

Calendar of Patent Records.

January 21, 1630.—The first patent to contain a direct proposal to raise water by fire was granted in England to David Ramsey, one of the grooms of the Privy Chamber, on Jan. 21, 1630. The patent recites a number of devices of which Ramsey claims to be the inventor, amongst which are "to raise water from lowe pitts by fire; to make any sort of mills to go without the helpe of wind, waite, or horse; to make boates, shippes, and barges to goe against strong winde and tyde; to rayse water from low places and mynes and coale pitts by a new waie never yet in use." No record of the details of these inventions is, however, available.

January 23, 1798.—Chlorine was first suggested as a bleaching agent for cotton goods by the French chemist Berthollet, and was so used by James Watt and others, but the establishment of the industry is mainly due to Charles Tennant of Glasgow, who patented his process for absorbing the gas in lime on Jan. 23, 1798. The patent was revoked four years later on the ground that Tennant was not the true inventor, but a second patent granted to him in 1799 for the production of bleaching-powder by impregnating slaked lime in the dry state with chlorine was more successful, and Tennant's works at St. Rollox, Glasgow, became the largest in the world.

January 23, 1849.—From the middle of the eighteenth century onwards, many proposals were made for the coking and industrial utilisation of peat, but the first large peat distillation factory was started by the Irish Peat Company at Kilberry, Co. Kildare, Ireland, to work the process invented by Rees Reece, for which an English patent was granted to him on Jan. 23, 1849. The process created great interest, and a Government Commission was appointed to investigate its possibilities, but the factory was compelled to close down a few years later.

January 24, 1578.—London was given its first water supply by Peter Morris, who was granted a patent for 21 years for his engine for raising water, on Jan. 24, 1578, and later obtained permission from the City Corporation to pump water from the Thames into the City by means of water-wheels placed in the arches of London Bridge and driven by the tide. The installation, completed in 1582, and enlarged from time to time by the addition of further water-wheels, furnished the City with water for 240 years, and only came to an end with the demolition of the old bridge in 1822.

January 24, 1730.—An important event in the history of chocolate-making was the patent granted to Walter Churchman of Bristol on Jan. 24, 1730, for an invention described as "a new invention and method for the expeditious, fine, and clean making of chocolate by an engine driven by a water wheel." The exact process was kept secret, but on Churchman's death the business was purchased by Joseph Fry, and thus became the starting-point of the well-known firm of J. S. Fry and Sons. The water-wheel was replaced by a Watt steam-engine before 1798.

January 26, 1796.—E. T. Jones, accountant of Bristol, was granted a patent on Jan. 26, 1796, for his "new-invented speedy and effectual method or plan for detecting errors in accounts of all kinds, and whereby such accounts will be kept and adjusted in a much more regular and concise manner than by any other method hitherto known." The patent would not presumably have stood the test of an action in the courts, but it no doubt served as an excellent advertisement for the pamphlet explaining his system, which Jones issued, with a licence to use it, at the price of one guinea.

Societies and Academies.

PARIS.

Academy of Sciences, Dec. 10.—Maurice Hamy: A consequence of a property of diffraction by a circular aperture.—Charles Moureu, Charles Dufraisse, and Marius Badoche: Autoxidation and antioxygen action. (33) The catalytic properties of antimony, bismuth, and their derivatives, and of some vanadium derivatives. The experimental results are summarised in eight diagrams. The catalytic properties of vanadium compounds were very marked.—L. Cayeux: The existence of fresh-water spongoliths in the Gard coal basin. The 'silex' of Doulovy is composed of spongoliths, exceptionally rich in spicules, and proves the existence of fresh-water sponges at a very remote period.—Gabriel Bertrand and Boje Benzon: The proportions of zinc in plants used for food. The leaves of plants contain zinc in amounts which increase with the proportion of chlorophyll present. Bulbs (garlic, onion) and seeds contain the highest percentages of zinc.—Riquier: A problem relating to the partial differential equation $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)u = f(x, y)$. — Jean

Baptiste Senderens: The catalytic dehydration of alcohols by alkaline bisulphates. Several dehydrations hitherto carried out with potassium bisulphate can be effected with greater facility with sodium bisulphate. Details of the preparation of cyclohexene from cyclohexanol are given.—Charles Nicolle, Charles Anderson, and Jacques Colas-Belcour: The experimental adaptation of recurrent spirochaetes to species of *Ornithodora* other than those which transmit them in Nature. The necessary conditions for success in these experiments are that nymphs must be used, since although adults can be infected they are incapable (with rare exceptions) of transmitting the spirochaetes by their bites, and to utilise for the infecting meal an animal the blood of which is rich in spirochaetes.—Serge Bernstein was elected *Correspondant* for the Section of Geometry.—Paul Delens: The calculus of spherical operations.—Marcel Vasseur: The deformation of a surface with a conical conjugated network.—Pierre Rivet: The contact of skew curves and of surfaces.—Mandelbrojt: A generalisation of a theorem of M. Hadamard.—Florin Vasiiesco: The nature of irregular and regular points and their distribution on the frontier of a domain.—Belzecki: Some cases of equilibrium of elasticity of a rectangular prism.—D. Pompeiu: A formula generalising Cauchy's integral and its interpretation in hydrodynamics.—Henri Bénard: Alternate vortices and the law of dynamic similitude.—G. P. Arcay: The influence of vibrations on the rate of chronometers. Vibrations bring about a change in the rate of the chronometer, usually a retardation, and part of this change in rate is permanent. The results of the experiments are given in detail.—Josef Mikuláš Mohr: The law of frequencies of the velocities of stars and the relation between the absolute magnitude and absolute velocity for *G*-type stars. The distribution of the frequencies of the absolute velocities of these stars, found by the author for 519 stars, is in agreement with the law of Adams, Strömberg and Jay, resulting from the study of type *K*.—R. Jarry-Desloges: The period of the planet Venus. The figure deduced is 23 hours 53 minutes, but this result is approximate only, since it implies no change in the markings on the planet during a terrestrial day.—E. Pierret: Oscillators with very short waves.—G. Grenet: The Hughes induction balance for the determination of the susceptibility of rocks. By the use of the methods and apparatus of wireless telephony, the sensitiveness of the Hughes

induction balance can be increased to a marked extent. The apparatus requires some tedious preliminary adjustments, but once set up, the determination of the magnetisation coefficient of a rock can be completed in five minutes.—Paul Soleillet: The theory of the polarisation of light emitted by fluorescence.—Mlle. Jacqueline Zadoc-Kahn: The refractive indices of a mesomorphic substance in the solid state. Details of the measurements of the three principal refractive indices of crystals of para-azoxyanisole. From the results, this is one of the most strongly doubly refractive substances known.—R. Coustal: The permanent luminescence of certain crystallised salts of uranium. Uranium salts have a faint permanent luminosity, visible only after the eye of the observer has been in complete darkness for thirty minutes or longer. The effect is shown most strongly by the sulphate, the nitrate rather less, acetate and other salts much less. The explanation is based on energy derived from the radioactivity of the uranium.—Pierre Auger: The directions of emission of the photoelectrons.—A. Boutaric and M. Doladille: The electrosmosis of mixtures of electrolytes.—Pierre Jolibois and Pierre Montagne: A rapid method of calculation of homogeneous dissociations. Application to carbon dioxide. A graphical method is described and illustrated.—Lécorché and Jovinet: Study of the mechanism of the stabilisation of nitroglycerol powders by diethyldiphenylurea. As soon as the powder becomes acid, the nitrous acid formed is absorbed, giving ethylphenylnitrosamine; the latter can be readily determined by a colour method based on the reaction with α -naphthylamine and hydrochloric acid.—Albert Portevin: The action of sulphur dioxide at high temperatures on glasses and basic rocks and a probable origin of sulphate mineral springs. Sulphur dioxide, even when diluted with other gases, at high temperatures attacks basic rocks and glasses superficially, forming the sulphates of the alkalis and alkaline earths. The attack is selective, as in spite of the low proportion of sodium in the rocks attacked, the deposit consists mainly of sodium sulphate.—J. Fallot: The northern limit of the subbetic overthrusts between Sierra Sagra and Rio Segura.—Léon Moret: The extension of the strata containing *Hemithersitea* and phosphate in the southern slope of the Marrakech Atlas (Morocco).—Aug. Chevalier: The origin of the Imbuia wood (Brazilian walnut) of Brazil and the biology of the producing tree, *Phæbe porosa*, belonging to the Lauraceæ family.—Pierre Dangeard: The favourable action of potassium iodide on iodovolatilisation. The emission of free iodine by certain algae is increased by treatment with sea water containing a small proportion of potassium iodide in solution.—Paul Guérin: Hydrocyanic acid in lotus. A discussion of the amount of hydrocyanic acid present in varieties of *Lotus*, with reference to possible danger as fodder.—Serge Youriévitich: The energetics of the ocular movements.—G. Hamel and J. Feldmann: The geographical distribution of the Fucaceæ and *Laminaria* on the western coasts of the Iberian peninsula.—A. Magnan and A. Sainte-Laguë: The experimental determination of the resistance to the forward motion of fishes. The results of a cinematographic study giving true velocities.—S. Posternak: A new organic phosphorus compound in the red blood corpuscles. The new compound is probably a diphosphate of α -ketotrioxadipic acid.—Y. Manouelien and J. Viala: The spinal marrow, the bulb, the protuberance, and the parasite of hydrophobia.—Et. Burnet, P. Durand, and D. Olmer: Marseilles exanthematic fever is absolutely distinct from exanthematic typhus fever. The Marseilles fever does not give immunity against typhus (in the ape), and acquired

immunity against typhus does not prevent the development of Marseilles fever, thus proving that the two diseases are distinct.—Camille Nacet: A new arrangement for the simultaneous registration of three selected images for the production of photographs in colour.

GENEVA.

Society of Physics and Natural History, Nov. 8.—Pierre Dive: The existence of a permanent regime of rotation in a heterogeneous fluid with ellipsoidal stratification. The author completes as follows a proposition previously enunciated. Whatever may be the law of variation of the flattening of the layers, there exists a permanent regime of rotation which maintains the fluid in its initial stratification, except perhaps in two extreme cases. Except for this, none of the earlier conclusions requires modification.—Rolin Wavre: The lines of force of the field of gravity. Continuing his earlier work, the author deduces two new propositions. (1) If in a portion of a fluid the surfaces of equal density are parallel, they have also a mean constant curvature. (2) If the tangent to a line of force of the field of gravity is stationary at a point, the mean curvature of the surface of equal density passing through this point is equally stationary there.—Fernand Chodat: The rôle of plants in the atmometric equilibrium of their phyllospheres. New atmometric researches made at the Linnæus alpine garden show that each plant association creates for itself a specific atmosphere, the phyllosphere. It is the same for each plant. The author gives measurements which express the contribution of different plants in the phenomenon of inhibition of the transpiration of the soil by the herbaceous covering.

Nov. 22.—A. Borloz: The volumetric estimation of gold in electrolysis baths. During electrolysis, the concentration of the bath diminishes, and it is desirable to have a method of determination which is both rapid and of sufficient accuracy. The author has adapted Jüpner's method (reduction of the gold in solution by a ferrous salt and titration of the excess of the latter with 0.5 normal permanganate) to the case of baths containing impurities, such as salts of bismuth, antimony, etc.—E. Joukowsky: Some observations on the phreatic waters of the Genevan plateau. The author has proved for two points of the same phreatic sheet, situated at a depth of about 25 metres, that the level of this sheet is always comprised between that of the lake and that of its outlet. The curves traced during several months show that the precipitations have no influence on the level of the deep waters. Variations in the level of the lake and previously of the outlet, on the contrary, are felt after a lag of several days.—Sw. Posternak: A new organic phosphorus compound of the red blood corpuscles. Pursuing his researches on the blood corpuscles of the horse, the author has been able to isolate in addition to the di- and monophosphate of *l*-glyceric acid, a new dextrorotatory principle, the diphosphate of α -ketotrioxadipic acid, reducing Fehling's solution. This product is certainly related to hexosediphosphoric acid and probably represents an intermediate stage in the course of the elaboration of lactic acid in the muscle and in other tissues.

SYDNEY.

Royal Society of New South Wales, Sept. 5.—C. A. Sussmilch, W. Clark, and W. A. Greig: Geology of Port Stephens. The area dealt with is situated immediately to the south of Port Stephens. The rocks occurring here belong to the Kuttung Series, a subdivision of the Carboniferous formation. Much of the Kuttung Series throughout the area is hidden under a

mantle of recent alluvial and blown sand, but the outcrops which do occur consist mainly of igneous rocks (lava flows). These Kuttung lavas fall into three groups as follows: (a) Andesites; (b) toscanites; and (c) rhyolites. The andesites occur near the base of the series, and have associated with them coarse conglomerates; the toscanites form a very thick series of flows upwards of 1000 ft. in thickness. With the rhyolites is associated a thick series of sedimentary strata consisting mainly of tuffs and tuffaceous conglomerates, but containing also thin beds of cherty shales containing fossil plants (*Rhacopteris*, etc.). These facts indicate that the district suffered from intense volcanic activity during the Carboniferous period.—R. H. Cambage: The outbreak of springs in autumn. During drought times it is not uncommon to hear of the outbreak of springs in New South Wales between February and June; this has nothing to do with the droughty conditions, but is the result of diminishing evaporation. These springs usually come from swamps, and often stop running during the hot weather owing to the whole of the moisture on the surface of the swamp being evaporated. At Kosciusko there is a small roadside spring which regularly flows a distance of 252 yards during the afternoon while it is in shadow, and at night, but late in the forenoon, owing to evaporation while it is fully exposed to the sun, it can only reach a distance of 160 yards. The outbreak of springs has no bearing on the duration of a drought.

Oct. 3.—W. F. Blakely: Description of three new Eucalypts and one new Acacia. Two of the new species of *Eucalyptus* are stringybarks; the other belongs to the Hemiphloë group and is allied to the broad-leaved peppermints. The acacia is an interesting alpine species with affinities to *A. podalyricifolia*.

Official Publications Received.

BRITISH.

- Board of Trade. British Industries Fair, 1929, The White City, Shepherd's Bush, London, W.12, February 18th-March 1st. Organised by the Department of Overseas Trade. Special Overseas Advance edition. Pp. xvi+400+Ad. 250. (London: Board of Trade.) 1s.
- Department of Agriculture, Trinidad and Tobago. Witch-Broom Disease of Cacao and its Control. By F. Stell; and Note by the Hon. A. B. Carr; Appendix: What is a Fungus? by F. Stell. Pp. 19+2 plates. (Trinidad B.W.I.: Government Printing Office, Port-of-Spain.) 3d.
- Publications of the Dominion Astrophysical Observatory, Victoria, B.C. Vol. 4, No. 5: The Spectroscopic Orbit of H.E. 5702 and Velocity and Light Curves of 12 Lacertae. By William H. Christie. Pp. 55-65. Vol. 4, No. 6: The Orbits of the Spectroscopic Components of the two Helium Stars H.D. 19820 and H.D. 176853. By J. A. Pearce. Pp. 67-79. Vol. 4, No. 7: Two A-type Binaries and the Radial Velocities of 50 Stars. By R. M. Petrie. Pp. 81-95. Vol. 4, No. 8: The Spectroscopic Orbit of H.D. 176819 and a Note on H.D. 185936. By P. M. Millman. Pp. 97-101. Vol. 4, No. 9: Two Spectroscopic Orbits and Notes on ν Sagittarii. By J. S. Flasket. Pp. 103-118. (Victoria, B.C.)
- Royal Society of Arts, John Street, Adelphi, London, W.C. 2. Report on the Competition of Industrial Designs, 1928. Pp. 46. (London.)
- Papers of the Society of Painters in Tempera. Edited by M. Sargant-Florence. Vol. 1: 1901-1907. Second edition, revised and brought up to date with Appendix by the Society of Mural Decorators and Painters in Tempera. Pp. ix+96. (Brighton: The Dolphin Press.) 10s. 6d.

FOREIGN.

- Geology and Water Resources of Palestine. By G. S. Blake. Pp. 51. (Jerusalem: Department of Lands.) 100 mils.
- Annual Report of the Board of Regents of the Smithsonian Institution showing the Operations, Expenditures and Condition of the Institution for the Year ending June 30, 1927. (Publication 2927.) Pp. xii+580+99 plates. (Washington, D.C.: Government Printing Office.) 1.75 dollars.
- Stanford University Publications: University Series. Biological Sciences, Vol. 5, No. 2: The Fossil Fishes of the Miocene of Southern California, Contribution No. 9. By David Starr Jordan. Pp. 16+4 plates. (Stanford University, Calif.: Stanford University Press.) 50 cents.

CATALOGUES.

- Catalogue of B.D.H. Fine Chemical Products. (January 1929.) Pp. 130. (London: The British Drug Houses, Ltd.)
- The Photo-electrical Recording Photometer. Second edition. (Mess 469/II.) Pp. 7. Photograms taken with the Recording Photometer. (Mess 469b.) Pp. 4. (London and Jena: Carl Zeiss, Ltd.)

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Diary of Societies.

FRIDAY, JANUARY 18.

- TEXTILE INSTITUTE (Lancashire Section) (at Manchester), at 1.15.—J. P. O'Callaghan: Water Softening for the Textile Industries.
- BRITISH INSTITUTE OF RADIOLOGY (Medical Members), at 5.—Informal Discussion on Gastro-intestinal Cases.
- ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Sir Arthur Keith: The Anatomy and Evolution of the Human Brain.
- SOCIETY OF CHEMICAL INDUSTRY (Liverpool Section) (at Liverpool University), at 6.—C. Gordon Smith: Common Salt.
- INSTITUTION OF MECHANICAL ENGINEERS, at 6.—J. G. Weir: Modern Feed-Water Circuits.
- INSTITUTION OF CHEMICAL ENGINEERS, (at Institution of Civil Engineers), at 6.30.—Prof. J. W. Cobb: The Reactivities of Solid Carbon in Fuel Processes (Lecture).
- SOCIETY OF DYERS AND COLOURISTS (Manchester Section), at 7.—Dr. S. G. Barker: The Standardisation of Fastness of Dyestuffs on Dyed Fabrics.
- ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN (Pictorial Group), at 7.—M. O. Dell: Some Recent Prints from the Pyrenees.
- GLASGOW SOCIETY OF DYERS (at 7 Gordon Street, Glasgow), at 7.15.—A. J. Hall: The Action of Swelling Agents on Artificial Silk.
- JUNIOR INSTITUTION OF ENGINEERS, at 7.30.—J. F. Petree: Notes on the Fitting and Operation of Michell Bearings.
- OIL AND COLOUR CHEMISTS' ASSOCIATION (Manchester Section) (at Milton Hall, Manchester), at 7.30.—Dr. J. J. Fox: The Examination of Paints.
- INSTITUTION OF AUTOMOBILE ENGINEERS (Scottish Graduates) (at 51 West Regent Street, Glasgow), at 8.—J. Swan: Dynamometers.
- ROYAL SOCIETY OF MEDICINE (Pathology, Surgery, and Obstetrics Sections), at 8.—Special Discussion on Post-operative Thrombosis. Openers: W. H. Evans (Pathology), D. H. Patey (Surgery), V. Bonney (Obstetrics).
- ROYAL SOCIETY OF MEDICINE (Electro-Therapeutics Section), at 8.30.—C. T. Holland: Epiphyseal Injuries of the Wrist Joint.—Dr. R. S. Patterson: Some Factors Influencing Epiphyseal Growth and Union.
- ROYAL INSTITUTION OF GREAT BRITAIN, at 9.—Sir William Bragg: Further Progress in Crystal Analysis.
- TODMORDEN TEXTILE SOCIETY (at Todmorden).—H. P. Curtis: Cloth Testing and Examination from the Manchester Man's View.

SATURDAY, JANUARY 19.

- GEOLOGISTS' ASSOCIATION (at Museum of Practical Geology, Jermyn Street), at 2.30.—Dr. R. Crookall: Demonstration of Coals, their Composition and Origin.
- PHYSIOLOGICAL SOCIETY (at National Institute for Medical Research, Mount Vernon, Hampstead), at 3.—Dr. H. H. Dale, H. W. Dudley, H. P. Marks, and J. H. Gaddum: A Choline Ester (?) in Extracts of Spleen.—Prof. L. Hill: Sphrygmometry of the Vessels of the Frog's Leg.—J. A. Campbell and T. Angus: Water Evaporated from the Body in Relation to Work.—J. A. Campbell: Tensions of Gases in Tissues. (a) Effects of CO Poisoning; (b) Hydrogen in the Peritoneal Cavity.—F. M. Durham: Effect of Alcohol on Genetic Behaviour of Guinea Pigs.—H. V. Horton and W. Dulière: Reversible Loss of Excitability in Isolated Amphibian Voluntary Muscles.—W. Dulière: The Condition of Creatine in Amphibian Voluntary Muscle.—D. W. Bronk: The Energy Expended in Maintaining a Contraction.—Prof. A. V. Hill: The Restoration of Fatigued Muscle by Washing with Oxygen-free Ringer's Fluid.—H. E. Magee: Further Experiments on the Movements of Isolated Intestinal Loops.—A. N. Drury and A. Szent-Györgyi: The Influence upon the Heart of a Substance Present in Heart Muscle and other Tissues.—Demonstrations.—J. A. Campbell: (a) Effects of Prolonged Exposure to Low Tensions of Oxygen; (b) Gas Tensions at the Surface of the Skin of Man.—Prof. L. Hill: A Katathermometer Graduated for Warm Atmospheres.—Prof. L. Hill and J. McQueen: Capillary Circulation in Liver of Mouse.—R. B. Bourdillon and R. G. C. Jenkins: Methods of Measuring Absorption of Ultra-violet Rays.—A. Eidinow: Sensitisation to Fluorescent Radiation.—Dr. H. H. Dale: Complete Artificial Perfusion of the Liver.—J. H. Gaddum: (a) Use of Richards-Collison Metabolism Apparatus for Thyroxin, etc.; (b) An Outflow Recorder for Rapid Flows.—H. E. Magee and J. J. R. Macleod: Diffusion through the Wall of the Living and Dead Intestine.
- ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Dr. E. Cammaerts: Flemish and Belgian Art (I): The Portrait.
- BRITISH ASSOCIATION OF MANAGERS OF TEXTILE WORKS (at Athenæum, Manchester), at 6.30.—W. A. Hanton: Recent Loom Design (Lecture).
- HULL ASSOCIATION OF ENGINEERS (at Municipal Technical College, Hull).—J. Evans: Modern Steam Condensers and Feed Systems.

MONDAY, JANUARY 21.

- ROYAL SOCIETY, EDINBURGH, at 4.30.—R. B. Mooney and E. B. Ludlam: The Thermal Equilibrium between Ethylene, Iodine, and Ethylene Di-Iodide.—E. B. Ludlam, H. G. Reid, and G. S. Soutar: The Hydrogen-Chlorine Flame.—R. W. Armour and E. B. Ludlam: Photochemical Equilibrium between Hydrogen, Bromine, and Hydrogen Bromide.—W. W. Taylor: Demonstration of a New Method of Determining Free and Bound Water.—W. W. Taylor: The Lyotrope Effect and the Antagonistic Action of Ions.—W. O. Kermack, A. G. M'Kendrick, and Eric Ponder: The Stability of Suspensions. III. The Velocities of Sedimentation and of Cataphoresis of Suspensions in a Viscous Fluid.
- VICTORIA INSTITUTE (at Central Hall, Westminster), at 4.30.—Rev. C. W. Cooper: Precious Stones of the Bible, with Special Reference to the High Priest's Breast Plate.
- ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Sir Arthur Keith: The Anatomy and Evolution of the Human Brain.
- TEXTILE INSTITUTE (London Section) (at Clothworkers' Hall), at 6.—G. Garnett: Woollens and Worsteds Customs Designation (Lecture).
- INSTITUTION OF MECHANICAL ENGINEERS (Graduates' Section, London) (jointly with Students' Sections of Institution of Civil Engineers and Institution of Electrical Engineers), at 6.30.—H. R. Sketch: Engineering Insurance.