

Calendar of Patent Records.

July 23, 1888.—J. B. Dunlop's patent for the pneumatic tyre is dated July 23, 1888. Though his invention had been anticipated in the year in which he was born, more than forty years earlier, by R. W. Thomson, the popularity of the bicycle at the later date provided a rapidly growing market for the new tyre, and it is on Dunlop's work and enterprise that the present industry is based.

July 24, 1874.—The game of lawn-tennis was gradually developed from the older games, tennis, rackets, and badminton, and its actual beginnings are hard to determine, but the first to formulate and codify definite rules and a lay-out for the court was Major W. C. Wingfield, who patented his game on July 24, 1874, under the name of 'Sphairistiké'. Wingfield's court was narrower at the net than at the serving lines, and this form was adopted by the M.C.C. committee when it published its rules in 1875, but the rectangular court with practically the present dimensions was general by 1877. The cloth-covered ball is due to John Heathcoat, the tennis-player.

July 25, 1698.—The first steam engine successfully to operate—for pumping water out of mines, one of the great problems of the day—was the invention of Thomas Savory, who was granted a patent on July 25, 1698, and published an account of the invention in 1702 in his book "The Miners' Friend". The life of the patent was extended for 21 years by Act of Parliament in 1699.

July 26, 1588.—Modern shorthand dates from the patent granted on July 26, 1588, for 15 years, to Dr. Timothy Bright, resident physician at St. Bartholomew's Hospital, which licensed him "to teache, imprynte, and publishe, or cause to be taughte, imprynted, and published, in or by character not before this time commonly knowne and used by any other our subjects". In the same year Bright published a description of the system in his book "Characterie. An arte of shorte swifte and secrete writing by character". A specimen, dated 1586, is in the Lansdowne MSS. in a communication to Sir Robert Cecil.

July 26, 1810.—J. C. Dyer's patent for a nail-making machine, dated July 26, 1810, is an important landmark in the history of the nail industry. There was considerable difficulty in getting the machine adopted, but finally a company was formed in London to work the invention and works were opened. By 1817, the machine-made nails had become a serious competitor in the market, as is evidenced by a petition to the House of Commons, which, referring especially to Dyer's factory, directed attention to "the ruin of the trade and devastation of the country" that was being brought about by the new industry.

July 26, 1811.—A patent was granted on July 26, 1811, to Henry James and John Jones for a method of welding gun-barrels by means of a series of hammers and for a lathe for turning barrels instead of grinding them. Jones was later employed by the Russian government in the State Arsenal, where he re-designed all the machinery and organised the factory on the 'interchangeable' system.

July 26, 1907.—The Garratt articulated locomotive, which provides a very flexible engine and allows of a wide increase in the steam-generating capacity within the limits imposed by the width of the track and the loading gauge, was invented by H. W. Garratt, of London, and patented by him on July 26, 1907. The first engine of the type was made by Beyer, Peacock, and Co., in 1909, for the Tasmanian Government railways, and the development has since been continuous and rapid.

Societies and Academies.

LONDON.

Geological Society, June 12.—E. Mackenzie Taylor: Base exchange and its bearing on the formation of coal and petroleum. The discovery of a bed of vegetable debris containing both peat and fusain under a layer of alkaline soil in Egypt led to the investigation of the effects of the presence of sodium-clay upon the decomposition of organic matter by bacteria. The alkaline soil was shown to be a sodium-clay produced by base exchange between the clay and solutions of sodium chloride. As the result of hydrolysis, a continuously alkaline medium under anaerobic conditions was produced in which continuous bacterial action is possible as the acidic products of such action do not accumulate. Lignocellulose decomposes under these conditions, yielding a material with fusain properties. The decomposition of proteins and fats takes place in the alkaline medium, and, in addition, it has been found possible to decompose free organic acids by bacteria under these conditions. It was suggested that coal and petroleum have both resulted from the decomposition of organic matter by bacteria, under the alkaline anaerobic conditions provided by strata which have undergone base exchange with solutions of sodium salts and subsequent hydrolysis in fresh water. The conditions provided by such strata are favourable to continuous bacterial action, to the elimination of oxygen from the material, and to the accumulation of the decomposition products as the result of the sealing of the organic deposit.

Physical Society, June 28.—Teresa J. Dillon: The relation between hydrogen pressure and filament resistance in a tube containing glowing tungsten. When a tungsten filament in a tube containing hydrogen is caused to glow, the gas rapidly disappears while the resistance of the filament rises progressively. The latter phenomenon can be used to measure the pressure of the hydrogen. Chemical action probably takes place between the hydrogen and tungsten.—Francis Lowater: The band systems of titanium oxide. The bands extend toward the infra-red through some 800 Å. farther than the range previously known. Bands in the orange, red and infra-red regions have been analysed into two systems, distinct from the blue-green system, one of these being due to the transition ${}^1\Pi \rightarrow {}^1\Sigma$, the other to ${}^3\Sigma \rightarrow {}^1\Pi^3$, the latter having the same final energy level as the blue-green system ${}^3\Pi \rightarrow {}^1\Pi^3$.—F. D. Smith: The absolute measurement of sound intensity. The sound is received with a moving coil receiver. The signal heard after suitable amplification is compared with the signal produced by a small known electromotive force applied to the receiver. When the two signals are equal in intensity a simple relation connects the total sound pressure on the receiver with the electromotive force. The phase of the sound can be determined with the aid of a phase-shifting transformer. Since the measurement is independent of the amplifying circuit, it is possible to use a high degree of amplification and very feeble sounds may therefore be measured.

LEEDS.

Philosophical Society, June 17.—R. Stoneley: Love waves of short wave-length. The calculation of the velocity of propagation of transverse surface waves involves a knowledge of the rigidity and density of the medium at all depths. The velocity of very short waves, however, is determined mainly by the properties of the layers near the surface; an asymptotic formula for such waves is developed which depends

on the surface values of the rigidity and density and of their gradients.—**A. O. Allen**: A simplified derivation of v. Seidel's aberration formulæ (2).—**E. C. Stoner**: Diamagnetism and space charge distribution. The diamagnetic susceptibilities corresponding to the space charge distributions obtained by the Hartree self-consistent field method are calculated for He, Li⁺, Na⁺, K⁺, Rb⁺, and Cl⁻. Except for Cl⁻, there is very satisfactory agreement with experiment.—**R. Whiddington**: (1) Some new discharge tube phenomena. Experiments are described using a straight argon-filled discharge tube showing moving striations. There are at least four types of moving striations from flashes possible at one pressure, the type produced depending on the current employed. The change from one type to another is accompanied by an unstable system which is described but not explained. With a steady source of potential applied to the tube, the majority of the current is steady, but superposed on this steady current is a slight flicker amounting to a small percentage only of this whole current. Oscillograph measurements of this flicker show interesting variations of wave form with change of total current. These changes again are described but not explained. (2) A note on the use of the cathode ray oscillograph. A cathode ray oscillograph is often used for indicating the wave form of alternating currents by the associated use of a winking Osglim lamp. The winking frequency and the alternating current frequency must bear some simple integral ratio for this method to be applicable. For certain experiments it was found desirable to superpose a time mark of 50,000 frequency on that of the Osglim lamp so that the trace corresponding to the alternating wave would be segmented at equal time intervals, presenting an appearance somewhat like that of a string of beads. A method of carrying this out is described in which an oscillating valve circuit of about the desired frequency is suitably linked to the lamp, the frequency ratio of the two being again some simple multiple.—**R. Gane**: Carbohydrate content of detached partially shaded leaves. Sucrose and reducing substances are estimated in the distal, median and proximal portions of leaves isolated from the plant; the median portions had been shaded, whilst the rest of the leaf had been exposed to light. Certain differences in the sugar content then found in the leaf seem to be associated with the shading, but the differences do not seem adequate to explain the complete failure of starch to appear in the shaded strip. The distribution of sugars in plantain leaves thus treated, and in those in which the main veins had been removed, suggests that sugars can still move into the shaded region from illuminated ones, in spite of the dislocation of the vein system.—**W. Garstang**: On the dextricolic condition in Tunicates. The author republishes two figures from Barrois which establish the dextricolic condition of *Anchinia* buds, recently disputed by Van Wijhe. Their 'neural cord' is a 'neurogenital cord', comparable with that of *Aplidium* (Brien), but lying in a dextral, instead of a sinistral loop of the gut,—a complete *situs inversus*. The key to this condition is sought in the origin of salps and doliolids from colonial (pyrosomatoid) ancestors, and in the part played by subsequent rearrangements of the gut in balancing the body of free zooids for a locomotive career.

PARIS.

Academy of Sciences, June 10.—The president announced the death of M. Georges Lecoq, *correspondant* of the Academy for the Section of Geography and Navigation.—**Maurice Hamy**: A particular case of diffraction of the solar images at the focus of a

telescope. It has been shown in earlier communications that the problem requires the calculation of some very complex double integrals. The evaluation of one of these integrals is dealt with in the present paper.—**Charles Moureu, Charles Dufraisse, and Léon Enderlin**: Researches on rubrene. A new oxide of rubrene. It is known that rubrene can fix a molecule of oxygen giving the oxide RO₂, readily dissociable into rubrene and oxygen. The preparation of another oxide, RO, is now described. This is more stable, is not dissociable into its constituents, but can be reduced to rubrene with ordinary reducing agents. It cannot be converted into the oxide RO₂. There is a close analogy between rubrene, the oxides RO₂, and RO and hæmoglobin, oxyhæmoglobin and methæmoglobin. It is concluded that the characteristic properties of hæmoglobin are not necessarily due to the presence of an atom of iron.—**V. Grignard and Tchéoufaki**: New researches on the additive properties of the α -diacetylene hydrocarbons. Experiments on the products formed by the addition of bromine, hydrobromic acid, and hydrogen to these diacetylene derivatives.—**Jules Drach** was elected a member of the Section of Mechanics in the place of the late J. Boussinesq.—**A. Gelfond**: Picard's theorem.—**Josef Mikuláš Mohr**: The absolute velocity of the sun.—**P. Salet**: The constancy of the velocity of light.—**Holweck and Lejay**: The preliminary study of a quartz tuning fork in a high vacuum. In the apparatus described, once the fork is started in oscillation, several hours elapse before the amplitude of the oscillations is reduced to one-half. The period was proved to be independent of the amplitude and constant within the limits of the accuracy of the measurements, about 0.0001 sec. Possible applications of the instrument are suggested.—**C. Raveau**: The rule of the four directions: Chatelier's principle.—**Henri Chaumat**: Electrostatic machines working with condensers.—**Gaston Rapin**: Attempts at the direct electrolytic preparation of ammonium permanganate. With an anode formed of silico-manganese in an ammoniacal solution, ammonium permanganate can be prepared directly, but on account of the low electrical conductivity of the ammonia solutions the method is of theoretical value only.—**S. Rosenblum**: The fine structure of the magnetic spectrum of the α -rays. The α -rays emitted by the radioactive substances radium-A, -C' and thorium-C' have been examined: the velocities of the α -rays attributed to these bodies are very homogeneous.—**F. Viès and A. Ugo**: Some properties of the electromotive forces developed in contact with aqueous solutions of electrolytes of variable pH and salinity.—**Georges Fournier**: A magnitude permitting a new classification of atoms. Neither the atomic number N , nor the atomic weight A , completely defines an atom. The quantity $U = \frac{3}{2}A - N$ is suggested and is regarded as representing its filiation capacity.—**Guy Emschwiler**: The action of the zinc-copper couple on methylene iodide. In ether solution, ethylene is evolved and an organozinc compound formed. The latter appears to be zinc-iodomethyl iodide, ICH₂ZnI. With iodine, methylene iodide is regenerated; with water, methyl iodide, zinc hydroxide and zinc iodide are produced.—**Henri Moureu**: The tautomerism of the α -diketones. Heat of transformation of the isomers. The heat of transformation of the α -diketones (methylbenzylglyoxal, phenylbenzylglyoxal) is of the order of 2.5 large calories per molecule. This was determined in two ways, one based on the thermodynamic relation between the heat of transformation and the thermal variation of the equilibrium constant, the other on the heats of combustion.—**Jacques Bourcart and A. Keller**: The geological

results of the Augiéras-Draper Sahara expedition (Cretaceous and Eocene).—Henri Erhart: The nature and origin of the soils of Madagascar.—Charles Rabot: The abnormal arrival of icebergs on the north coast of Norway. For the first time on record, numerous icebergs (from Nova Zembla or Franz-Joseph Land) have appeared on the north coast of Norway during May last.—R. Bureau: Pressure and temperature by radiotelegraphy.—Roger Heim: The vasiform apparatus (*hyphes*) of the Agaricaceae.—Robert Lemesle: The embryogeny of the Elatinaceae. The development of the embryo in *Elatine Alsinastrum*.—J. Loiseleur: The modifications of the collagen substances under the action of the radiation from radioactive bodies. The β -radiation of radium or of radon effects a profound alteration in the colloidal state of collagen substances; salts of the heavy metals (lead acetate, gold chloride) sensitise the collagen to the action of the radiation. The phenomenon is independent of the temperature between 0° C. and 37° C. and is proportional to the intensity of the radiation.—Lamberton: The Archæoindris of Madagascar.—Robineau and Contremoulins: Examples of syntheses and protheses in bone, in metal uncovered or covered with rubber, established on metroradiographic data. Observations continued over several years show that the tolerance of the organism is complete if the mounting on the bone is correctly carried out.

CAPE TOWN.

Royal Society of South Africa, April 17.—J. L. B. Smith and R. H. Sapiro: Some derivatives of thiazole.—G. E. Hutchinson, G. E. Pickford, and J. F. M. Schuurman: Report on the natural history of pans and other freshwaters of the Transvaal (see also NATURE, June 1, p. 832).—H. N. Dixon and H. A. Wager: New and noteworthy mosses from South Africa.—B. F. J. Schonland: Thunderstorms and the penetrating rays. The main feature of the instrument used is an electroscope in which the moving part is a very light mica mirror suspended by two fine strips of gold leaf. Measurements of the intensity of the penetrating radiation underneath five active thunderstorms did not differ appreciably from measurements made during periods of fine weather.—W. A. Jolly: On recording lymph-heart beats. The work was undertaken with the object of studying the action of the lymph-hearts in Anura when the conditions are as nearly as possible normal. The method employed is that of the optical lever. A minute fragment of silvered cover-glass is placed on the skin—to which it adheres—where the impulse is most distinct, and a beam of light reflected from this mirror is focussed on the slit of a photographic recorder furnished with a roll of sensitised paper. The beat of the lymph-heart recorded in this way is remarkably regular. The beat action is not continuous, but shows periods when it becomes very small or ceases altogether.

PRAGUE.

Czech (Bohemian) Academy of Arts and Sciences (second class, Natural Sciences and Medicine), April 12.—Fr. Ulrich: Variscite and barrandite from Třenice, near Zbiroh.—J. Švéda and R. Uzel: Determination of tin by rapid electro-analysis. After a critical examination of electro-analytical methods for tin, the authors have worked out as the most reliable (within 0.32 per cent tin) the procedure in which tin is deposited electrolytically from acid oxalate solutions of stannous and stannic salts in the presence of hydroxylamine.—J. Bašta: New aspects of the stability, resistance, and fragility of rails and wheels in railway engineering.

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May 31.—J. Wolf: The organic cement substance of the bone and of the dentin.—V. Tůma: Histological changes in rats during avitaminosis.—J. Janatka: The development, structure, and significance of the nucleus pulposus of the intervertebral discs.—J. Nešpor: Differentiation and de-differentiation of the tissue cultures from the viewpoint of the vitality measurements.—F. Chudáček: Calcification of the costal cartilages.—V. Janko: The insular tissue of the adult pancreas of the Cyprinides, its form and its relation to the excretory system.—M. Uher: The development of the nervous elements *in vitro*.—M. Mikan: A certain Cremona correspondence in quadri-dimensional space.—J. Sobotka: A contribution to the solution of the generalised problem of Apollonius.—J. Charvát and D. Gjurič: The cause of Basedow's glycosury.

ROME.

Royal National Academy of the Lincei, April 21.—V. Volterra: Observations on hereditary phenomena.—G. Loria: The scientific manuscripts of Francesco Siacci.—A. Tonolo: Classification of the surfaces of Hilbertian space, the 2-tangent space of which is of four dimensions (1).—L. Fantappiè: Linear functional equations in the complex field.—G. Mammana: Certain applications of the theory of the decomposition of linear and homogeneous differential expressions to the study of homogeneous linear differential equations.—Pia Nalli: Derivation of a tensor along a line.—A. Mambriani: A theorem relative to ordinary differential equations of the second order.—G. Scorza-Dragoni: A particular differential equation.—E. Pini: The existence of integrals of ordinary differential equations.—D. Pompeiu: The unicity of the prolongation of harmonic functions.—A. Palatini: Einstein's new theory. By means of his new theory, and starting from a principle of Hamilton with an appropriate universal function, Einstein has arrived at satisfactory analytical results. These are, however, only a first approximation, and the methods adopted do not render it easy to follow the corresponding exact equations, which have not yet been obtained. In the present note it is shown how, by the systematic use of known operations, without further formal complications, such equations are readily derivable.—L. Genovese: Comparison of the photographic magnitudes of various zones of the Astrographic Catalogue.—A. Belluigi: Simple and rapid processes of topographic correction.—C. Mineo: Relations between the parameters of terrestrial ellipsoids and the values of gravity.—I. Ranzi: Phenomena of negative resistance in a diode subjected to a magnetic field.—A. Occhialini: The charge of emission centres as shown by the polarity of the electrodes. The results of experiments with magnesium, mercury, and lead show that, for each element, the ratios between the lengths of the lines for positive and negative polarity are equal for lines emitted from centres having the same charge, and different, and increasing with the order of ionisation, for lines emitted from centres ionised differently. These results may be utilised for distinguishing spark lines according to the order of ionisation of the emitting atom.—S. Di Franco: Natrolite from Viagrande (Etna). Crystals of natrolite found in the cavities of a very old, reddish lava show the specific gravity 2.19-2.21 and the axial ratios $a:b:c=0.978523:1:0.353626$, which agree well with the measurements made by Brögger on Norwegian natrolite. No deviation in the direction of extinction is observable. Most of the water present in the mineral is expelled within a somewhat narrow range of temperature, namely, 290°-305°.—M. Comel: The

physiological action of strontium. Continued endo-muscular administration of strontium hexose-oxy-propionate to fowls causes a characteristic intoxication developed at the expense of the nervous system. The first symptom is wasting accompanied by a voracious appetite, nervous changes appearing later. The symptoms as a whole are reminiscent of those produced by lack of vitamin B and are to some extent attenuated by administration of this vitamin.—C. Guareschi: The ootocysts of anuran amphibia considered as a mosaic system.—S. Pastore: A special method of staining malaria parasites.

Official Publications Received.

BRITISH.

City and Guilds of London Institute. Annual Report of the Council to the Members of the Institute, 1928. Pp. xlix+72. (London.)

Indian Central Cotton Committee: Technological Laboratory. Technological Bulletin, Series A, No. 12: Technological Reports on Standard Indian Cottons, 1929. By A. James Turner. Pp. iv+125. (Bombay.) 2 rupees.

Report of the Nineteenth Meeting of the Australasian Association for the Advancement of Science (Australia and New Zealand). Hobart Meeting, January 1928. Edited by Clive E. Lord. Pp. xl+707. (Sydney, N.S.W.)

Transactions of the Royal Society of Edinburgh. Vol. 56, Part 2, No. 14: Studies on the Scottish Marine Fauna; The Fauna of the Sandy and Muddy Areas of the Tidal Zone. By A. C. Stephen. Pp. 291-306. (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.) 2s.

Air Ministry: Aeronautical Research Committee. Reports and Memoranda. No. 1195: A Mechanical Method for Solving Problems of Flow in Compressible Fluids. By G. I. Taylor and Dr. C. F. Sharman. Pp. 21+1 plate. 1s. net. No. 1197 (Ae. 358): Wing Flutter Experiments upon a Model of a Single Seater Biplane. By W. G. A. Perring. (T. 2684.) Pp. 20+10 plates. 1s. 3d. net. No. 1216 (Ae. 375): The Lift and Pitching Moment of an Aerofoil due to a Uniform Angular Velocity of Pitch. By H. Glauert. (T. 2687.) Pp. 9+2 plates. 9d. net. No. 1219 (M. 59): Investigation into the Proposed Use of a Sand Cast Test Bar for Specification Purposes for Aluminium Alloys. By Dr. W. Rosenhain and S. I. Archbutt. Work performed for the Engineering Research Board of the Department of Scientific and Industrial Research. (A. 55.) Pp. 9. 6d. net. No. 1225 (Ae. 380): Wind Tunnel Tests of a R.A.F. 30 Wing fitted with a Self-setting Slotted Wing (Pilot Plane). By F. B. Bradfield and S. Scott Hall. (T. 2471.) Pp. 12+4 plates. 9d. net. No. 1226: The Characteristics of a Tapered and Twisted Wing with Sweep-back. By H. Glauert and S. B. Gates. (T. 2730.) Pp. 19+4 plates. 1s. net. No. 1235 (Ae. 391): The Control of the Fokker F. VII-3M Aeroplane. Interim Report by the Stability and Control Panel, with an Appendix giving Precipitous Pilots' Reports. (T. 2408.) Pp. 5. 4d. net. (London: H.M. Stationery Office.)

Cambridge Observatory. Annual Report of the Observatory Syndicate, 1928 May 19-1929 May 18. Pp. 3. (Cambridge.)

Journal of the Royal Microscopical Society. Series 3, Vol. 49, Part 2, June. Pp. 91-209+xvi. (London.) 10s. net.

Annals of the (Mededelingen van het) Transvaal Museum. Vol. 13, Part 1. Pp. 69+15 plates. Vol. 13, Part 2. Pp. 71-121. (Pretoria.)

Department of Scientific and Industrial Research. Report of the Forest Products Research Board, with the Report of the Director of Forest Products Research, for the Period ended 30th September 1928. Pp. v+71+10 plates. (London: H.M. Stationery Office.) 3s. net.

Association of Technical Institutions. Paper read at the Summer Meeting, June 27th, 28th and 29th, 1929, on "The Relation between the Technical College and the Local University", by Principal W. A. Richardson. Pp. 19. (Loughborough: Loughborough College.) 6d.

FOREIGN.

Proceedings of the Imperial Academy. Vol. 5, No. 5, May. Pp. ix-xii+183-221. (Tokyo.)

Instituto Central Meteorológico y Geográfico de Chile. Publicación No. 38: Anuario Meteorológico de Chile de 1925. Pp. iv+163. (Santiago.)

Statens Meteorologisk-Hydrografiska Anstalt. Årsbok, 10, 1928. 2: Nederbörden i Sverige. Pp. 160. (Stockholm.) 5.00 kr.

Jahresbericht der Hamburger Sternwarte in Bergedorf für das Jahr 1928. Erstattet von Dr. R. Schorr. Pp. 26+4 Tafeln. (Bergedorf.)

The Rockefeller Foundation. A Review for 1928. By George E. Vincent. Pp. 54. (New York City.)

Department of the Interior: Bureau of Education. Bulletin, 1929, No. 4: Illiteracy in the Several Countries of the World. By James F. Abel and Norman J. Bond. Pp. vi+68. (Washington, D.C.: Government Printing Office.) 15 cents.

Agricultural Experiment Station: Michigan State College of Agriculture and Applied Science. Technical Bulletin No. 98: Further Studies on the Value of Non-virulent Living Culture Vaccination of Cattle against Brucella Abortus Infection. By I. Forest Huddleson. Pp. 11. Chart Section of Technical Bulletin No. 98: Herd Charts. By I. Forest Huddleson. Pp. 15. (East Lansing, Mich.)

Smithsonian Miscellaneous Collections. Vol. 73, No. 6: Opinions rendered by the International Commission on Zoological Nomenclature. Opinions 105 to 114. (Publication 3016.) Pp. 26. (Washington, D.C.: Smithsonian Institution.)

Cornell University: Agricultural Experiment Station. Bulletin 470: Pollination of Greenhouse Tomatoes. By H. W. Schneck. Pp. 60. Bulletin 471: An Economic Study of Retail Feed Stores in New York State. By E. A. Perregaux. Pp. 61. Bulletin 472: Sizes of Purchasing Centers of New York Farm Families. By Helen Canon. Pp. 15. Bulletin 473: The Cost of Handling Fluid Milk and Cream in Country Plants. By C. K. Tucker. Pp. 119. Bulletin 474: The Fumigation of Greenhouses to destroy Insect Pests. By Glenn W. Herrick and Grace H. Griswold. Pp. 20. Memoir 118: Wheat Prices and the World Wheat Market. By Vladimir Prokopovich Timoshenko. Pp. 100. Memoir 119: Prices of Fertilizer Materials, and Factors affecting the Fertilizer Tonnage. By Edmund Ellsworth Vial. Pp. 159. Memoir 120: A Physiological Study of Dormancy in Vetch Seed. By John Paul Jones. Pp. 50. Memoir 121: Variation and Correlation in the Appendages of the Honeybee. By E. F. Phillips. Pp. 52. Memoir 122: The Effect of Freezing on the Catalase Activity of Apple Fruits. By D. B. Carrick. Pp. 18. Memoir 123: Three Rust Diseases of the Apple. By H. E. Thomas and W. D. Mills. Pp. 21. (Ithaca, N.Y.)

Proceedings of the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge. Vol. 68, No. 1. Pp. 68. (Philadelphia, Pa.)

The List of the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge. Pp. 28. (Philadelphia, Pa.)

The Science Reports of the Tôhoku Imperial University, Sendai, Japan. Second Series (Geology), Vol. 13, No. 2. Pp. 17-33+plates 9-10. (Tokyo and Sendai: Maruzen Co., Ltd.)

Proceedings of the United States National Museum. Vol. 74, Art. 11: Synopsis and Description of North American Tadpoles. By A. H. Wright. (No. 2756.) Pp. 70+9 plates. Vol. 75, Art. 1: Mammals from China in the Collections of the United States National Museum. By A. Brazier Howell. (No. 2772.) Pp. 82+10 plates. Vol. 75, Art. 24: Tertiary Fossil Plants from Colombia, South America. By Edward W. Berry. (No. 2795.) Pp. 12+5 plates. (Washington, D.C.: Government Printing Office.)

CATALOGUES.

Constable Announcements. Summer-Autumn 1929. Pp. 12. (London: Constable and Co., Ltd.)

The Cambridge Bulletin. No. 63, June. Pp. 24+4 plates. (Cambridge: At the University Press.)

Catalogue of Cine Cameras and Projectors. Pp. 16. (London: Sands Hunter and Co., Ltd.)

McGraw-Hill Books on Radio Engineering, Telegraphy and Telephony. (List 11, second edition.) Pp. 10. McGraw-Hill Books on Astronomy, Mathematics, Meteorology, Physics. (List 13, second edition.) Pp. 16. (London: McGraw-Hill Publishing Co., Ltd.)

Diary of Societies.

TUESDAY, JULY 23.

NEWCOMEN SOCIETY FOR THE STUDY OF THE HISTORY OF ENGINEERING AND TECHNOLOGY.—Summer Meeting at Dartmouth (jointly with the Devonshire Association) to Commemorate the Bicentenary of the Death of Thomas Newcomen (continued on July 24, 25, and 26).

THURSDAY, JULY 25.

ROYAL AERONAUTICAL SOCIETY (at Science Museum, South Kensington), at 9 P.M.—The Hon. W. P. MacCracken, jun.: Science in its Relation to Regulating and Promoting Civil Aviation (Wilbur Wright Memorial Lecture).

CONFERENCES.

JULY 23 TO 26.

BRITISH MEDICAL ASSOCIATION (at Manchester).

Tuesday, July 23, at 8 P.M.—Prof. A. H. Burgess: The Debt of Modern Surgery to the Ancillary Sciences (Presidential Address).

Wednesday, July 24, at 10 A.M.—Sections of Medicine, Surgery, Obstetrics and Gynaecology, Diseases of Children, Neurology and Psychological Medicine, Physiology and Biochemistry, Pathology and Bacteriology, Oto-Rhino-Laryngology, Ophthalmology, Radiology and Radio-Therapeutics, Venereal Diseases, Orthopaedics, Tuberculosis (also at 11.30 A.M.), Public Health (also at 11.30), Occupational Diseases.

Thursday, July 25, at 10 A.M.—Sections of Medicine, Surgery, Obstetrics and Gynaecology, Diseases of Children, Neurology and Psychological Medicine, Physiology and Biochemistry, Pathology and Bacteriology, Oto-Rhino-Laryngology (also at 11.30 A.M.), Ophthalmology, Anaesthetics, Dermatology, Radiology and Radio-Therapeutics, Venereal Diseases (also in afternoon), Orthopaedics, Tuberculosis (also at 11.30), Public Health, Occupational Diseases.

Friday, July 26, at 10 A.M.—Sections of Medicine, Surgery, Obstetrics and Gynaecology, Diseases of Children, Neurology and Psychological Medicine, Physiology and Biochemistry, Anaesthetics, Dermatology, History of Medicine, Medical Society.

At 7.30 P.M.—Prof. A. V. Hill: Experiments on Frogs and Men (Popular Lecture).

JULY 25 TO 31.

LEAGUE OF NATIONS UNION SUMMER SCHOOL (at New College, Oxford).

JULY 25 TO AUGUST 2.

FRENCH ASSOCIATION (at Havre).