Calendar of Patent Records.

April 27, 1844.—The aneroid barometer was the invention of a Frenchman, Lucien Vidie, and was patented in England in the name of De Fontaine-moreau, merchant, of London, on April 27, 1844. The advantages that it possessed over the mercury instrument, especially as regards portability, were apparent directly its accuracy for general purposes had been tested, and it was soon extensively adopted, especially in Great Britain.

April 27, 1909.—The modern metal-spraying process for coating iron and steel is largely due to the Swiss chemical engineer, Dr. M. U. Schoop, whose first patent was applied for in Germany on April 27, 1909. The English patent was granted the following year.

April 28, 1784.—Stereotype printing was first introduced about 1726 by William Ged, but the earliest patent for the process was that granted to Alexander Tilloch and Andrew Foulis, printer to the University of Glasgow, on April 28, 1784. These and others of the early processes, though actually used for printing books, were only practised by the inventors themselves, and it was due to Lord Stanhope, who had been taught the art by Foulis, that the possibilities of the new method were generally realised. It was not, however, until the use of papier mâché for the matrix, in place of the plaster of paris formerly employed, was invented in France about 1828, that stereotyping was extensively adopted.

April 29, 1790.—On April 29, 1790, William Nicholson was granted a patent for the first rotary printing machine. Though the invention was not put into practice, it embodied suggestions which were successfully introduced by Koenig in his flat-bed cylinder machine of 1811, and by Applegarth in his rotary press some years later.

April 30, 1844.—The 'Lancashire' steam-boiler was the invention of Sir William Fairbairn and was patented by Fairbairn and John Hetherington on April 30, 1844. The boiler, which differs from its predecessor, the 'Cornish,' by having two tubular flues instead of one and by being internally fired, was the most economical one of its time, and by reason of its simplicity and its capacity of withstanding rough treatment, is still frequently preferred to other types for certain purposes

May 1, 1704.—The use of jewelled pivot-holes in watches was the invention of Nicholas Facio de Duillier, a Swiss resident in London, and a fellow of the Royal Society, and a patent for it was granted to him in conjunction with two London watchmakers, Peter and Jacob Debaufre, on May 1, 1704. A petition presented to the House of Commons for the prolongation of the patent was successfully opposed by the Clockmakers' Company, but it has since been discovered that the evidence which was the principal factor in securing the rejection of the petition was not genuine, and was probably 'faked' for the occasion.

May 2, 1782.—Among the claimants for the new prizes offered by the Board of Longitude for improvements in the marine chronometer after the award of the original £20,000 to John Harrison in 1764, were the rival London watchmakers, John Arnold and Thomas Earnshaw, who share the right to be called the inventor of the modern chronometer escapement, though the exact share of each in the invention has not been satisfactorily determined. It is precisely Earnshaw's escapement that is now in universal use, but Arnold's construction is very similar, gives few points to the other, and was the first, by a year, to be patented, the date of the grant being May 2, 1782. Arnold was the first to manufacture chronometers on a commercial scale.

Societies and Academies.

LONDON.

Physical Society, Mar. 8.—Ezer Griffiths and J. H. Awbery : The dependence of the mobility of ions in air on the relative humidity. The apparatus employed was a modification of Zeleny's original method, the end of a wind channel being closed by a disc of gauze fitted with a guard ring through which a steady stream of air of definite humidity was pumped. The motion of the negative ions due to the action of the air stream was balanced by a counter potential gradient, and the mobility deduced from the critical potential required to produce a balance. The rate of air flow was measured by means of an Ewing ball and tube flowmeter, using a hollow glass sphere to make it suitable for low air rates. Efforts were made to construct a direct indicating instrument.— A. M. Tyndall, with a note by C. F. Powell : Some unsolved problems relating to the mobilities of gaseous ions. The address dealt with : (1) Established results and proposed theories ; (2) the difference between positive and negative mobilities ; (3) the effect of vapours ; (4) mobility in pure gases ; (5) positive ions of short age ; (6) suggestions as to future progress. Note by Mr. C. F. Powell : An apparatus of the 'four gauze' type has been designed for experiments with highly purified gases.

Linnean Society, April 4.—G. M. Graham : The natural history of the Victoria Nyanza. The Fishing Survey of Lake Victoria, 1927–1928, was carried out, by the author and Mr. E. B. Worthington, to solve a problem in economic fisheries. This involved a study of the general ecology of the lake. The cichlid fish, *Tilapia esculenta*, is the most important food species, and next in importance is *T. variabilis*. Excluding the shore, the lake may be divided into certain ecological zones—(1) the surface waters ; (2) the deep mud region (190-230 feet) ; (3) the intermediate zone (50-150 feet) ; (4a) shallow water (less than 50 feet) where the ground is exposed ; (4b) shallow water where there is shelter. These zones are distinguished by their fauna. The tropical situation of the lake results in (1) a constant plankton population ; (2) rapid growth and decay, with perhaps more virulent parasitism ; (3) more or less continuous reproductive activity.—G. P. Bidder : On the classification of sponges. In 1927 reasons were shown for regarding Hexactinellida, on account of their naked cells, as forming a phylum separate from the horny, calcareous, and four-ray sponges, with no common ancestors below Choanoflagellata. The needle sponges are now put in the latter phylum, and a complete classification is given.

PARIS.

Academy of Sciences, Mar. 18.—P. Séjourné : The line from Nice to Coni. Details of the construction of a new Alpine line, 63 kilometres long, more than one-third of which is tunnel.—Henri Villat : A fundamental problem of the theory of vortices.—Charles Achard was elected a member of the Section of Medicine and Surgery in the place of the late Fernand Widal.—Paul Pelseneer : Academic biostatistics. A comparison of the age at election, average years membership, and age at death of members of learned societies at Paris, Brussels, London, and Washington. —Dubourdieu : The topological invariants of networks of curves and surfaces.—Etienne Halphen : A theorem on quadrics analogous with that of Chasles on conics.—Hadamard : Observation on the preceding note.—Paul Mentré : The principal surfaces of complexes of right lines.—J. A. Lappo-Danilevski : The

singularities of integrals of systems of linear differential equations with arbitrary rational coefficients. —Radu Badescu : Abel's integral equation generalised.—R. Gosse : The determination of the equations : $\delta = p\omega(x, y, z, q) + \theta(x, y, z, q)$, which admit an involution of order 2 and a second involution of higher order.—Léon Pomey : The integration of differential equations with general initial conditions (real variables).—Ernest Esclangon : The apparent displacements of the pole star. The Observatory of Strasbourg possesses a long series of observations of the pole star. An analysis of these data shows that the position of this star is not known with the precision desirable. The possible causes of this systematic error are considered.—Albert Arnulf, A. C. S. Van Heel and Emile Perrin : An optical method for the localisation of polished surfaces.—Charles Guilbert : A method of measuring very small electric currents, called tachymetric electrometry.—R. de Mallemann : Magnetic rotatory power in an anisotropic medium.— Decombe : Pulsating electrified spherical pellicles, the principle of areas, and the Zeeman phenomenon. —A. Segay : The inflammation of fire damp by explosives. Discussion of the effect of adding common salt to the explosive and of placing a small cartridge containing liquid carbon dioxide alongside the explosive.—H. Caron and L. Vanbockstael : A new isomorphous series of fluorine compounds. Mixtures of hydrofluosilicic acid, calcium chloride, and aluminium sulphate give octahedral crystals, the composition of which was found to be $4CaSiF6, 8CaF_2, Al_2(SO_4)_3, 45H_2O$. These are very slightly soluble in water and may be utilised in microchemical analysis as a test for calcium, aluminium, and sulphur.—L. Neltner : The extension of the Cambrian in south Morocco and the presence in this region of pre-Cambrian folds.—J. Thoulet : The Kurosio current of Japan.—L. Eblé and J. Itié : The values of the magnetic elements at the station of Val-Joyeux (Seine-et-Oise) on Jan. 1, 1929.—Joseph Richard : The antherozoids of *Fucus*.—Theodureto de Camargo, R. Bolliger, and Paulo Correa de Mello : The influence of the hydrogen ion concentration of the culture medium on the development of the coffee tree, *Coffea arabica*. The coffee plant develops best in acid media, the optimum acidity being between pH 4·2 and pH 5·1. The plant is very sensitive to the action of lime, a very small amount of which is distinctly harmful.— W. Russell and L Hedin : New cisalpine African Leguminoseæ with secretory apparatus.—Abeloos : The influence of temperature on the growth of the *Planaria*. The maximum size is, for given conditions of nutrition, a function of the temperature and decreases notably when the temperature is raised. The speed of growth is a maximum at 12° C., smaller at 20° C., and still smaller at 8° C.—Pierre P. Grassé and Mlle. Odette Tuzet : The origin and nature of the supposed cephalic skeleton of sperm.—G. Delamare and C. Gatti : Spirochætes and treponemes from a venerian granulome.

ROME.

Royal National Academy of the Lincei, Jan. 6.— F. Severi and B. Segre : A topological paradox.— G. Giorgi : The propagation of waves in media with selective absorption. By means of an example it is shown how physical phenomena which should depend on matrices of infinite order may be brought back to finite matrices combined with normal functional operators.—U. Cisotti : Certain space integrals in the complex plane.—G. Fano : An example of birational cubic transformation inherent to a linear complex.— G. Fubini : A problem of the theory of the congruences of straight lines, with applications to the problem of

the spherical representation of a non-Euclidean surface and to a theorem of Bianchi and Blaschke.—G. A. Crocco : Considerations on the guiding of an aeroplane in cloud.—G. Armellini : The astronomical refraction at Rome. The results of a preliminary measurement indicate that at Rome the refraction constant C has a value slightly greater than 60·154″, and also that this varies somewhat with the season of the year ; in virtue of its connexion with other modern astronomical questions, this phenomenon deserves further investigation. Application of the method of least squares to the data as yet obtained yields for C the value 60·51″, which lies between the number 60·15″ now adopted by the " Connaissance des Temps " of Paris and that now found at Abbadia, namely, 60·61″, and is, moreover, very nearly in agreement with the old value, 60·44″, given by Radau in the *Annales* of the Paris Observatory.—S. Franchi : The distant re-outcrop at a great height of the inverted nummulitic syncline of Valdieri.—E. Bompiani : Various determinations of the projective normals of a surface.— G. Vitali : Hamilton's principle. It is shown that this principle of classical mechanics may be written in a form which satisfies the following two conditions : (1) It should render evident the necessary invariance of the integral of which the variation is to be annulled by an invertible substitution on the integration variable, and (2) the system of Euler's equations into which the annulling of the variation of the integral is translated is changed into an equivalent when the integral is subjected to an invertible substitution on the system of four co-ordinates constituted initially of three Cartesian co-ordinates and of time. Further, a proof is given of the known fact that, for slow motions, Hamilton's principle is translatable with sufficient approximation into the system of equations of the geodetics of a space, the linear element of which is expressed by the elements figuring in the ordinary problem and by a constant c sufficiently great.—M. Previatti Bortolozzi : The equivalence of two equations presented in the determination of Vitali's principal terna for a generic surface of Hilbertian space.— J. Kanitani : An intrinsic quadratic form in relation to the hypersurface in projective space of several dimensions.—P. Barreca : Deduction of the experimental law of the duration of twilight colours of the clouds, and the probable discrimination between the theory of a macroscopic diffractive screen (terraqueous globe) and that of microscopic screens (dust). The author has previously shown deductively that the mean durations of the twilight colorations of the clouds are proportional to their respective wavelengths and also to a number relating to the order of the annular spectrum surrounding the globe. A proof is now given of the theorem that, if in an isotropic medium there are two punctiform sources of monochromatic light, vibrating persistently from infinite time, and if, further, there are opaque screens of any form but similar geometrically in relation to the respective wave-lengths and situated similarly with respect to the sources, these produce diffraction fringes which are geometrically similar and situated similarly. —A. Belluigi : The form of deep, gravimetrically perturbing masses.—M. Lombardini : The viscosity of the air and the constant of surface friction at the experimental station of Vigna di Valle.—M. Amadori : Condensation products of p-phenetidine and glucose (2). Investigation of the two condensation products previously obtained shows that the condensation of a primary aromatic amine with glucose gives rise to (1) a compound of glucosidic character formed by the reaction of one hydrogen atom of the amino group with the hydroxyl of the glucose, and (2) a basic compound, resulting from the interaction of two

hydrogen atoms of the amino group with the ketonic oxygen of the aldehydic group or of the lactonic linking of the glucose.—R. Altschul : New method of impregnation with gold. In the impregnation of tissues with gold, the use of mercuric bromide together with gold chloride yields results quite different from those hitherto observed.—T. Carpanese : The prochlorite of Monte Rosso di Verra (Monte Rosa group). The dehydration of this specimen of prochlorite—which contains little iron—when heated follows a course perfectly analogous to that observed with pennine from Zermatt and with clinochlore from Val Devero. The existence of a hydrate containing about 5 per cent of water and stable at 550°-700° C. is indicated. Re-absorption of moisture from the air proceeds rapidly at first and then gradually slackens and ceases. The mineral undergoes optical transformation when heated, the optic axial angle being annulled and the sign changing to negative ; afterwards biaxial character is assumed, the mineral remaining negative but with the plane of the optic axes perpendicular to the original position.—P. Principi : Outcrops of ' scaly clay ' in Northern Umbria.—L. De Caro : The isoelectric point of myoprotein and the regulating power of muscular juice. The regulating power of the muscle juice of *Emys, Scyllium*, and of the electric organ of the torpedo, measured by the ratio $\Delta B/\Delta pH$, exhibits two minimum values at about $pH = 7\cdot7$ and $5\cdot7$. From the former value it increases rapidly on the alkaline side and from the latter on the acid side.—B. Monterosso : Cirripedological studies (5). Anabiosis and revivescence in *Chthamalus*.—L. Mamoli : The adenoid tissue in the normal human lachrymal gland. The characters of this tissue, as observed in fifteen living and sixteen dead individuals, varying from a six-months old fœtus to an octogenarian, are described.—P. Pasquini : Phenomena of regulation and reparation in the development of the eye of amphibia (results of new experiments on the removal and transplantation of the optical vesicle in *Pleurodeles, Axolotl*, and *Rana*). The processes of compensatory regulation during the development of the optical vesicle in these organisms show, in their quality and degree, that this vesicle must be regarded as a specific equipotential and auto-differentiable system.—L. Sanzo : Egg and larva of the tunny (*Orcynus thynnus* Ltkn.).—B. Strampelli : Significance of the Heinz-Ehrlich bodies, and their relations between macrophagic and myeloplaxic apparatus.

Official Publications Received.

BRITISH.

Air Ministry : Aeronautical Research Committee. Reports and Memoranda. No. 1170 (Ae. 334) : Report of the Air-worthiness of Semi-rigid Airships Sub-Committee. (T. 2668.) Pp. 16+1 plate. 9d. net. No. 1188 (Ae. 350) : Full Scale Experiments with a Bristol Fighter fitted with Slots and Flaps and Slot and Aileron Control. By K. V. Wright. (T. 2639.) Pp. 6+6 plates. 9d. net. (London : H.M. Stationery Office.)
Proceedings of the Royal Society of Edinburgh, Session 1928-1929. Vol. 49, Part 1, No. 5 : The General Expression for Boundary Conditions and the Limits of Correlation. By J. Ridley Thompson. Pp. 65-71. 6d. Vol. 49, Part 1, No. 6 : Mental Measurements ; the Probable Error of some Boundary Conditions in Diagnosing the Presence of Group and General Factors. By Thomas P. Black. Pp. 72-77. 6d. Vol. 49, Part 1, No. 8 : The Photochemical Equilibrium between Hydrogen, Bromine and Hydrogen Bromide. By R. W. Armour and E. B. Ludlam. Pp. 91-101. 1s. Vol. 49, Part 2, No. 9 : On the Relation of Fertility in Fowls to the Amount of Testicular Material and Density of Sperm Suspension. By F. B. Hutt. Pp. 102-117. 1s. 3d. (Edinburgh : Robert Grant and Son ; London : Williams and Norgate, Ltd.)
Department of Scientific and Industrial Research. Building Science Abstracts. Compiled by the Building Research Station and published in conjunction with the Institute of Builders. Vol. 2 (New Series), No. 2, February. Abstracts Nos. 201-399. Pp. v+55-95. (London : H.M. Stationery Office.) 9d. net.
Imperial Department of Agriculture for the West Indies. Report on the Agricultural Department, Dominica, 1927-28. Pp. iv+48. (Trinidad.) 6d.
Board of Education. Vacation Courses in England and Wales and Scotland, 1929. Pp. 26. (London : H.M. Stationery Office.) 6d. net.

FOREIGN.

Department of Commerce : U.S. Coast and Geodetic Survey. Special Publication No. 150 : Tides and Currents in Portsmouth Harbor. By A. J. Hoskinson and E. A. Le Lacheur. Pp. vi+98. 20 cents. Special Publication No. 153 : Conformal Protection of the Sphere within a Square. By Oscar S. Adams. Pp. 13. 5 cents. (Washington, D.C. : Government Printing Office.)
Ministry of Agriculture, Egypt : Technical and Scientific Service. Bulletin No. 77 : Preliminary Experiments with Dusting and Spraying against Insect Pests of Cotton. By Ibrahim Eff. Bishara. Pp. 11+3 plates. (Cairo : Government Press.) 5 P.T.
Proceedings of the United States National Museum. Vol. 74. Art. 10 : Tropical American Diptera or Two-winged Flies of the Family Dolichopodidae from Central and South America. By M. C. Van Duzee. (No. 2755.) Pp. 64+2 plates. Vol. 74, Art. 19 : Further Studies of Types of American Muscoid Flies in the Collection of the Vienna Natural History Museum. By J. M. Aldrich. (No. 2764.) Pp. 34. Vol. 75, Art. 3 : On some New and Interesting Species of Water Beetles of the Family Gyrinidae in the United States National Museum. By Georg Ochs. (No. 2774.) Pp. 6. (Washington, D.C. : Government Printing Office.)
Comité National Français de Géodésie et Geophysique. Assemblée générale du 2 juillet 1928. Compte rendu publié par le Secrétaire général G. Perrier. Pp. 59. (Paris.)

CATALOGUES.

Catalogue of Important Works Pre-Linnean, Old Herbals, and Modern Botany ; Birds, Microscopy, Fossils, Insects, and General Literature. (No. 8.) Pp. 16. (London : John H. Knowles.)
The Products of X-Rays, Ltd. Pp. 104. (London : X-Rays, Ltd.)
Hilger Spectroscopically Standardised Substances. (H. S. Brand.) Pp. 4. (London : Adam Hilger, Ltd.)
Classified List of Second-Hand Scientific Instruments. (No. 94, April.) Pp. vi+58. (London : C. Baker.)
Steel Office Furniture. (List No. 454.) Pp. 12. (London : G. A. Harvey and Co., Ltd.)

Diary of Societies.

FRIDAY, APRIL 26.

ROYAL SANITARY INSTITUTE (at City Hall, Cardiff), at 3.—R. M. F. Picken and E. C. Williams : The New Local Government Act.—A. N. J. Sair : Some Notes on Town Planning.—T. H. Morris : The Proposed Reconstruction, Widening, and Lowering of Cardiff Bridge.
PHYSICAL SOCIETY (at Imperial College of Science), at 5.—T. Smith, Dr. G. F. C. Searle, Instructor-Capt. T. Y. Baker, Dr. J. W. French, W. E. Williams, C. G. Vernon, H. H. Emsley, C. W. Hansel, H. Tunley, L. Moore, Conrad Beck, V. T. Saunders, and Dr. C. V. Drysdale : Discussion on The Teaching of Geometrical Optics.
ROYAL SOCIETY OF MEDICINE (Disease in Children Section), at 5.
ARMSTRONG COLLEGE MINING SOCIETY (at Armstrong College, Newcastle-upon-Tyne), at 7.—J. S. Carson and others : Discussion on Iron and Steel Supports in Mines.
ROYAL INSTITUTION OF GREAT BRITAIN, at 7.—E. A. Salt : Platinotype.
INSTITUTION OF ELECTRICAL ENGINEERS (Scottish Centre) (at University College, Dundee), at 7.30.—W. Holmes : Load-levelling Relays and their Application in connexion with Future Metering Problems.
ROYAL SOCIETY OF MEDICINE (Epidemiology Section), at 8.—Dr. J. G. Thomson : Endemic Malaria in Southern Rhodesia.
BRITISH PSYCHOLOGICAL SOCIETY (Industrial Section) (at National Institute of Industrial Psychology), at 8.—J. N. Langdon : Evidence of a Central Factor in Tests of Manual Dexterity.
ROYAL INSTITUTION OF GREAT BRITAIN, at 9.—Prof. R. W. Chambers : English Civilisation from Alfred to Harold, 900-1066.
INSTITUTE OF BREWING (North of, England Section) (at Midland Hotel, Manchester).—F. M. Maynard : A Tropical Brewery.—H. Abbot : Some Bottling Notes.
INSTITUTION OF CHEMICAL ENGINEERS (Graduates' and Students' Section).

SATURDAY, APRIL 27.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS (Associates' and Students' Section) (at Newcastle-upon-Tyne), at 2.45.—J. T. Whetton : The Optics of Surveying Instruments and Tacheometric Surveying.
PHYSIOLOGICAL SOCIETY (in Department of Physiology, Cambridge), at 3.—F. Bremer : Contractile Duality of Skeletal Muscle.—F. D. Ingraham and Dr. J. F. Fulton : Emotional Disturbances following Experimental Lesions of the Base of the Brain (prechiasmal).—Dr. J. S. Haldane : The Dissociation and Reformation of Oxyhæmoglobin and Bicarbonate in Blood within the Living Body.—A. J. Canny, Prof. E. B. Verney, and Dr. F. R. Winton : The Double Heart-Lung-Kidney Preparation.—Prof. E. B. Verney and Dr. F. R. Winton : The Action of Caffeine on the Isolated Kidney of the Dog.—A. Szent-Györgyi and A. N. Drury : The Influence upon the Heart of Substances related to Nucleic Acid.—A. Walton : The Effect of Temperature on Surviving Mammalian Spermatozoa *in vitro*.—J. Y. Bogue and R. Mendez : The Mechanical and Electrical Response of the Frog's Heart.—I. Mazeu : Evidence in Favour of the Existence of Depressor Fibres in Secretory Nerves.—H. Häusler : Hot Wire Analysis of the Effect of Drugs on the Coronary System.—Dr. G. V. Anrep, I. Mazeu, and J. Stella : Vaso-motor Reactions of the Coronary System.—C. W. Bellerby : (a) The Relation of the Anterior Lobe of the Pituitary to Ovulation ; (b) The Physiological Properties of Anterior Lobe Pituitary Extracts.—J. M. R. Innes and C. W. Bellerby : Spontaneous Deciduomata in the Rat.—J. S. Patel and B. P. Wiesner : The β Hormone.—B. P. Wiesner : Further Studies on Pituitary Extracts.—Demonstrations :—B. H. C. Matthews : A Portable Electrocardiograph.—F. Bremer : Myographic Records illustrating—(a) Summation of Impulses ; (b) Contractile Duality of Skeletal Muscle.—J. Hammond and Dr. F. H. A. Marshall :