Calendar of Scientific Pioneers.

July 14, 1827. Augustin Jean Fresnel died.—An officer in the Corps des Ponts et Chaussées, Fresnel during the last twelve years of his life devoted himself to experimental and mathematical researches in optics. Like Young, he did much to establish the undulatory theory of light.

July 14, 1879. Sir Thomas Maclear died.—Trained as a doctor, through Admiral Smyth Maclear took up astronomy, and from 1833 to 1870 was Royal Astronomer at the Cape of Good Hope. Among other work was his extension of Lacaille's arc of meridian.

July 14, 1907. Sir William Henry Perkin died.—The discoverer in 1856 of the first of the aniline dyes, aniline purple or mauve, Perkin established a factory for its manufacture, and thus became the founder of the great coal-tar colour industry. His success, especially with the manufacture of alizarin, enabled him in 1874 to retire, after which he made important investigations of questions of chemical constitution. He was knighted at the jubilee of his great discovery.

July 17, 1878. Thomas Oldham died.—After holding the chair of geology at Trinity College, Dublin, Oldham in 1850 was appointed by the East India Company the first Superintendent of the Geological Survey of India.

July 17, 1899. Charles Graves died.—The successor of McCullagh in the chair of mathematics in Trinity College, Dublin, Graves contributed matnematical memoirs to *Crelle's Journal*, and served as president of the Royal Irish Academy.

July 17, 1912. Jules Henri Poincaré died.—Born in Nancy in 1854, Poincaré in 1908 was elected president of the Academy of Sciences of Paris, by which time he had written 1300 books and memoirs relating to pure mathematics, mathematical physics, astronomy, and philosophy.

July 18, 1650. Christoph Scheiner died.—A member of the Society of Jesus and an opponent of the views of Copernicus and Galileo, Scheiner was one of the earliest observers of sun-spots. He taught at Freiburg (Baden), Rome, and Ingolstadt, and was rector of a Jesuit college in Silesia.

July 18, 1819. Barthélemy Faujas de Saint-Fond died.—Attracted to natural history by Buffon, Faujas de Saint-Fond became professor of geology in the Jardin des Plantes. He travelled much, wrote a valuable work on extinct volcanoes, and was the first scientific writer to direct attention to the basalt pillars of the Isle of Staffa.

July 19, 1814. Matthew Flinders died.—Known for his important survey of the Australian coast, Flinders made observations on the compass, and to him we owe the "Flinders bar" for neutralising a ship's magnetism.

July 19, 1838. Pierre Louis Dulong died.—Dulong was director of studies at the Ecole Polytechnique, and in 1832 became one of the secretaries of the Paris Academy of Sciences. In 1819 with Petit he enunciated the law connecting the atomic weight of a substance with its specific heat.

July 19, 1882. Francis Maitland Balfour died.—Killed at the age of thirty-one when climbing Mont Blanc, Balfour had just been appointed to a newly created chair of animal morphology at Cambridge. His "Comparative Embryology" appeared in 1880–81.

July 20, 1819. John Playfair died.—An Edinburgh professor, Playfair's principal contribution to science was his "Illustrations of the Huttonian Theory of the Earth."

July 20, 1866. Georg Friedrich Bernhard Riemann died.—Successor of Dirichlet in the chair of mathematics at Göttingen, Riemann was one of the most profound mathematicians of his time. E. C. S.

Societies and Academies.

LONDON.

Geological Society, June 22.—Mr. R. D. Oldham, president, in the chair.—Dr. C. T. **Trechmann** and L. F. **Spath**: The Jurassic of New Zealand. The Jurassic beds of New Zealand comprise an important set of sediments, probably 10,000 ft. in thickness, exposed at certain points extending over the length of the North and South Islands. They follow the Trias with apparently perfect conformity. The affinities of the fossils from the Lower Lias to the Upper Jurassic formations are with those occurring in the Jurassic of the Argentine Andes, Western Australia, the Sula Islands, the Spiti Shales of the Himalayas, and the Jurassic deposits of Kutch. Descriptions of New Zealand ammonites from the British Museum collections, notably a small fauna of typically Mediterranean aspect, which is referred to the Middle Lias, were given.—F. **Dixey**: The norite of Sierra Leone. The norite of Sierra Leone constitutes a complex of which the oldest and most important member is an olivine-norite. The complex forms the mountainous mass which, with a narrow coastal plane of Pleistocene sediments, makes up the Sierra Leone peninsula. The norite was intruded in the form of a huge stock; it has no marginal or basic modifications, while its junction with older rocks is obscured by the Pleistocene sediments. The complex is probably somewhat later than Pre-Cambrian in age. The main intrusion of norite was invaded in succession by minor intrusions of younger norites, norite-pegmatite, beerbachite, norite-aplite, and dolerite. Features of the older norite are well-developed flow-banding, a series of binary and ternary intergrowths of the common minerals, and metamorphism due to the minor intrusions. Iron-ores occur in the norite as small masses, narrow schlieren, and disseminated grains; they are highly titaniferous. Sulphides and other economic minerals are rare or absent.

EDINBURGH.

Royal Society, July 4.—Prof. F. O. Bower, president, in the chair.—C. T. R. **Wilson**: Recent work on lightning and thunderstorms. A thundercloud may be regarded as a great electrical machine, and suggests such questions as the electromotive force developed by the machine, the current which passes through it, and the external distribution of the current. It is at present mainly from a study of the electric force at the ground during thunderstorms that we obtain information on these points. Records were shown of the changes in the electric field due to thunderstorms at a distance, and of the sudden changes produced by lightning discharges. From the results of automatic records of this kind it is concluded that in an average lightning flash a quantity of electricity amounting to about 20 coulombs passes, and that the potential difference required to cause the discharges is of the order of one thousand million volts. In addition to lightning discharges there may be considerable continuous currents maintained by the thundercloud. The electrical energy going to waste in a thunderstorm may amount to a million horse-power. A large part of the current maintained by the thundercloud may pass through the cloud from the ground to the conducting upper atmosphere, or from the upper atmosphere to the ground, and produce effects which are of importance in connection with the atmospheric electricity of fine weather, and possibly with terrestrial magnetism.—Prof. H. **Briggs**: The adsorption of gas under pressure. The author describes a series of experiments

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with different gases and with different adsorptive substances to ascertain the volume of gas adsorbed at pressures up to 100 atmospheres. The tests show that it is possible to increase the gas capacity of a cylinder, holding the gas under compression, if the cylinder be completely filled with coconut charcoal before the gas is pumped in. The reason for certain sudden outbursts of fire-damp in coal mines is stated to be due to the adsorption of that gas under pressure by the coal. In some cases millions of cubic feet of fire-damp have been suddenly discharged in mines when the equilibrium was disturbed.—Miss Elizabeth **Gilchrist**: The utilisation of solid caustic soda and the absorption of carbon dioxide. The experiments aimed at ascertaining the optimum condition for the absorption of carbon dioxide by solid caustic soda granules, especially with the object of improving that action in mine rescue apparatus. The absorption diminishes at temperatures approaching 0° C. and at temperatures exceeding 100° C. The behaviour of a caustic granule at or near the optimum condition is described, it being shown how the granule swells gradually, eventually becoming a shell of carbonate hollow within.—Miss Augusta **Lamont**: The development of the feathers of the duck during the incubation period. The external appearance and the internal structure of the feather-papillæ are figured and described, and special stress is laid on the distinction between pennaceous and plumaceous feathers during their earliest stages. The work is preliminary to further researches.—A. G. **Ramage**: Note on the conditions for mirage on the Queensferry Road. The surface of the road was remade in the spring of 1919 with road metal and liberal supplies of bitumen, and small pieces of quartz scattered on the top of the bitumen, the whole being rolled by a steam-roller. After this had been done no signs of the mirage, so common on this road the previous summer, made their appearance until August, and then but faintly. During the summers of 1920 and 1921, on bright days, mirage was again much in evidence, showing that a newly made road is not conducive to the appearance of the mirage phenomenon.

DUBLIN.

Royal Dublin Society, June 28.—Dr. F. E. Hackett in the chair.—Prof. T. **Johnson** and Jane G. **Gilmore**: The occurrence of a Sequoia at Washing Bay, Co. Tyrone. The conifer was found in the core of the coal-bore, especially in the zone between 890–930 ft. It is represented by wood, by shoots showing dimorphic foliage, by cones and pollen-grains. The authors find it to agree in all respects with *S. Couttsiae*, Heer, from the upper Oligocene of Bovey Tracey, Devonshire. They have also examined Baily's type material of *S. du Noyeri*, and refer it to *S. Couttsiae* as a possible variety. They describe one specimen showing the two types of foliage on the same shoot. The paper also contains an account of the distribution and characters of the stomata in Sequoias, recent and fossil.—P. A. **Murphy**: The sources of infection of potato tubers with the blight fungus, *Phytophthora infestans*. The results of field experiments in Canada and Ireland on the decay caused by the blight fungus in potato tubers, with particular reference to the rot which sets in after digging, are detailed. When blight rot is found in quantity in the pits in winter it does not owe its origin to the spreading of the disease from a few initially infected tubers. Many tubers not visibly diseased carry the infection with them to the pits. The source of infection has been traced to contact of the tubers at digging time with blighted, but partially living, foliage, and with contaminated surface soil. The conidia live in the soil for at least two weeks after the death of the tops, and such soil may be a dangerous source of infection.

PARIS.

Academy of Sciences, June 20.—M. Georges Lemoine in the chair.—H. **Andoyer**: The direct demonstration of a theorem of Tisserand relating to the development of the perturbation function.—E. **Houg**: The tectonic of the coast region between Saint-Cyr and Hyères.—C. **Richet**, Mlle. Eudonie **Bachrach**, and H. **Cardot**: The alternations between tolerance and anaphylaxy. Studies on the lactic ferment. Successive generations of the bacillus show at first a decrease in activity by small proportions of mercuric chloride in the culture media, then get accustomed and increase in activity (measured by the lactic acid formed), but lose this tolerance later, become sensitive, and are killed. With smaller doses of the poison there is at first an acceleration, then an anaphylactic phase, and finally death of the organism.—C. **Depéret** and M. **Solignac**: The Sahalian of northern Tunis.—M. **de Sparre**: The yield of turbines working with a variable head.—W. **Kilian** and F. **Blanchet**: The presence of a sub-alluvial sheet of thermal or mineralised water in the bed of the Durance, at Serre-Ponçon. These hot springs were discovered in the course of work carried out in connection with the construction of a hydro-electric power station. The water was saline, temperature 47° to 49° C.—B. **Gambier**: The deformation of surfaces and the Laplace equation.—L. **Dunoyer**: The complete chronophotographic determination of trajectories. The method is based on the simultaneous photography from two determined positions of the path of a luminous projectile.—A. **Sanfourche**: The absorption of the oxides of nitrogen by sulphuric and nitric acids.—L. **Guillet** and M. **Ballay**: Critical points due to hardening caused by wire-drawing. The hardened wire has a part annealed, and the electrical resistances of the annealed and unannealed portions are compared at various temperatures; the results are recorded on a differential curve. This electrical method is superior to the dilatometric and other methods in use.—A. C. **Vournazos**: A new magnesian hydraulic cement. A description of the preparation and properties of some cements produced from magnesia (magnesite calcined at a low temperature) and powdered pumice or silica.—M. **Baille-Barrelle**: Contribution to the study of the coking of Saar coals.—A. **Mailhe**: The catalytic decomposition of the polyhalogen derivatives of the paraffins. A study of the reduction of tetrachloroacetylene, tetrabromoacetylene, chlorodibromopropane, dichlorodibromoacetylene, and trichlorodibromoacetylene by hydrogen in presence of reduced nickel and barium chloride as catalysts. The product is always a halogen-substituted ethylene. When there are different halogens the bromine is first removed by the hydrogen.—J. B. **Senderens** and J. **Aboulenc**: The catalytic decomposition of the bromoacetic acids and of mixtures of bromine and acetic acid.—J. **Savornin**: Observations on the Palæozoic of Rabat, Morocco.—P. **Bonnet**: Mesocretaceous volcanic eruptions and their relations with the distribution of the facies in the Caucasian geosynclinals.—J. **Cvijić**: River platforms and erosion steps.—Mlle. Y. Boisse **de Black**: The "frane" of the Cère Valley.—A. **Treuthardt**: Some new measurements of the density of the air at Geneva. Some results of measurements carried out in 1917. The deviations observed are larger than the experimental error, and the values below the average (1·29269) were obtained when the barometric pressure was above the

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mean pressure for Geneva.—E. **Moles**, T. **Batuccas**, and M. **Payà**: The density of the air at Madrid and its small variations. The results of thirty series of measurements are given, each series comprising two or three observations. The mean is 1·29303, and the deviations are regarded as being outside the experimental error. In agreement with the Loomis-Morley hypothesis, the minima of density correspond with the maximum of atmospheric pressure and conversely.—L. **Blaringhem**: The pollen of flax and the degenerescence of the varieties cultivated for the fibre. The study of the quality of the pollen of isolated pedigrees, followed during several generations, is recommended for the selection of flax grown for the fibre.—C. **Porcher** and A. **Chevallier**: The distribution of the saline substances and the mineral elements in milk.—W. **Mestrezat** and Mlle. S. **Ledebt**: The compensating *rôle* of chlorides in its relations with the chemical composition of the body fluids.—P. **Chailley-Bert**, R. **Faillie**, and J. P. **Langlois**: The "second wind" of runners. Experiments are given showing that the "second wind" is brought about by a diminution in the respiratory exchanges, and that this diminution, the work remaining constant, is the result of a better adaptation of the subject, an improvement in the yield of the human machine.—H. **Piéron**: The importance of the peripheral phase in the margin of the variation of the times of sensorial latency as a function of the intensities of stimulation.—A. **Vandel**: The question of cellular specificity in *Polycelis cornuta*.—F. **Picard**: The determination of egg-production in *Pimpla instigator*. Experiments proving that the sight plays no part in the act of depositing the egg.—P. **Remy**: The action of the vapours of chloropicrin on *Argas reflexus*. This parasite of the pigeon has proved to be extremely difficult to destroy by the ordinary insecticides; it is now proved to be destroyed by the vapours of chloropicrin, the amounts required being small enough for practical use.—A. **Goris** and **A. Liot**: Observations on the culture of the pyocyanic bacillus on artificially defined media.—E. **Sergent** and M. **Béguet**: The mycosic nature of a new disease of the date-palm threatening the Morocco oases.

SYDNEY.

Linnean Society of New South Wales, May 25.—Mr. G. A. Waterhouse, president, in the chair.—T. G. **Sloane**: Revisional notes on Australian Carabidæ, pt. vi. The tribe Bembidiini is reviewed so far as the Australian fauna is concerned. The synonymy is given, and seven species of Tachys are described as new. The tribe, as represented in Australia, consists of five genera, of which only Illaphanus is peculiar to Australia; the five genera comprise fifty-eight species.—Dr. A. J. **Turner**: Revision of Australian Lepidoptera—Hypsidæ, Anthelidæ. Six genera, one of which is new, and fourteen species of Hypsidæ and seven genera and forty-seven species (twelve new) of Anthelidæ are described.—T. **Steel**: Ulmite, a constituent of black sandstone. A black friable sandstone which outcrops frequently on the coast of New South Wales consists of sand grains with a thin, dark-coloured coating. This coating is identical with humus extracted from soil.—W. P. **Hiern**: A new species and a new variety of Diospyros. A new species is described from New Caledonia, and a new variety of *D. samoënsis* from Apia, Samoa.

Books Received.

Power House Design. By Sir J. F. C. Snell. Second edition. Pp. xi+535. (London: Longmans, Green and Co.) 42*s*. net.

The Garden of Earth. By A. Giberne. Pp. xiv+178. (London: S.P.C.K.) 6*s*. 6*d*. net.

Mountain and Moorland. By Prof. J. A. Thomson. (Nature Lover's Series.) Pp. 176. (London: S.P.C.K.) 6*s*. net.

Engineering Steels. By Dr. L. Aitchison. (Reconstructive Technical Series.) Pp. xxxi+348+48 plates. (London: Macdonald and Evans.) 25*s*. net.

The Beloved Ego. By Dr. W. Stekel. Authorised translation by R. Gabler. Pp. xv+238. (London: Kegan Paul and Co., Ltd.) 6*s*. 6*d*. net.

Whitherward? Hell or Eutopia. By V. Branford. Pp. xv+116. (London: Williams and Norgate.) 2*s*. 6*d*. net.

Air Ministry: Meteorological Office. Professional Notes No. 19. Cracker Balloons for Signalling Temperature. By L. F. Richardson. (M.O. 240i.) Pp. 95–115. (London: H.M. Stationery Office.) 1*s*. net.

Diary of Societies.

THURSDAY, JULY 14.

ROYAL SOCIETY OF ARTS, at 8.—Prof. H. E. Armstrong and A. C. Klein: Paints, Painting, and Painters, with Reference to Technical Problems, Public Interests, and Health. (To be followed by a discussion.)

FRIDAY, JULY 15.

INSTITUTION OF PRODUCTION ENGINEERS (at Institution of Mechanical Engineers), at 7.30.—M. Lawrence: Production and the Engineer.

MONDAY, JULY 18.

ROYAL BOTANIC SOCIETY OF LONDON, at 3.—Prof. A. R. Bickerton: The Generic Simplicity and Great Importance of Basic Principles in all Scientific Work. III. The Importance of the Cosmic Theory of the Third Body.

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