Calendar of Discovery and Invention.

January 9, 1729.—While holding the Savilian professorship of astronomy at Oxford, Bradley attempted to detect the annual parallax of the fixed stars. Hooke at Gresham College, and Molyneux at Kew, attacked the same problem, and Bradley collaborated with the latter. He then erected a zenith sector at Wanstead. The observed movement of the stars for a time baffled him, but after much thought he was able to explain what he saw by his important discovery of the aberration of light; a discovery which was communicated to the Royal Society on Jan. 9, 1729, in the form of a letter from Bradley to Halley.

January 10, 1849.—Some of the earliest experiments in submarine telegraphy were made by Wheatstone, Sömmering, Morse, and Colt, but it was the introduction of the use of guttapercha by Werner Siemens which made submarine cables practicable. On Jan. 10, 1849, C. V. Walker, of the South-Eastern Railway, laid two miles of cable in the Channel off Folkestone, and by this and a land line of 83 miles communicated from a ship with London. There are now more than 300,000 miles of submarine cables in use.

January 11, 1816.—It was the terrible explosion at Felling Colliery, near Sunderland, in May 1812, which led to the formation of a Society for Preventing Accidents in Coal Mines through which Davy's attention was attracted to the subject. His investigation of the properties of fire-damp and the passage of flame through tubes, and his invention of the wire-gauze safety lamp, were described to the Royal Society on January 11, 1816. Many improvements in miners' lamps have been introduced since, giving greater safety and more light. In 1924 it was recommended that lamps should have 0·8 candle-power, and in recent years electric lamps have been largely adopted.

January 12, 1727.—On this day two hundred years ago died Jacob Leupold, of Saxony, famous for his skill in constructing mathematical instruments and machines. His great work, "Theatrum Machinarum," was published in 1723-1727. The contemporary of Savery and Newcomen, Leupold was the first to suggest a high-pressure steam engine. His sketch shows an engine with two pistons working two force pumps through beams, the distribution of steam being controlled by a four-way cock.

January 13, 1800.—Founded through the instrumentality of Rumford, the Royal Institution was incorporated on Jan. 13, 1800. The name Institution was adopted in imitation of the Instituto of Bologna, while its purpose was "for diffusing the knowledge and facilitating the general introduction of useful mechanical inventions and improvements, and for teaching, by courses of philosophical lectures and experiments, the application of science to the common purposes of life." Its early development as a research institution was due to Davy and Faraday.

January 15, 1876.—In the Science Museum, South Kensington, is preserved the apparatus with which Andrews, of Belfast, made his famous experiments on liquids and gases and discovered the existence of a critical temperature. His work was done in the 'sixties. Writing to him on January 15, 1876, Kelvin said: "We are all greatly delighted in my laboratory with what you have given us—my old assistant MacFarlane is in raptures to see carbonic acid compressed to the liquid state in that always ready way. It will be a splendid lesson to my students, and I think that henceforth they will every lesson know more of the meaning of liquids and gases and vapours than I have ever been able to teach them." E. C. S.

Societies and Academies.

LONDON.

Royal Microscopical Society, November 17.—M. T. **Denne**: A new apparatus for casting paraffin imbedding blocks. It consists of a jacketed chamber in the upper surface of which troughs are formed, fitted with frames or 'lifters,' and adapted to receive the wax. A second reservoir contains water heated to a definite temperature by gas or electricity, and this is so arranged that it may be raised to fill the jacketed chamber or lowered to empty it. In operation, the hot water is caused to enter the jacketed chamber, the troughs are filled with melted paraffin, and the objects arranged in the ordinary way or oriented under a Greenough binocular, the paraffin being maintained at the correct temperature meanwhile. When ready, the reservoir receives the hot water, and cold from a main supply is forced into the jacket causing very rapid cooling. A second momentary application of the hot water from the reservoir frees the blocks by superficial melting, and they are lifted out of the troughs.—C. **Tierney**: Caballero's technique for mounting diatom and other type slides. The method consists essentially in manipulating the specimens with a fine hair in a hermetically sealed chamber attached to the microscope. A petri dish with a raised platform in the centre, on which the specimens and prepared cover-glass are placed, is filled with mercury. From the nosepiece of the microscope is suspended a wire carrying the hair and a glass cylinder which, when the body-tube is lowered, enters the mercury, thus forming a sealed chamber free from all air currents, condensation, and dust particles.

PARIS.

Academy of Sciences, November 22.—Émile **Borel**: A theorem on systems of linear forms with skew symmetric determinant.—C. **Matignon** and Mlle. G. **Marchal**: The heat of oxidation of beryllium. Starting with the pure metal prepared by the method of Stock, Praetorius, and Priess, the heats of solution in hydrofluoric and hydrochloric acids were determined, from which the heat of formation of beryllium oxide is deduced as 140·3 calories. Based on this figure, the heats of formation of various beryllium compounds have been recalculated.—Georges **Claude** and Paul **Boucherot**: The utilisation of the thermal energy of the sea. At depths of 1000 metres the temperature of the sea water is between 4° C. and 5° C., and in the tropics that of the surface between 26° C. and 30° C. The possibility of utilising this temperature difference to work a low-pressure turbine is discussed, and some experiments described in which a low-pressure steam turbine was made to work between the temperatures 0° C. and 28° C.—Léon **Guillet**: The addition of nitrogen to steel. In an earlier paper the case hardening of certain steels by the action of ammonia at 500° C. is described: the present communication gives measurements of hardness (Brinell) of these steels under varying conditions.—**Tilho**: The Nile at the borders of Tibesti near the centre of the Libyan desert (explorations of Prince Kemal el Dine).—Paul **Montel**: The domain corresponding to the values of an analytical function.—Maurice **Janet**: The possibility of plunging a given Riemannian space of n dimensions into a Euclidian space of $\frac{1}{2}n(n+1)$ dimensions.—Léon **Pomey**: The integration of a system comprising an infinity of ordinary differential equations with an infinity of unknowns.—N. **Podtiaguine**: Regularity of growth [of functions].—A. **Toussaint** and E. **Carafoli**: The kinematographic spectra of the plane flow of fluids round varied obstacles.—A. **Véronnet**: The rotation of a heterogeneous mass.

Evolution and fractionnation. The case of Jupiter and Saturn.—P. **Helbronner**: The twenty-first and twenty-second campaigns of the detailed geometrical description of the French Alps.—Th. **Vautier**: The increase of intensity and the duration of extinction of sound.—Léon **Bouthillon**: Radiogoniometers and radiophares with accentuated maximum.—L. **Longchambon**: The rotary power of tartaric acid. Discussion of a recent note on the same subject by E. Vellinger. Details are given of the changes in the rotary power of tartaric acid produced by dilution down to a concentration 0·00625. A tube 10 metres long was used in these measurements.—J. **Galibourg** and F. **Ryziger**: Contribution to the study of the Röntgen spectrography of pearls. A discussion of a Röntgen spectrograph as a means of distinguishing natural from cultivated pearls.—P. **Mercier**: The particles of long path emitted by the active B + C deposit of actinium.—Neda **Marinesco**: Some properties of large molecules in solution.—Charles **Dufraisse** and Paul **Gailliot**: Pecularities of the fractures of acrolein gels: rhythmic production of ridges. Fractured surfaces of acrolein gels, examined under the microscope, show remarkable regularities, the surface being covered with parallel, equidistant straight lines resembling a ploughed field. These surfaces form a diffraction grating (about 120 lines to the millimetre) and give spectra both by transmission and by reflection. A spectrograph of mercury vapour obtained with such a grating is reproduced.—**Tiffeneau** and Mlle. **J. Levy**: The desamination of some phenyl-amino-alcohols, $C_6H_5 . CH(OH) . CH(NH_2)R$. Preparation of acylophenones without transposition.—Pierre **Jolibois**: The constitution of the organo-magnesium compounds. In an earlier communication (*C. R.*, 1912, p. 353) the author has given reasons for preferring the formula $Mg(C_2H_5)_2 . MgI_2$ to the more generally admitted $Mg . C_2H_5 . I$. Work for and against this view published since 1912 is summarised, and the work of Job and Dubien, which supports the formula $Mg . C_2H_5 . I$, is adversely criticised.—V. **Ipatief** and N. **Orlof**: The hydrogenation of xanthone and xanthene.—Y. **Altchidjian**: The utilisation of liquid fuels containing a high proportion of organic sulphur compounds as a source of an antidetonating combustible. It is suggested that from the work of Midgley and Boyd, organic sulphur compounds might be expected to act as antidetonants in internal combustion motors: this conclusion has been confirmed by experiments with mixtures of petrol and heavy oils containing sulphur obtained by carbonisation of bituminous limestones.—N. **Menchikoff**: Primary strata to the south of Oued Drâa.—Const. A. **Kténas**: The chemico-mineralogical nature of the enclosure of Fouqué-Kaméni (Santorin).—Pierre **Allorge**: The benthos with desmids of the lakes in the west and centre of France.—Pierre **Dangeard**: The variation of the plates (carapace) in Peridinium.—J. **Magrou**: The anatomy of plant cancer or crowngall.—Raoul M. **May**: The reaction velocity of *Calliactis effoeta* in the presence of alkaloids and of gland extracts.—P. **Delauney**: The biochemical synthesis of a chlorinated glucoside, β - 5 chlorosalicyl glucoside.

Official Publications Received.

BRITISH AND COLONIAL.

The Manchester Museum. Museum Publication 92: The 'Behrens Collection of Sumerian Tablets in the Manchester Museum. By T. Fish. (Notes from the Manchester Museum, No. 20.) Pp. 6+12 plates. 1s. 6d. Museum Publication 93: Report of the Museum Committee for the Year 1925–26. Pp. 20. 6d. (Manchester: At the University Press; London: Longmans, Green and Co., Ltd.)

Third Annual Report of the Research Association of British Flour-Millers, 1925–1926 (July 1st to June 30th). Pp. 24. (St. Albans, Herts; London: 40 Trinity Square, E.C.3.)

Journal of the Indian Institute of Science. Vol. 9B, Part 3: Aerial Testing. By J. K. Catterson-Smith. Pp. 21-28+11 plates. 1.8 rupees. Vol. 9B, Part 4: Circulating Currents in Wave-wound Armatures. By F. N. Mowdawalla and G. K. Pradhan. Pp. 29-35+18 plates. 1.8 rupees. Vol. 9B, Part 5: Madras (Fort) Radio Field Intensity Measurements at Bangalore. By K. Sreenivasan. Pp. 37-60+12 plates. 3 rupees. (Bangalore.)

Union of South Africa: Department of Agriculture. Science Bulletin No. 50: Some Physical and Chemical Changes occurring during the Ripening of Grapes (Second paper). By P. R. v. d. R. Copeman and G. Frater. (Division of Chemistry Series No. 67.) Pp. 54. 9d. Science Bulletin No. 51: Factors Influencing Overrun. By D. J. Retief. Pp. 24. 3d. (Pretoria: Government Printing and Stationery Office.)

Aeronautical Research Committee: Reports and Memoranda. No. 1031 (M. 42): The Torsion of Circular and Elliptical Cylinders of Homogeneous Æolotropic Materials. By S. J. Wright. Work performed for the Engineering Research Board of the Department of Scientific and Industrial Research. (E.F. 176.) Pp. 5. 4d. net. No. 1035 (M. 44): Report on the 'Burning' of Aluminium. By J. D. Grogan. Work performed at the National Physical Laboratory for the Engineering Research Board of the Department of Scientific and Industrial Research. (B.1.a. Metals, Strength and Properties, 53.—T. 2208.) Pp. 12+3 plates. 1s. net. (London: H.M. Stationery Office.)

South Australia. Annual Report of the Director of Mines and Government Geologist for 1925. Pp. 9. (Adelaide: R. E. E. Rogers.)

Canada. Department of Mines: Mines Branch. Investigations of Mineral Resources and the Mining Industry, 1925. (No. 669.) Pp. ii+84. Bituminous Sands of Northern Alberta: Occurrence and Economic Possibilities. Report on Investigations to the end of 1924. By S. C. Ells. (No. 632.) Pp. vii+244+43 plates. 75 cents. Bituminous Sands of Northern Alberta. Topographical Maps (to Accompany Report No. 632). 12 maps in Case. Sodium Sulphate of Western Canada: Occurrence, Uses and Technology. By L. Heber Cole. (No. 646.) Pp. vii+160+15 plates+22 maps. 40 cents. (Ottawa: F. A. Acland.)

Dove Marine Laboratory, Cullercoats, Northumberland. Report for the Year ending June 30th, 1926. Edited by Prof. Alexander Meek. (Published by the Marine Laboratory Committee of Armstrong College.) Pp. 44+2 plates. (Cullercoats.) 5s.

British Photographic Research Association. Report for the Year 1925–26. Pp. 16. (London.)

The Journal of the Institution of Electrical Engineers. Vol. 65, No. 360, December. Pp. 96+xxviii. (London: E. and F. N. Spon, Ltd.) 10s. 6d.

FOREIGN.

Smithsonian Miscellaneous Collections. Vol. 73, No. 4: Opinions rendered by the International Commission on Zoological Nomenclature. Opinions 91 to 97. (Publication 2873.) Pp. 30. Vol. 78, No. 4: Solar Activity and Long-Period Weather Changes. By Henry Helm Clayton. (Publication 2875.) Pp. 62. Vol. 78, No. 5: The Distribution of Energy over the Sun's Disk. By C. G. Abbot. (Publication 2876.) Pp. 12+1 plate. (Washington, D.C.: Smithsonian Institution.)

Department of Commerce: U.S. Coast and Geodetic Survey. Serial No. 330: Coastal Currents along the Pacific Coast of the United States. By H. A. Marmer. (Special Publication No. 121.) Pp. iv+80. (Washington, D.C.: Government Printing Office.) 15 cents.

Department of the Interior: U.S. Geological Survey. Water-Supply Paper 580-A: Geology of No. 3 Reservoir Site of the Carlsbad Irrigation Project, New Mexico, with Respect to Water-Tightness. By Oscar E. Meinzer, B. Coleman Renick and Kirk Bryan. (Contributions to the Hydrology of the United States, 1926.) Pp. iv+39+2 plates. Bulletin 782: Ore Deposits of the Jerome and Bradshaw Mountains Quadrangles, Arizona. By Waldemar Lindgren, with Statistical Notes by V. C. Heikes. Pp. ix+192+23 plates. 50 cents. Professional Paper 142-A: The Molluscan Fauna of the Alum Bluff Group of Florida. By Julia Gardner. Part 1: Prionodesmacea and Anomalodesmacea. Pp. iv+79+iii+15 plates. Professional Paper 142-B: The Molluscan Fauna of the Alum Bluff Group of Florida. By Julia Gardner. Part 2: Astartacea, Carditacea, Chamacea. Pp. iv+81-99+i+plates 16-17. 10 cents. Professional Paper 142-C: The Molluscan Fauna of the Alum Bluff Group of Florida. By Julia Gardner. Part 3: Lucinacea, Leptonacea, Cardiacea. Pp. iv+101-149+ii+plates 18-23. Professional Paper 142-D: The Molluscan Fauna of the Alum Bluff Group of Florida. By Julia Gardner. Part 4: Veneracea. Pp. iv+151-184+ii+plates 24-28. Professional Paper 147-A: A Comparison of the Genera *Metaplacenticeras* Spath and *Placenticeras* Meek. By John B. Reeside, Jr. (Shorter Contributions to General Geology, 1926.) Pp. ii+5+2 plates. Professional Paper 147-B: The Montana Earthquake of June 27, 1925. By J. T. Pardee. (Shorter Contributions to General Geology, 1926.) Pp. ii+7-23 +plates 3-13. 20 cents. (Washington, D.C.: Government Printing Office.)

CATALOGUES.

Splices and Tapes for Rubber Insulated Wires. Pp. 16. (Passaic, N.J.: The Okonite Co.; London Agents: Wm. Geipel and Co.)

List No. 148: Cambridge Dissolved Oxygen Recorder for Boiler Feed Water. Pp. 4. (London: Cambridge Instrument Co., Ltd.)

Diary of Societies.

FRIDAY, JANUARY 7.

GEOLOGISTS' ASSOCIATION (at University College), at 7.30.—Dr. G. Slater: Glacial Tectonics as reflected in Disturbed Drift Deposits: Studies in the Drift Deposits of the South-Western Part of Suffolk. Part 2 and 3.

SATURDAY, JANUARY 8.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Prof. A. V. Hill: Nerves and Muscles: How we Feel and Move: (6) Speed, Strength, and Endurance.