

## Calendar of Industrial Pioneers.

**December 18, 1888.** Joseph James Coleman died.—One of the pioneers of the cold storage industry, Coleman was first a teacher of chemistry and then chemical engineer to Young's Paraffin Works, Bathgate, Glasgow, where he devised means of liquifying gases, and with Bell introduced the Bell-Coleman dry-air refrigerating system which revolutionised the meat-carrying trade.

**December 19, 1877.** Heinrich Daniel Ruhmkorff died.—Ruhmkorff was born in Hanover in 1803 and in 1819 went to Paris as assistant in a laboratory. There he started in business for himself and became a successful electrical instrument maker. In 1844 he invented a thermo-electric battery, and in 1851 brought out the Ruhmkorff coil for which he afterwards received a prize of 50,000 francs at the French Exhibition of Electrical Apparatus.

**December 20, 1904.** Sir Isaac Lowthian Bell died.—The son of an engineer of Newcastle, Bell studied at Edinburgh and at the Sorbonne, and in 1854, with his brothers, founded the Clarence Iron Works on the Tees, the firm ultimately employing some 6000 men. Bell was distinguished as an investigator and writer on metallurgy, and as a man of affairs assisted to found the Iron and Steel Institute, of which he served as president in 1873-75. He was also the first recipient of the Bessemer Gold Medal.

**December 21, 1909.** Charles B. Dudley died.—From 1875 to 1909 Dudley was chemist to the Pennsylvania Railroad Company, in which situation he carried out a number of important researches on the properties of materials and other matters connected with railways. He was president of the American Chemical Society, and at the time of his death, president of the International Association for Testing Materials.

**December 22, 1867.** Jean Victor Poncelet died.—A distinguished French engineer and mathematician, Poncelet passed through the École Polytechnique, served in the army, was taken prisoner on the retreat from Moscow, and during his confinement began writing his "Traité des propriétés projectives des figures." He rose to high military rank, held a chair of mechanical physics in Paris, published a treatise on practical mechanics, improved the water wheel, and invented a turbine.

**December 23, 1895.** Sir Edward James Harland died.—The founder of the great shipbuilding firm of Harland and Wolff, of Belfast, Harland was born in 1831 at Scarborough, served an apprenticeship under Robert Stephenson at Newcastle, and became draughtsman to J. and J. Thomson, Glasgow. In 1854 he removed to Ireland, becoming the owner of a small shipbuilding concern, in which he was joined by Wolff in 1860. Among the most notable vessels he constructed was the Atlantic liner *Teutonic*, which, built in 1889, was the first mercantile vessel to be fully armed and equipped as an auxiliary cruiser. She was 560 feet long, displaced 16,740 tons, and with 17,500 horsepower attained a speed of twenty knots.

**December 23, 1865.** Alan Stevenson died.—The eldest son of Robert Stevenson (1772-1850), whom he succeeded as engineer to the Scottish Lighthouse Commissioners, Stevenson erected ten lighthouses, among them being that at Skerryvore, "the finest example for mass combined with elegance of outline of any extant rock tower." This lighthouse, which was built between 1838 and 1843, is 138 feet high and weighs 4300 tons.

E. C. S.

## Societies and Academies.

LONDON.

**Royal Microscopical Society, November 15.**—Prof. F. J. Cheshire, president, in the chair.—C. Singer: The earliest drawings made by means of the microscope. These drawings, probably the earliest made, were prepared in 1625, 3 years before the birth of Malpighi and 8 years before the birth of Leeuwenhoek. They represent the anatomy of a bee, of which the mouth parts are particularly accurately rendered. The drawings are to be found on the fly-leaf of an excessively rare book, the "Melissographia" of Federigo Cesi, Duke of Aquasparta. The only specimen of this book known to exist is in the Lanuvian library at Rome. The drawings were made under the supervision of Cesi himself and of his colleague in the first "Academy of the Lynx," Francesco Stelluti. A mechanical microtome was constructed by the instrument maker Cummings in 1770 and described by the notorious Sir John Hill.

**Physical Society, November 24.**—Dr. Alexander Russell, president, in the chair.—E. G. Richardson: The theory of the singing flame. Lord Rayleigh's theory of the action of the singing flame fits the results most closely, in that (1) heat is given by the flame to the air in the tube at each condensation, and (2) stationary waves are formed in the gas as well as in the air-tube. But the lengths of gas-tube unfavourable to the "singing" cover a more restricted range than Lord Rayleigh surmised.—Miss Alice Everett: Unit surfaces of Cooke and Tessar photographic lenses. A number of rays in an axial plane (and a few general rays) are traced through the lens systems by exact methods, and on each ray the positions of the conjugate points for unit magnification are found by Mr. T. Smith's formulæ. For general rays the loci of these "unit points" are three-dimensional. They are surfaces only when the chief rays are bound by some condition such as passing through a fixed point of the object. Within the region for which the lenses are designed, the curvature of both object and image unit-point loci is positive (convex to the light source) and the image locus is more curved than the object locus.—R. L. Jones: Vibration galvanometers with asymmetric moving systems. The theory of vibrations of a system with two degrees of freedom is given, expressions for the amplitudes of the forced vibrations are deduced, and the conditions for resonance ascertained. The results are applied to a galvanometer in which the moving system is asymmetrically hung on a laterally yielding axis, and it is found that the formula for the amplitude is capable of reproducing with fair accuracy the sensitivity curve of the galvanometer, which shows multiple resonance. Asymmetry always lowers the sensitivity of the resonance.—Paul Schilowsky: Some applications of the gyroscope. To stabilise a system in unstable equilibrium a reaction must be set up between the system and the gyrostator of such a character as to help the precession of the gyrostator during the return of the system to normal. To check the oscillations of a stable system, the reaction must be such as to oppose such precession. The gyrostator must be power-driven to neutralise friction. A collection of apparatus for teaching purposes, comprising, *inter alia*, models illustrating the precession of the earth, a method of optically projecting an image of a spinning top, and small mono-rail models, was exhibited. To prevent rocking in a model ship a

gyrostatic fly-wheel is mounted with its axle vertical in a frame, which can both rock about and slide along an axis transverse to the ship. In an aeroplane the problem of combining automatic stability with mobility while avoiding dangerous stresses was discussed. Angular velocity of the aeroplane about a vertical axis causes a tendency to precess in a gyroscope rotating about an horizontal axis. This is balanced by a gravity control, and the angle moved through in attaining a balance affords a measure of the required angular velocity. In models of mono-rail gyrostatic apparatus the fly-wheel is mounted with its axle vertical in a frame which can tilt in a fore-and-aft plane and also slide sideways under gravity. The frame is mounted by a pinion co-axial with and geared down from the fly-wheel; the pinion lies between, but normally clear of, two parallel fixed racks mounted on the carriage, and having their lengths in a fore-and-aft direction. In practice the gyrostatic apparatus would form from 3 per cent. to 5 per cent. of the load of a ship, and from 5 per cent. to 10 per cent. of the load of a mono-rail carriage.—P. Ditisheim: A new balance for compensating the temperature error of watches and chronometers. Elinvar, an alloy invented by Dr. Ch. Ed. Guillaume, the elasticity of which is not affected by changes of temperature, is used for the hair-spring. Satisfactory timing can thus be obtained up to certain limits with a plain solid uncut balance. To apply the elinvar spring to higher-grade watches a new compensation balance has been designed. It is made from a plain monometallic uncut ring into which two very small symmetrical bimetallic blades are inserted. The latter will enable small corrections to be made in order to obtain very fine rates.

Aristotelian Society, November 27.—Prof. A. N. Whitehead, president, in the chair.—R. F. A. Hoernlé: Notes on the treatment of "Existence" in recent philosophical literature. The ontological argument is treated in current philosophical literature (a) in a *restricted* form, in which it applies only to the unique case of God, and (b) in a *generalised* form, in which it is one with the problem of the validity (or "reference to reality") of thought in general. Prof. A. E. Taylor's criticisms of the restricted argument, in his article on "Theism" in the "Encyclopedia of Religion and Ethics," are mutually contradictory, but they contain the valuable suggestion that the validity of the argument depends on the meaning of the term "God," or of the terms defining "God." What these terms *mean* can be decided only by asking what they *express*, and this requires that we should not divorce the language of the argument from the religious experience (=Anselm's *fides*) which underlies it. Thus, the restricted argument appears as but a special case of the generalised argument which depends on the principle that experience, as the union of "that" and "what," "existence" and "essence," supplies the missing existential premise for all meanings which are well-founded. The generalised argument depends on maintaining consistently the "epistemic" against the "formal-logic" point of view. In formal logic, no definition, as such, can imply the existence of the thing defined; no class-concept can imply that the class has members. But, if instead of beginning with definitions, concepts, suppositions (*Annahmen*), we take the *epistemic* point of view and ask what the terms of the definition, etc., mean, *i.e.* what they express, or what we are asked to think *with*, we are driven back to concrete experience in which meanings are *realised*, and in which, therefore, essence is not divorced from, but is one with, existence.

Linnean Society, November 30.—Dr. A. Smith Woodward, president, in the chair.—R. J. Tillyard: The wing-venation of the order Plecoptera or Mayflies.—D. S. M. Watson and E. L. Gill: The structure of certain palæozoic Dipnoi (fishes).—J. Duncan Peirce: The Giant Trees of Victoria. The tallest trees grow in gullies between ridges, the greater moisture and abundance of leaf-mould conducing to their height; the highest tree measured was 326 ft. 1 in.

## CAMBRIDGE.

Philosophical Society, November 13.—Mr. C. T. Heycock, president, in the chair.—A. Smith Woodward: The skulls of palæolithic men.—W. M. H. Greaves: On a system of differential equations which appear in the theory of Saturn's rings.—C. G. Darwin and R. H. Fowler: Fluctuations in an assembly in statistical equilibrium.

## SHEFFIELD.

Society of Glass Technology, November 22.—W. E. S. Turner: The glass industry and methods of manufacture in Czecho-Slovakia. The technical side of the glass industry has not in recent years made anything like the progress that it has in this country. The Bohemian glass industry is living largely on its old tradition and the existing store of knowledge. Machinery scarcely exists for the manufacture of glassware. A great deal of money was made in the industry in the boom years of 1919 and 1920, but very little was put into the industry to improve it. In many methods, from a technical point of view, Great Britain leads the Continent at the present time.—A. Cousen: Selenium in the production of colourless glass. A large number of experimental melts were made to determine the effect of various batch materials on the decolourising power of selenium and the effect of the duration of melting on the colour developed.

## DUBLIN.

Royal Dublin Society, November 28.—Mr. G. Fletcher in the chair.—J. Wilson: On the variation of milk-yield with the cow's age and the length of the lactation period. Ten years ago, working on data, from the cows exhibited at the London Dairy Shows, it was found that, if cows' yields at eight years old be set down as 100, the yields at earlier ages work out at about 67 for 3-year-olds; 81 for 4-year-olds; 90 for 5-year-olds; 95 for 6-year-olds; and 98 for 7-year-olds. Recently Dr. Raymond Pearl of Washington and Dr. Tocher of Aberdeen, working with data collected by the Ayrshire Cattle Milk Records Committee, have found yields for the younger ages to be considerably higher, but the Ayrshire records cannot be used to find how yield increases with age, because the breed has been out of equilibrium since about twenty years ago; the records are loaded in favour of those of the younger ages. If twelve months from calf to calf be taken as the normal lactation period, the annual yield is reduced by about 20 gallons in an eleven months lactation, and increased by about 35, 65, and 90 gallons in thirteen, fourteen, and fifteen months lactation periods.—H. H. Poole: On the detonating action of  $\alpha$ -particles. Experiments show that the probability of detonation of a specimen of iodide of nitrogen by  $\alpha$ -particles is proportional to the concentration of the particles, and not to the square, or a higher power, of the concentration. Hence, detonation is caused by a single  $\alpha$ -particle, and not by the joint effect of two or more particles, and it is reasonable to assume that detonation is caused by the collision of the particle with a nitrogen or a hydrogen nucleus. Fulminate of mercury, silver

azide, and several other explosives were not detonated by exposures to  $\alpha$ -particles which would have caused several thousand detonations of iodide of nitrogen. Probably only a very sensitive body, such as the iodide, can be detonated in this way, and the risk of such an effect with detonators or explosives in common use is negligible.—T. G. Mason: Note on the growth and the transport of organic substances in bitter cassava (*Manihot utilissima*). Weekly measurements of 20 plants were made over a period of 27 weeks; alternate plants were ringed close to the ground. The rate of growth of the stems of the ringed plants was not affected by the operation for about 3 weeks; it then commenced to lag behind that of the unringed plants. The weight of the tuberous roots formed by the ringed plants was about one quarter of that formed by the unringed; the weight of the stem was more than 1.2 times as much. Probably the activity of the cells of the apical meristem is not controlled by the available supply of organic substances, but is determined by autogenous changes within the growing point. No evidence was obtained of the presence of a factor correlating the activity of the apical meristem and the growth of the tuberous roots. The results are in accord with the view that the rate of growth of the stem is conditioned by the catalytic activity of the cells of the apical meristem.

## PARIS.

Academy of Sciences, November 20.—M. Emile Bertin in the chair.—The president announced the death of M. G. Lemoine.—Marcel Brillouin: Einstein and Newtonian gravitation. Remarks on a recent note by M. Le Roux. The criticisms of M. Le Roux are regarded as unfounded.—Pierre Termier: The structure of the eastern Alps.—L. Joubin: The geographical distribution of some deep-sea corals in western European seas. In consequence of the increase in the size and power of steam trawlers, trawling is now carried out at much greater depths than formerly. As a result, the quantities of coral brought up in the nets causes great inconvenience. As a guide to fishermen, a chart is given showing the distribution of the most objectionable corals (*Lophohelia*, *Amphihelia*, *Dendrophyllia*), so that the trawlers can avoid these localities.—E. Mathias, C. A. Crommelin, and H. Kamerlingh Onnes: The rectilinear diameter of neon. The purification of the neon used in these experiments is described in detail, and its purity was confirmed of observations of the critical phenomena. Neon obeys the law of the rectilinear diameter. Like other gases, the diameter shows a deviation in the neighbourhood of the critical point. In the case of hydrogen the deviations are distributed irregularly, but with neon they are systematic: at low temperatures the diameter is slightly convex to the temperature axis, and at higher temperatures slightly concave. Argon, nitrogen, and carbon dioxide behave similarly.—M. Charles Camichel was elected Correspondant for the section of mechanics.—S. Bays: Steiner's cyclic systems of triplets.—A. Myller: Remarkable ruled surfaces passing through a given curve.—Paul Mentré: Complexes which present projective singularities of the second infinitesimal order.—H. Roussilhe: Results obtained in 1921 and 1922 by the application of aerial photography to precision plans on the large scale. The mean errors of plans derived from aerial photographs are less than those of a topographical plan taken with every precaution; the area covered by a given staff is also greater when the photographic method is employed.—C. Raveau: Fresnel's law of the entanglement of the æther.—Emmanuel Dubois: The minimum potential of electric discharge in gases

at low pressures. Some anomalies described in an earlier communication have been now shown to be due to the presence of saline substances on the electrodes.—L. Bouchet: An absolute plane-cylinder electrometer. A cylinder is mounted on a balance beam and the attraction between the cylinder and a plane surface measured. The theory of the instrument is developed. The limits between which the formula holds have been determined by experiment.—Georges Déjardin: The production of the spectrum of mercury. The influence of helium. A study of the spectrum emitted by mercury vapour traversed by electrons of variable velocity. The lines are those of the arc spectrum. For potentials below 20.4 volts a mixture of helium and mercury vapour gives the same arc spectrum as that observed in the absence of helium. Above 20.4 volts the mercury spectrum undergoes modification, and at the same time the helium spectrum appears.—Pierre Lafon: Anomalies in the expansion of glass.—A. Portevin: The reduction and disappearance of internal strains in steels by reheating followed by slow cooling.—André Kling and D. Florentin: The spontaneous formation of sulphate on limestone in urban centres. Chemical analyses of various limestone structures, showing the serious attack by the sulphuric acid in town atmospheres.—MM. Tiffeneau and Orékhoff: The semipinacolic transposition of the alkylhydrobenzoins: the influence of the alkylradicles.—Raymond Delaby: The alkylglycerols. The preparation of vinylalkylcarbinols.—E. Grandmougin: The acyl-aminoanthraquinones as vat dyes.—Paul Gaubert: The action of heat on spherulites.—H. Joly: Preliminary note on the general direction and age of the folds of the Celtiberic Chain (Spain).—M. Teilhard: A fauna of mammals found in northern China.—V. Van Straelen: The decapod crustaceans of the Callovian of Voulte-sur-Rhône (Ardèche).—Lucien Daniel: Hyperbiases of the sunflower and artichoke.—Maurice Lenoir: The nucleoles during the prophase of kinesis II. of the embryonic sac of *Fritillaria imperialis*.—M. Mascré: The stamen of the Boraginaceæ.—Mlle. Marie Braecke: The presence of aucubine and of melampyrite (dulcite) in several species of *Melampyrum*. Aucubine was isolated from *Melampyrum pratense*, *M. nemorosum*, and *M. cristatum*: dulcite (Hünefeld's melampyrite) was also extracted in the pure state from the two latter species.—Pierre Lesage: The comparative action of sylvinite and its components on the first development of plants. Sylvinite proved more favourable to the development of seedlings than its constituents (chlorides of sodium, potassium, magnesium, and calcium sulphate) taken separately, or even when mixed in the proportions present in the mineral employed.—J. Stoklasa: The respiration of the roots. Experiments are described confirming the conclusion published by the author in an earlier communication, that no acid, organic or inorganic, other than carbonic acid is secreted by growing roots. The respiration of the roots is more intense in the presence of air containing radium emanation.—A. Goris and P. Costy: Urease and urea in fungi.—L. Léger and A. Ch. Hollande: Coccidia of the intestine of the eel.—L. M. Betances: Some refinements on the morphogenesis of the hæmatic cell.

## CAPE TOWN.

Royal Society of South Africa, September 27.—Dr. J. D. F. Gilchrist, president, in the chair.—H. B. Fantham: Some Protozoa found in soils in South Africa. Protozoa belonging to the Sarcodina, Mastigophora, and Ciliata have been found. As regards actual numbers of organisms, flagellates are the

most numerous. There is daily variation in the numbers of a Protozoon in a given quantity of culture. Dark, heavy soils containing much humus yielded more kinds of Protozoa than sandy ones. Samples of soil taken relatively near the surface, say six or eight inches down, usually yielded more Protozoa than deeper samples. Cultivated soils yielded more species of Protozoa, especially of Ciliata, than uncultivated ones. Owing to partial sterilisation of South African soils by solar heat and drought, the number of Protozoa in a given area of soil seems to be less than in soils from England or the northern United States. The ingestion of bacteria by soil Protozoa has, so far, not been often observed naturally in South African soils.—J. A. Gilmore: Note on elasticity of Dwyka Tillite. Investigation of Dwyka Tillite from Matjesfontein, Cape Province, shows that for an absorption of water of less than 1/400 gm. per gm., Young's Modulus decreases by about 12 per cent., whereas for an absorption of order 1/800 gm. per gm. the crushing strength increases by about 50 per cent. or more.—H. O. Mönning: On some new South African parasitic nematodes.—Sir Thomas Muir: Note on the co-evanescence of the primary minors of an axisymmetric determinant.—T. J. Mackie: The serum constituents responsible for the Sachs-Georgi and the Wassermann reactions. Sera were fractioned by Liefman's carbon-dioxide method; the carbonic-acid-insoluble globulin was inactive and inhibitory in the flocculation test. The carbonic-acid-soluble fraction was further fractioned into pseudo-globulin and albumin components and flocculation was found to be due almost entirely to the former. In the Wassermann reaction, the most active fraction is the carbonic-acid-insoluble globulin.—J. R. Sutton: Note on the propagation of heat in water. Harmonic analysis of hourly observations of the temperature of water in a brick cistern, 7 feet square and 30 in. deep, shows that the whole body of water is heated nearly simultaneously (chiefly by the sun's rays) and that the surface temperature is propagated downward as a wave of about 7 in. per hour.

Royal Society of South Africa, October 18.—Dr. J. D. F. Gilchrist, president, in the chair.—Miss A. V. Duthie: The cones, spores, and gametophytes of *Selaginella pumila*.—F. G. Cawston: South African larval trematodes and the intermediary hosts. The commoner species of fresh-water mollusc found in certain rivers of South Africa, as well as some lagoon inhabitants which are occasionally found in quite fresh water, together with the commoner larval trematodes of these localities, are described.—J. Moir: Colour and chemical constitution, Pt. XVIII.: Colourless substances in concentrated sulphuric acid solution (halochromy). Observations on coloured solutions in sulphuric acid of 25 simple substances, mostly colourless *per se*, are recorded, and a scheme for calculating colour from chemical constitution is put forward.—J. Stuart Thomson: African Alcyonaria with a statement of some of the problems of their dispersal.

### Official Publications Received.

Straits Settlements. Annual Report on the Raffles Museum and Library for the Year 1921. By Major J. C. Moulton. Pp. 16. (Singapore.)

The Royal Technical College, Glasgow. Annual Report on the One Hundred and Twenty-sixth Session adopted at the Annual Meeting of Governors, held on the 17th October 1922. Pp. 71. (Glasgow.)

County Borough of Warrington: Museum Committee. Report of the Keeper of the Museum for the Two Years ending 30th June 1922, with a List of the Principal Additions to the Museum Collections. Pp. 18. (Warrington.)

NO. 2772, VOL. 110]

Department of the Interior: Bureau of Education. Bulletin, 1922, No. 20: State Laws relating to Education enacted in 1920 and 1921. Compiled by Wm. R. Hood. Pp. iv+269. (Washington: Government Printing Office.) 25 cents.

Department of Fisheries, Bengal. Bulletin No. 19: Statistics of Fish imported into Calcutta for the Year ending 31st March 1922. Pp. 14. (Calcutta: Bengal Secretariat Book Depot.) 8 annas.

### Diary of Societies.

#### SATURDAY, DECEMBER 16.

BRITISH ECOLOGICAL SOCIETY (Annual Meeting) (at University College), at 10.30 A.M.—Dr. R. Lloyd Praeger: Dispersal and Distribution (Presidential Address).—Dr. Cockayne's Work on the Tussock Grassland of New Zealand (Lantern and Specimens).—J. Ramsbottom: The Mycology of the Soil.—W. H. Pearsall: Plant Distribution and Basic Ratios.

BRITISH PSYCHOLOGICAL SOCIETY (Annual General Meeting) (at University College), at 3.—S. J. F. Philpott: The Analysis of the Work Curve.—H. Gordon: Hand and Ear Tests.

#### MONDAY, DECEMBER 18.

ROYAL GEOGRAPHICAL SOCIETY (at Lowther Lodge, Kensington Gore), at 5.—Col. Sir Gerald Lennox-Conyngham: The Proposed Determination of Primary Longitudes by International Co-operation.

INSTITUTION OF ELECTRICAL ENGINEERS (Informal Meeting), at 7.—E. E. Sharp and others: Discussion of Time Switches.

INSTITUTION OF MECHANICAL ENGINEERS (Graduates' Section), at 7.—A. J. Gould: Warships.

ROYAL INSTITUTE OF BRITISH ARCHITECTS, at 8.—A. N. C. Shelley: The Law of Building outside London.

ARISTOTELIAN SOCIETY (at University of London Club, 21 Gower Street), at 8.—Prof. R. W. Sellars: Body and Mind.

CHEMICAL INDUSTRY CLUB (at 2 Whitehall Court), at 8.—Dr. W. R. Ormandy: Paper.

#### TUESDAY, DECEMBER 19.

ROYAL SOCIETY OF MEDICINE, at 5.—General Meeting.

ROYAL STATISTICAL SOCIETY, at 5.15.—T. T. S. de Jastrzebski: Changes in the Birth Rate and in Legitimate Fertility in London Boroughs, 1911-1921.

INSTITUTION OF CIVIL ENGINEERS, at 6.—F. M. G. Du-Plat-Taylor: Extensions at Tilbury Docks, 1912-1917.

INSTITUTE OF MARINE ENGINEERS, INC., at 6.30.—Film illustrating Industrial Works—Messrs. Hadfields.

ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN (Technical Meeting), at 7.—H. T. G. Meredith: Gravure.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—Dr. C. Fox: The Distribution of Population in the Cambridge Region in Early Times, with special reference to the Bronze Age.

#### WEDNESDAY, DECEMBER 20.

ROYAL SOCIETY OF MEDICINE (History of Medicine Section), at 5.—Dr. Nixon: The Debt of Medicine to the Fine Arts.

ROYAL METEOROLOGICAL SOCIETY, at 5.—C. J. P. Cave and R. A. Watson Watt: The Study of Radiotelegraphic Atmospheres in Relation to Meteorology.—C. J. P. Cave: Winter Thunderstorms in the British Islands.—D. E. Row: Forecasting Sky Types.

GEOLOGICAL SOCIETY OF LONDON, at 5.30.—W. A. Richardson: A Micrometric Study of the St. Austell Granite (Cornwall).—W. G. Shannon: The Petrography and Correlation of the Igneous Rocks of the Torquay Promontory.—Prof. O. T. Jones: Demonstration of the Crystallisation of a Doubly-Refracting Liquid.

ROYAL MICROSCOPICAL SOCIETY, at 8.—J. E. Barnard: Sub-Bacteria.

#### THURSDAY, DECEMBER 21.

ROYAL SOCIETY OF MEDICINE (Dermatology Section), at 5.

INSTITUTION OF MINING AND METALLURGY (at Geological Society), at 5.30.—F. White: Notes on the Correction required to Aneroid Readings for Altitude to counteract the Effect produced by the Diurnal Barometric Wave.—P. C. Whitehead: Some Notes on the Secondary Sulphide Enrichment exhibited by certain Auriferous Veins.

CHEMICAL SOCIETY, at 8.

### PUBLIC LECTURES.

#### SATURDAY, DECEMBER 16.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—H. N. Milligan: Animals without Teeth.

#### THURSDAY, DECEMBER 21.

CITY OF LONDON Y.M.C.A. (186 Aldersgate Street), at 6.—Sir John N. Jordan: Some Chinese Problems.