europe. The probability of these having a common focus or communicating foci appears better justified than in the

parallel case of the Cimini system.—**G. Cotronei**: Causal morphology of eye development in the toad.—**E. Remotti**: Variations in the specific weight of eggs of Teleosteans during development in shallow or deep water.—**S. Sergi**: Vertebro-medullary topography of chimpanzee, ii.—**Prof. Castelnovo** was elected secretary of the Academy.

January 16.—**Prof. F. D'Ovidio**, president, in the chair.—**G. Pellizzari**: Synthesis of *o*-phenylenedicyanoguanidine from *o*-phenylenediamine.—**A. Comessatti**: Geometric theory of binary forms, iv. Typical representation of co-variants.—**S. Lefschetz**: "Sur le théorème d'existence des fonctions abéliennes."—**G. Castelnovo**: Abelian functions, i. Intermediary functions.—**E. Bompiani**: Metric invariants and co-variants in deformations of surfaces, iv.—**R. Serini**: Dirichlet's symmetrical cylinder problem.—**N. Paravano** and **C. Mazzetti**: Transformation of light into heavy magnesia. It is found that the change takes place at comparatively low temperatures, but the rate of transformation increases continuously with increase of temperature.

February 6.—**Prof. V. Volterra**, vice-president, in the chair.—Original contributions by fellows:—**C. Segre**: Foci of second order of infinite systems of planes, and hyperspatial curves with a double infinity of plurisecant planes.—**G. Ciamician** and **R. Ciusa**: Constitution of benzol and heterocyclic nuclei.—**G. Bruni**: Solubility of crystalline substances in caoutchouc. Caoutchouc can be regarded as a thick liquid and its solvent power varies, being greatest for the aromatic series and least for minerals. Vulcanised rubber has the character of a saturated solution of sulphur in presence of free sulphur.—**F. Millosevich**: Minerals of Latian province. During excavations in the Peperino at Albano melilite was discovered in some blocks in crystals of somewhat exceptional purity.—Papers communicated by fellows:—**Prof. A. Lo Surdo**: Synthetic helium and neon.—**Dr. M. Ferrari**: Beryl from Piona (on the left bank of the Lake of Como near Colico).—**C. Jucci**: Uric deposits in the fat of Termites.—The chairman, **Prof. Volterra**, announced the death of **Prof. Giuseppe Colombo** on January 16. The Academy has also lost the foreign fellows, **Profs. Waldeyer** and **Federow**. **Prof. Mattiolo** contributed a notice of the work of the late **Prof. Pier Andrea Saccardo**. For the Royal prize for astronomy four candidates submitted lists of papers. The chairman announced that a prize had been offered by the King in commemoration of the late **Prof. Augusto Righi** for the best work on experimental physics contributed by one of **Prof. Righi's** former pupils at Bologna.

Books Received.

Tidal Power. By **A. M. A. Struben**. (Pitman's Technical Series.) Pp. xii+115. (London: Sir I. Pitman and Sons, Ltd.) 2s. 6d. net.

Continuous Wave Wireless Telegraphy. By **Prof. W. H. Eccles**. Part i. Pp. vii+407. (London: Wireless Press, Ltd.) 25s. net.

Social Decay and Regeneration. By **R. Austin Freeman**. Pp. xx+345. (London: Constable and Co., Ltd.) 18s.

The Alpha, Beta, Gamma Navigation Tables. By **H. B. Goodwin**. Pp. iv+54. (London: J. D. Potter.) 8s.

Annuaire de l'Académie Royale des Sciences, 1921. Pp. 452. (Bruxelles: M. Lamertin.)

Diagnosis of Protozoa and Worms Parasitic in Man. By **Prof. R. W. Hegner** and **Prof. W. W. Cort**. Pp. 72. (Baltimore, Md.: Johns Hopkins University.)