Calendar of Discovery and Invention.

May 8, 1654.—One of the most striking demonstrations in physical science made during the seventeenth century was that of Otto von Guericke, who on May 8, 1654, before the assembled princes at Ratisbon, showed his great experiment with the big Magdeburg hemispheres which, when exhausted of air, could not be pulled asunder by sixteen horses.

May 8, 1795.—Though the planet Neptune was not discovered until 1846, yet it was shown as a star in Harding's Atlas of 1822, and on May 8 and 10, 1795, Lalande had also registered it as a star.

May 9, 1865.—The first application of hydraulic power to machinery was due to Lord Armstrong; but its application to machine tools was due to Tweddell who, on May 9, 1865, patented a hydraulic riveter for fixing the ends of boiler tubes. In the same year he also designed hydraulic riveting plant for a Newcastle firm, enabling machine riveting to be carried out at one-seventh of the cost of hand riveting.

May 10, 1752.—Dalibard, the French botanist, was the first to draw electricity from a thundercloud. By means of an insulated rod forty feet long fixed in a stand, on May 10, 1752, when a thundercloud was overhead, sparks were drawn from the rod, leading Dalibard to write, "Franklin's idea ceases to be a conjecture. Here it has become a reality."

May 11, 1671.—On this day Nehemiah Grew's "Anatomy of Plants begun" was read before the Royal Society and ordered to be printed. It was published the following year, and later was translated into Latin, French, and Italian. In 1682 it was incorporated in the author's larger work, "Anatomy of Plants." With Malpighi, Grew shares the honour of the foundation of plant anatomy.

May 12, 1881.—In the Berlin Exhibition of 1879 an electric railway, one-third of a mile long, was shown in operation, and similar demonstration lines were installed in other exhibitions. The first permanent electric railway was that from Berlin to Lichtenfelde, which was put into operation on May 12, 1881. Electricity at 100 volts was utilised, one rail being positive and the other negative.

May 13, 1731.—After spending some years in effecting improvements in reflecting telescopes, which led to their wide adoption, John Hadley turned his attention to instruments for measuring angles, and on May 13, 1731, read to the Royal Society a paper entitled "Description of an Instrument for taking Angles." By the introduction of the use of two mirrors, Hadley was for the first time able easily to measure angles subtended by distant objects, independently of small changes in the position of the observer.

May 14, 1796.—Jenner's famous experiment in inoculation was made 131 years ago. He had long desired to try the passing of the vaccine virus from a human being to another by the ordinary mode of inoculation, and on May 14, 1796, a boy named Phipps was inoculated in the arm from a pustule on the hand of a dairymaid, Sarah Nelmes, who was infected by her master's cows. Writing a little later, Jenner said, "But now listen to the most delightful part of my story. The boy has since been inoculated for the smallpox which, as I ventured to predict, produced no effect."

May 15, 1836.—It was during the annular eclipse of the sun of May 15, 1836, that Francis Baily saw the phenomena called "Baily's Beads," of which he gave a very striking description. Though in later eclipses the "Beads" were not so vividly seen, Baily's account did much to stimulate attention to the physical aspects of solar eclipses. E. C. S.

Societies and Academies.

LONDON.

Royal Meteorological Society, Mar. 20.—R. A. Watson Watt: The range of atmospherics (Report of the Committee on Atmospherics and Weather). The distances over which an atmospheric may produce disturbance of broadcast reception was discussed. The Committee organised experiments in which observers in the British Isles, Norway, Germany, France, Spain, Morocco, and Madeira recorded disturbance of broadcast talks, while the sources of the atmospherics were identified by radio position-finding by the organisation set up by the Department of Scientific and Industrial Research on the advice of its Radio Research Board. Many of the sources were found to lie in regions of meteorological disturbance. Atmospherics from beyond the Azores have disturbed the reception of Daventry's signals in Paris and of London's signals in Aberdeen, and a thunderstorm at Rome disturbed reception in Spain, France, Madeira, the British Isles, and Norway. Many atmospherics are heard at distances exceeding 1800 miles from their sources, and may reach at least 4500 miles. There is no evidence of the presence of many atmospherics with a short range of disturbing effect.

Geological Society, April 6.—Vincent G. **Glenday** and John **Parkinson**: The Kateruk series and associated rocks of the northern Suk Hills (Kenya Colony). A series is described of completely metamorphosed sediments which crop out on or near the Kateruk River, an eastward-flowing tributary of the Turkwal River, situated about 30° 15′ long. E. and 2° 37′ lat. N., in the north-western part of Kenya Colony. The rocks consist of the metamorphosed representatives of various sedimentary deposits, ashes being included. The constituents indicate a somewhat lower grade of metamorphism than those of the Turoka series of the south, and may prove to be slightly younger.—H. L. **Hawkins** and Miss S. M. **Hampton**: The occurrence, morphology, and affinities of the Silurian Echinoidea Echinocystis and Palæodiscus. Church Hill Quarry, near Leintwardine, was re-opened, and a careful record of the sediments was made. A column of rock was excavated to a depth of 12 feet 6 inches from the surface. The beds traversed are all calcareous flaggy mudstones, varying slightly in lime-content. Ripple-marked surfaces were found at two horizons. Fossils are very rare, except in congested bands. The series seems to have accumulated in shallow lagoon-water, and the indigenous fauna of echinoderms and Lingulæ was periodically reinforced by brachiopods, pteropods, and graptolites drifted in during storms. New material of Echinocystis and Palæodiscus, including specimens which show obverse and reverse casts, and others showing upper and under surfaces of the test, has made it possible to solve many of the problems associated with the genera. Echinocystis is revealed as a typical perischœchinoid, with a normal endocyclic apical system and an advanced complexity of ambulacral structure. In Palæodiscus, the indications of an endocyclic apical system seem convincing. The reputed 'Asteroid' ambulacral plates are knob-like ingrowths from the perradial zones of the otherwise normal plates. Both genera are claimed as advanced perischœchinoids—far too specialised to show pre-echinoid features.

Society of Public Analysts, April 6.—C. Ainsworth **Mitchell** and T. J. **Ward**: The sequence of strokes in writing. Systematic experiments have been made to determine to what extent one may trust to the appearance of one of two intersecting lines being

uppermost as a proof that it was made more recently than the other. The appearance coincides with the fact in the case of insoluble opaque pigments such as lead pencil, but is deceptive with a transparent pigment such as an aniline dye. The relative position of lines made with writing inks which undergo oxidation, and thus form an opaque insoluble pigment, can usually be accurately determined, but if the ink has been blotted the observation is, as a rule, untrustworthy.—D. W. Kent-Jones and C. W. Herd: (1) Observations on the washing of gluten from flour. The use of a special washing solution does not eliminate the errors inherent in gluten determinations. Even when the same amount of washing water is used and the same procedure followed, personal differences in the manipulation of the dough and gluten cause large variations in the result. Each operator, however, gets essentially consistent results, which means that the ratio between the nitrogen of the flour and the dried gluten is approximately constant for each worker. (2) A numerical expression for the colour of flour. The yellow colouring matter is extracted by means of petroleum spirit, and its colour measured in a special form of colorimeter. This figure indicates the natural whiteness, or alternatively, the artificial bleaching of the flour. The grade of the flour may be judged by the amount of the reddish-brown pigment present which, presumably, comes from the finely powdered offal. This pigment is determined in the colorimeter after extraction with alkaline methyl alcohol.—H. B. Dunnicliff and Kishen Lal: The determination of free mercury in commercial products. The main constituents of the substance containing free mercury are removed by extraction with a suitable solvent. The residue is treated with bromine water, the resulting mercuric bromide is dissolved in alcohol, and the mercury is precipitated as mercuric sulphide, which is filtered off and weighed in a Gooch crucible.

PARIS.

Academy of Sciences, Mar. 28.—G. Friedel: The recent controversy between MM. Hettich and Valéton. Holoaxial hemihedral forms do not necessarily imply the hemihedry of the crystal.—Norbert Wiener: A new method for the demonstration of Tauber's theorems.—Julius Wolff: A generalisation of a theorem of H. Jentzsch. — Sugot: The gyroscopic movement of the projectile near the mouth [of the gun].—R. Mazet: The flow of a liquid starting from rest in a liquid of the same density in steady motion.—Huguenard, Magnan, and V. Sainte-Laguë: The kinematographic determination of the polars in the flight of birds, gliders, and aeroplanes.—E. Carafoli: The movement round a plane plate in rotation.—Louis Breguet: Long flights without stops and the distance record in an aeroplane. — Rateau: Observations on the preceding note.—Th. De Donder: The physical interpretation of the equation of quantification of continuous systems.—Jean Jacques Trillat: The analytical interpretation of the X-ray spectra of the fatty acids and their mixtures. The same spectrum is always obtained from a pure or nearly pure acid if the preparation is made by fusion on a glass plate or by evaporation from an alcoholic solution. With mixtures of fatty acids the position of the lines cannot be predicted from the known proportions of the constituents. The study of a mixture of fatty acids fused on glass does not give the qualitative composition of the mixture, but more definite results are obtained when lead is substituted for glass.—A. Boutaric and Mlle. G. Perreau: The possibility of modifying at will the electrical sign of colloids.—Maurice Lecat: Formulæ for predicting the azeotropic constants of systems formed of an alcohol and an alkyl halide.—René Girard: The action of complex saline solutions on the ferrous metals. With a mixture of salts in solutions, such as an artificial sea water, the net result depends on the texture of the corrosion products.—Marcel Godchot: Some syntheses of glycols containing the ether oxide grouping. —André Kling and Daniel Florentin: The hydrogenation of naphthalene and of anthracene at a high temperature and under high pressure in the presence of non-hydrogenating catalysts. Results of experiments are tabulated shewing effects, on yields and nature of hydrocarbons produced, of varying pressures of hydrogen, and also the effect of adding a catalyst.—Barré: A new method of preparing α-ketonic acids. The interaction of ethyl magnesium bromide on ethyl diethyloxamate, $C_2H_5 . O . CO . CO . N(C_2H_5)_2$, gives rise to two products, the diethylamide of α-ethyl-α-oxybutyric acid $(C_2H_5)_2 C(OH) . CO . N(C_2H_5)_2$, and the diethylamide of propionyl formic acid, $C_2H_5 . CO . CO . N(C_2H_5)_2$, and the reaction can be modified to give either of these as the principal product by varying the temperature and the proportion of the magnesium compound. Propionyl formic acid can be obtained with good yields by hydrolysis of its diethylamide, and this method for the preparation of α-ketonic acids is more advantageous than those hitherto in use.—A. Wahl and Féricéan: Disulphisatide. Experiments are given proving that the double formula, $C_{16}H_{12} . O_2 . N_2S_2$, is more probable than the single formula, $C_8H_7 . ONS$ suggested by Sander.—J. Campardou: The general preparation of hydrocarbons by the reduction of organic substances. The use of carbon and carbon monoxide. A description of a general method of reduction based on the action of carbon monoxide at 400°-450° C., in the presence of wood charcoal as a catalyst.—A. Demay: The mylonitic zone of Grimaud and the prestephanian breaking away of the western part of the Maures massif.—Georges Mouret: The geological constitution of the Arnac-la-Poste region (Haute-Vienne).—H. Colin: The formation of sugar in the beet.—R. G. Werner: Compulsory symbiosis or independent life of the fungi of lichens.—Jacques Rollet: Histological researches on testicular grafts in mammals (white rat). The observations cited show that there is never a true graft.—A. Gurwitsch and Mme. L. Gurwitsch. The secondary mitogenetic radiation.—Ch. Achard, A. Grigaut, and A. Leblanc: The lipoid equilibrium of the blood serum.

ROME.

Royal National Academy of the Lincei, Feb. 6.—G. Armellini: Horizontal diameter of the sun in 1925 and 1926. The results of three observers give for the horizontal radius of the sun at its mean distance from the earth the mean value 16′ 0·63±0·04″ for 1925 and 16′ 0·09±0·04″ for 1926, the value being 16′ 1·03±0·04″ for 1924. These results confirm the gradual diminution in the solar diameter corresponding with the maximum of sun-spots occurring in 1927–1928.—L. Petri: The presence in plants of a substance which becomes luminescent in ultra-violet light. This substance, previously noted, withstands dry heat at 170° C. but is destroyed by incineration of the plant tissues. It occurs most abundantly in those organs capable of effecting the photosynthetic assimilation of carbon and possibly constitutes a factor necessary to such assimilation, although it is not an integral part of the pigments contained in the chloroplasts. It is found in subterranean organs, but only in those which form chlorophyll if exposed to light.—M. Picone: 'Majoration' of the integrals of elliptico-parabolic linear equations with partial derivatives of the second order.—E. Bompiani: The geometry of Laplace's equation.—Arturo Cecconi:

A theorem on the work of elastic deformation.—B. **Caldonazzo**: An observation concerning viscous motion symmetrical with respect to an axis.—A. **Weinstein**: The theorem on the existence of liquid jets.—G. **Rossi**: Observations on the scintillation of the stars at the Royal (Italian) Observatory, Campidoglio. The phenomenon of scintillation oscillates about a mean condition in accordance with laws analogous to those governing so-called casual phenomena.—A. **Carrelli**: The summation theory of Thomas and Reiche.—G. **Piccardi**: Order number, excess weight, and atomic structure. Chemico-physical considerations concerning the relations between atomic number and atomic weight, in conjunction with astro-physical considerations, lead to the hypothesis that the excess positive and negative electrons, represented by the difference between the atomic weight of an element and twice its atomic number, are arranged outside of the atomic nucleus. It seems possible to formulate a complete theory of isotopes on this foundation.—G. R. **Levi** and A. **Reina**: Peptisation of 'meta' thorium oxide. Investigation of the process of peptisation of thorium oxide by X-ray analysis shows that the 'meta' variety of this compound has a distinctly higher degree of subdivision than the ordinary product, and that this process involves no further subdivision of the separate crystalline granules and no increase of the interatomic distances.—G. **Bozza** and G. **Devoto**: Calculation of the chemical affinity on the basis of entropy.—G. **Ponte**: Temperature of laval percolations from Etna. Consideration of the observations recorded by previous investigators indicates that the temperature in the bed of the flow of a stream of lava is transmitted slowly and may rise considerably in the central part where the movement is greatest, that is, where fresh hot lava is continually arriving. The extent of the cooling at the surface naturally depends on a number of factors.—P. **Principi**: Miocene strata between the valleys of the Lamone and Bidente.—D. **Rosa**: A possible variant of hologenesis.—**Darwin Wen**: New experiments on the hereditary behaviour of the capacity of the egg for development. Parthenogenesis in crosses between uni- and bi-voltine races of *Bombyx mori*.—G. **Cotronei**: The systematic biology of Petromyzon.—U. **D'Ancona**: Growth of the Tiber shad. The curve representing the length of this fish in relation to its age resembles a parabola, whereas the weight-age curve is analogous to that representing autocatalytic reactions according to Robertson's equation, $\log x/A - x = K(t - t_1)$. Hence, the value of k in the equation, $P = kL^3$, where P is the weight and L the length, varies with the age. The growth in length varies during different months of the year in a manner represented approximately by a sinoidal curve, which is superposed on the parabola showing the annual growth. The growth in weight also exhibits oscillations with an annual period, the amplitude being small before the attainment of sexual maturity, and considerable afterwards.

VIENNA.

Academy of Sciences, Mar. 10.—H. **Mache**: Nernst's heat theorem and the impossibility of attaining absolute zero.—A. **Kieslinger**: (iii) The stone-ovens (*Steinöfen*) of the Kor Alp region; (iv) Old and young disintegrations in the Kor Alp region.—H. **Herrmann**: The behaviour of frog's lymph towards blood of another species.—J. **Pollak**, K. **Deutscher**, and M. **Krauss**: The course of Leuckart's xanthogenate reaction.—E. **Blumenstock-Halward**: The action of aqua regia on fluorine.—O. **Lustig** and E. **Katscher**: The action of chlorosulphonic acid on aromatic amines.—J. **Warkany**: (i) The problem of the destruction of lactic acid by erythrocytes; (ii) The methods of determining lactic acid in urine.—J. **Lense**: A contribution to the geometry of the sphere.

Mar. 17.—F. **Quittner**: The electrolytic conductivity of glass at high voltages.—L. **Moser** and M. **Niessner**: The determination and separation of rare metals: (ix) Beryllium from aluminium. Aluminium can be precipitated along with ferric hydrate, which acts as a flocculating agent. Replacing iron by tannin, the tannin can be used to bring down the aluminium, whilst ammonium acetate retains the beryllium in solution as a complex salt.—H. **Neudorfer**: The analysis of the principal tangent curves on algebraic net-surfaces.—A. **Smekal**: Further investigations on deformed crystals of rock-salt.

Official Publications Received.

BRITISH.

Memoirs of the Geological Survey of India. Palæontologia Indica. New Series, Vol. 10, Memoir No. 1: Palæozoic and Mesozoic Fossils from Yun-nan. By Dr. F. R. Cowper Reed. Pp. iv+331+vi+20 plates. (Calcutta: Government of India Central Publication Branch.) 20.9 rupees; 32s.

Report of the Kodaikanal Observatory for the Year 1926. Pp. 4. (Calcutta: Government of India Central Publication Branch.) 6 annas.

University of Glasgow. Reports on the Hunterian Collections for the Year 1925-26. Pp. 7. (Glasgow.)

The Half-Yearly Journal of the Mysore University. Vol. 1, No. 1, January. Pp. 92. (Bangalore.) 2 rupees.

Memoirs of the Department of Agriculture in India. Botanical Series, Vol. 14, No. 3: Sugarcane Breeding—Indications of Inheritance. By Rao Saheb T. S. Venkatraman. Pp. 113-129+6 plates. (Calcutta: Government of India Central Publication Branch.) 8 annas; 10s.

Rhodesian Museum, Bulawayo. Twenty-fifth Annual Report, 1926. Pp. 15. (Bulawayo.)

The Snake Park, Port Elizabeth. By F. W. FitzSimons. Pp. 32. (Port Elizabeth: Port Elizabeth Museum.)

Institution of Chemical Engineers. Some Industrial Developments and the Chemical Engineer. Presidential Address by Sir Frederic L. Nathan delivered at the Fifth Annual Corporate Meeting of the Institution of Chemical Engineers, held at the Hotel Victoria, London, W.C.2, 11th March 1927. Pp. 7. (London.)

The Scientific Proceedings of the Royal Dublin Society. Vol. 18 (N.S.), No. 33: The Maintenance Requirements of Cattle on Different Rations and at Different Rates of Production; with a Note on 'Dynamic Action.' By James Wilson. Pp. 399-406. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) 6d.

Annual Report of the Auckland Institute and Museum for 1926-27, adopted at the Annual General Meeting held on 7th March 1927. Pp. 29. (Auckland, N.Z.)

Transactions and Proceedings of the New Zealand Institute. Vol. 57. Pp. x+1123+80 plates. (Wellington, N.Z.)

New Zealand: Dominion Museum. Bulletin No. 8: Games and Pastimes of the Maori; an Account of various Exercises, Games and Pastimes of the Natives of New Zealand, as practised in former Times; including some Information concerning their Vocal and Instrumental Music. By Elsdon Best. Pp. viii+191+67 plates. (Wellington, N.Z.)

The Scottish Forestry Journal: being the Transactions of the Royal Scottish Arboricultural Society. Vol. 41, Part 1, March. Pp. x+104+39. (Edinburgh: Douglas and Foulis.) 3s.

FOREIGN.

Statens Meteorologisk-Hydrografiska Anstalt. Årsbok, 6, 1924. 3: Vattenstanden vid Rikets kuster. Pp. ii+21. (Stockholm.) 2 kr.

Meddelanden från Statens Meteorologisk-Hydrografiska Anstalt. Band 3, No. 10: Sur la structure thermique de l'atmosphère au-dessus de la Suede méridionale; sondages faits par avion en 1924 et 1925. Par F. Lindholm. Pp. 42. 2.50 kr. Band 3, No. 11: De svenska vattendragens arealförhållenden. 4: Piteälv m.fl. Av Gustaf Wersén. Pp. 15. 1.50 kr. Band 3, No. 12: Recording Nocturnal Radiation. By Anders Ångström. Pp. 12. 1 kr. (Stockholm.)

U.S. Department of Agriculture: Weather Bureau. *Monthly Weather Review*, Supplement No. 28: Climatological Data for the Tropical Islands of the Pacific Ocean (Oceania). By W. W. Reed. Pp. iii+22. (Washington, D.C.: Government Printing Office.) 10 cents.

General Guide to the Exhibition Halls of the Peabody Museum of Natural History, Yale University. Prepared by the Curators, edited by Clara M. LeVene. Pp. 54. (New Haven, Conn.) 25 cents.

Astronomical Papers prepared for the Use of the American Ephemeris and Nautical Almanac. Published by the Nautical Almanac Office, U.S. Naval Observatory, by direction of the Secretary of the Navy and under the Authority of Congress. Vol. 9, Part 3: The Orbit of Neptune's Satellite and the Pole of Neptune's Equator. Pp. ii+275-337. (Washington, D.C.: Government Printing Office.)

University of California Publications in American Archaeology and Ethnology. Vol. 22, No. 3: Washo Texts. By Grace Dangberg. Pp. 391-443. (Berkeley, Calif.: University of California Press; London: Cambridge University Press.) 65 cents.

Bulletin of the National Research Council. Vol. 11, Part 3, No. 57: Molecular Spectra in Gases. Report of the Committee on Radiation in Gases. Pp. 358. (Washington, D.C.: National Academy of Sciences.) 4 dollars.