main political divisions of the world: the remaining eighteen, including Germany, the U.S.S.R., the United States, India, Brazil, Australia, and Canada, are excluded because their ministries of education, where they have any, are less than national in their legal and functional characteristics. Under the heading "General Characteristics" are dissertations on the internal organisation of the ministry in Italy, Belgium, Persia, and Uruguay, and organisations advisory to the ministry in Hungary, Belgium, Spain, England, New Zealand, and Bulgaria. In a chapter on the relations of the ministry to secondary education, the systems in force in Spain, Portugal, and Rumania are described as typical of the twenty-five Latin language countries studied, those of Yugoslavia, Denmark, and Hungary for the Germanic type, and those of the Irish Free State, New Zealand, and England and Wales for the English language countries. Special chapters are devoted to the Board of Education of England and Wales and the ministries of France, Belgium, and Mexico. The other bulletin, on "Accredited Higher Institutions", is a compilation of the lists of institutions of college grade accredited or approved or classified by recognised State or voluntary agencies, including national professional organisations, with descriptions of standard criteria used.

Birthdays and Research Centres.

Oct. 26, 1874.—Prof. T. M. LOWRY, C.B.E., F.R.S., professor of physical chemistry in the University of Cambridge.

I am interested in problems of valency, especially in the compounds of nitrogen, phosphorus, sulphur, and tellurium, and in the study of molecular structure by physical methods. Optical and spectroscopic methods have been used extensively for this purpose; but researches on photochemistry, the diffraction of electrons, the scattering of molecular rays, electrode potentials, electrolytic conductivity, and lubrication are also in progress in the Laboratory of Physical Chemistry at Cambridge. In polarimetry, the study of optical rotatory power has been extended to vapours, and measurements are now being made of the form of the dispersion curves in the region of absorption within which the Cotton phenomenon is observed.

Oct. 27, 1856.—Prof. E. W. HOBSON, F.R.S., formerly Sadleirian professor of pure mathematics in the University of Cambridge.

It is very improbable that, at my age, I shall be able to take up investigation of any new subject. I hope, however, to be able to fill up some gaps in subjects such as the theory of integral equations, and possibly in the calculus of variations; subjects at which I have worked in past years.

Oct. 27, 1894.—Prof. LENNARD-JONES, Melville Wills professor of theoretical physics in the University of Bristol.

The theoretical researches in the Wills Physical Laboratory, Bristol, centre round problems of cohesion and molecular structure. The main investigations, in which we are now engaged, aim at (1) a detailed knowledge of the electronic structure of certain atoms and molecules, (2) a calculation of the cohesive forces between atoms in a molecule, (3) a correlation of certain properties of gases and solids with the electronic structure of the atoms and molecules of which they are composed.

Societies and Academies.

LONDON.

Society of Public Analysts, Oct. 7.—**J. Cecil Maby**: The identification of wood and wood charcoal fragments. The economic and forensic importance of distinguishing between different woods by their microscopical structure is discussed, and the value of the method in archæological investigations is illustrated by various examples, such as the identification of the nature of the wood in the piles of lake dwellings, and of the charcoal from ancient furnaces.—**T. Callan** and **N. Strafford**: The examination of dyed leathers in cases of alleged dermatitis. The possibility of applying to dyed leather the tests used by Cox for the detection of diamines and allied bodies in fur has been investigated. The tannins in leather may interfere with many of these tests, but four of them will enable definite conclusions to be drawn, provided that control tests are applied to portions of the extract from the leather, after the addition of very small amounts of a meta- and para-diamine respectively.—**W. L. Davies**: The determination of chlorides in dairy products and biological material. The advantages of a wet (nitric acid) method are described, and suggestions for obtaining a sharper end-point in the titration of the excess of silver nitrate are made.

Physical Society, Oct. 16.—**G. A. Wedgwood**: Young's modulus for steel in two directions in a bar. Experiments showed that the elastic constant E of the various steels from which the hollow cylinders used were made is the same in two directions at right angles, one direction being along the axis of the original bar and the other across a diameter.—**N. W. McLachlan**: On the effective mass of flexible discs and conical diaphragms used for sound reproduction. The effective mass of a circular aluminum disc vibrating in air is zero at the centre-stationary and centre-moving modes. At a centre-stationary mode the effective mass attains a positive maximum before the zero value and a negative maximum thereafter. From the shape of the curves for a disc it is possible to interpret those obtained for conical diaphragms. In the latter case the curves depend upon the apical angle of the cone.—**A. T. McKay**: Further study of diffusion for the infinite plane sheet. A method is developed whereby the diffusivity and surface constants can be evaluated from experimental data. In order to facilitate the practical application of the methods propounded to this and similar diffusion problems, tables have been specially calculated giving the first four roots of each of the four equations $\left.\begin{matrix}\tan\\ \cot\end{matrix}\right\} x = \pm x \cdot \left.\begin{matrix}\tan\\ \cot\end{matrix}\right\} \lambda$.

PARIS.

Academy of Sciences, Sept. 7.—**André Blondel**: New graphical solutions of calculations for electric cables transmitting at high voltage.—**E. Bataillon** and **Tchou Su**: The three types of mitosis characteristic of the first development in the egg of *Bombyx*, fertilised or parthenogenetic.—**R. Tremblot**: The application of (optical) interference to some problems of flow at high velocities. By means of the apparatus described in an earlier communication the author has measured the distribution of the densities in a Laval tuyère in order to decide between the conclusions of Prandtl, Steichen, and Stodola (rigorously adiabatic flow) and those of Müller (at constant heat). The curves obtained agree with the first hypothesis within one per cent.—**Jean Peltier**: The search for want of symmetry and faults in ferro-

magnetic test pieces. In the differential arrangement described and figured, any want of homogeneity in the test pieces is shown by the production of a note in a loud speaker.—**Maurice Billy** and **Félix Trombe**: The preparation of pure cerium. In various experiments the crucible holding the fused salt was carbon, porcelain, fused quartz, and fluorspar porcelain (Damiens). The best results were obtained with an apparatus consisting of a carbon crucible as anode, at the bottom of which was a quartz or fluorspar crucible. The cathode was a molybdenum cylinder. The metal contained 0·08 per cent of silicon, and no other impurity could be detected.—**P. Fallot**: The palæozoic massif of Talambot (Spanish Riff).—**Michel Polonovski** and **René Hazard**: Some physiological effects of chlorotropane. The esterification of tropanol by hydrochloric acid increases the toxic power of this alcohol: it reinforces the paralysing action of the latter on the cardiac vagus, and gives to the action of the molecule on the intestine a resemblance to that produced by nicotine.—**P. Cappe de Baillon**: The experimental bipartition of the odd pieces of the exoskeleton in *Tenebrio molitor*.—**René Wurmser** and **Louis Rapkine**: A method of quantitative micro-injection.

GENEVA.

Society of Physics and Natural History, June 18.—**Paul Rossier**: (1) An astrophysical formula. A classical relation between the absolute magnitude, the radius, and the temperature of a star necessitates a term based on a simplifying hypothesis concerning the spectral sensibility of the eye. Replacing this by a much more probable supposition, the author gives this term a closer approximation.—(2) The calculation of the apparent diameter of a star. The author replaces an old relation between the apparent magnitude, the apparent diameter, and the temperature of a star, an equation holding for an integral receptor only, by a new formula including the magnitude furnished by any receiver whatever. Although the numerical constants are furnished by the sun, the application to giant stars, the diameters of which have been measured with the interferometer, gives results agreeing with observation.—**W. H. Schopfer**: The study of the influence of yeast extracts and concentrates of B vitamins on the sexuality of a fungus. Concentrated extracts of yeast were added to a rigorously synthetic fungal medium. A clear action has been observed on the development and on the sexuality of the fungus utilised.—**A. Amstutz**: The petrographic character of Banks Island in Melanesia. The author has defined the petrographic character of Banks Islands, which form one of the numerous archipelagos scattered in the Pacific and are attached politically to the Franco-English condominium of the New Hebrides. These islands are essentially volcanic in origin and are constituted of augite labradorites.—**E. Joukowsky**: A levigator with a motionless liquid medium. The author describes an apparatus designed for the study of fine sediments. This allows the classification of the sediments into a considerable number of grades, according to the differences in the velocity of fall in water. The ultra-fine elements which remain in suspension are obtained without loss.—**A. Schidlof**: The application of wave mechanics to nuclear physics. With reference to a recent work of M. Terroux on the energy of the β-rays emitted by radium E, the author remarks that, contrary to the conclusions drawn by M. Terroux, the results of his experiments furnish a striking confirmation of the quantum theory of radioactivity.—**Georges Tiercy**: The systematic use of the rotation of the transit instrument. The idea of turning the transit instrument for all stars has been sometimes attributed to the German astronomer Schnauder (1891). The author shows that Plantamour, director of the Geneva Observatory, had applied this idea so far back as 1868; the credit of using this innovation systematically in the simplest possible manner appears to belong to the Padua Observatory (1878). Hence Schnauder was anticipated.

July 2.—**A. Borloz**: Liquation phenomena in a coinage bronze. The author has taken several samples from different points of an ingot of coinage bronze. The analyses show nearly perfect homogeneity, except for the upper portion, the jet, where there is some liquation, as shown by a concentration in the copper and a reduction in the proportion of tin.—**A. L. Perier**: Contribution to the study of the maxillofacial correlations. Is the alveolo-palatal sagittal development related to the upper facial height? Observations on two cranial series, Bushmen and Alpine, give a negative answer. In fact, the alveolo-palatal region is modelled by the dental arch, the potential of growth of which is quite independent of the other facial diameters.—**E. Galopin**: The use of the polarising microscope in the determination of organic substances. Organic substances generally, possessing very high double refraction, can only be studied optically in very minute crystals of the order of 0·01 mm. The author has recognised that special operations are necessary for the production of such crystals; he (with Marc Cramer) has studied the special media for microscopical preparation. The measurement of the double refraction is made by a Berek compensator with convergent light on plates fixed parallel to the principal sections of the mineral studied.—**J. J. Pittard**: The bitumen of the Urgonian limestone and the molasse of Pyrimont (Ain). The author shows by numerous analyses that the proportion of volatile products of the bitumen is much higher in the Urgonian limestone (69 per cent) than in the molassic grits superposed (55 per cent). This suggests impregnation *per ascensum*, the hydrocarbons coming from deep layers and showing increasing oxidation towards the top.

ROME.

Royal National Academy of the Lincei, April 12.—**A. Lo Surdo**: Thermionic valves with fall of potential across the grid. A thermionic valve is described in which the grid consists of a conductor of suitable form for passing a current through it. By adjusting the intensity and sense of this current the non-uniformity of behaviour of the various parts of the filament grid space may be diminished or enhanced. In this way it seems possible to increase markedly the amplifying power of thermionic valves.—**Q. Majorana**: Certain new facts ascertainable by means of ordinary photoelectric cells. Further observations on the negative electrification of the photoelectric metal of an ordinary photoelectric cell when red light impinges thereon are described.—**M. La Rosa**: New proof of the influence of motion of the source on the velocity of light; ballistic explanation of Miss Leavitt's law (2).—**A. Del Chiaro**: Homogeneous functions.—**F. Tricomi**: Further observations on the distribution of the baricentres of the plane sections of a body.—**G. Palozzi**: A characteristic property of Darboux's tangents.—**Giacinta Andruetto**: The intrinsic equations of elastic equilibrium. Using the methods of absolute differential calculus, Tonolo has established the intrinsic equations of anisotropic or isotropic elastic bodies, including the case when the elastic body is immersed in a space of constant curvature. All these equations may be derived by rapid calculations by applying modern vectorial methods to the known vectorial

equations for the equilibrium of elastic media.—**R. Calapso**: Surfaces of the third degree (of Cayley's type) united to the point of a given surface.—**R. Caccioppoli**: The united elements of functional transformations: an observation on the problems of limiting values.—**R. Serini**: The integrals of the equations of propagation in one dimension.—**G. M. Pugno**: Contribution to the treatment of doubly hyperstatic elastic systems.—**B. Novàkovà**: Microphotometric measurements of the line H_α at the centre and at the edge of the sun.—**R. Zoja**: The distribution of the tensions in a solid with rectilinear axis and with rectangular transverse section of variable height.—**C. Antoniani**: The behaviour in an electric field of colloidal humic-mineral complexes. A colloidal complex, extracted from soil by means of 10 per cent sodium hydroxide solution and afterwards purified to remove clayey constituents, and containing 82·75 per cent of organic matter and small proportions of inorganic matter, was found to be electronegative and to have its isoelectric point at *p*H 7·4. When the complex was flocculated at the isoelectric point and brought back to the disperse state by addition of sodium hydroxide, it exhibited anodic migration under the influence of an electric field. As the concentration of the hydroxyl ions is increased, the velocity of this migration increases to a maximum and then gradually decreases to zero, cathodic migration ultimately ensuing.—**G. Roberti**: Hydrogenation of the nitrogen compounds contained in primary tar. At 350° C., under a pressure of 100 atmospheres, and in presence of cobalt sulphide as catalyst, the bases of primary tar give rise to hydrocarbons, the nitrogen being liberated as ammonia. Aniline yields cyclohexane, cyclohexene, and small amounts of hydrogenated diphenyls. Pyridine gives pentane, amylene, hexane, hexene, heptane, etc., whilst quinoline is converted into propylcyclohexane, propylcyclohexene, and other hydrocarbons.—**M. Airoldi**: Fossil Corallinaceæ from the Canaries (2). *Porolithon inaspectum* n. sp. and other forms are described.—**G. Cannicci**: Bacterial flora of certain fish. Bacteriological examination of cod, pilchards, and mullet caught in the Gulf of Naples shows that the cœlom contains only bacteria; the gills contain mostly motile bacteria, with moulds and chromogenic micro-organisms in some cases. The pilchard is the richest in *B. proteus* and the cod in fusiform bacteria which liquefy gelatine. *B. vulgare* Hauser, which is able to degrade proteins with formation of toxic products, occurs most abundantly in the gills during the summer, and *B. proteus* is found only in small number during the autumn and winter.—**Amelia Tonon**: Structure of mulberry buds and their development (2).—**R. Perotti**: The struggle of cereals against *stretta*. Incorporation of finely divided wood or bone charcoal with the layer of soil pervaded by the root systems of chlorophytes of various families, including the Graminaceæ, results in diminished dispersion of water from the soil, the food reserves of which are utilised more efficiently.

Official Publications Received.

BRITISH.

Proceedings of the Royal Society of Edinburgh, Session 1930–1931. Vol. 51, Part 2, No. 17: The Ionizing Efficiency of Electronic Impacts in Air. By Dr. John Thomson. Pp. 127-141. 1*s.* 3*d.* Vol. 51, Part 2, No. 18: Relation between the Composition of Retortable Carbonaceous Minerals and their Yield of Crude Oil. By Prof. Henry Briggs. Pp. 142-149. 9*d.* (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.)

Transactions of the Royal Society of Edinburgh. Vol. 57, Part 1, No. 3: The Life-History and Cytology of *Didymium migripes* Fr. By Dr. Elsie J. Cadman. Pp. 93-142+5 plates. (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.) 8*s.*

Air Ministry: Aeronautical Research Committee: Reports and Memoranda. No. 1374 (E. 46—I.C.E. 789): Oxidation Characteristics of Fuel Vapours with regard to Engine Detonation. By Dr. E. Mardles. Pp. 27+14 plates. (London: H.M. Stationery Office.) 1*s.* 6*d.* net.

The Royal Technical College, Glasgow. Calendar for the One Hundred and Thirty-eighth Session, 1931–1932. Pp. 448+xxx. (Glasgow.)

Transactions of the Leicester Literary and Philosophical Society, together with the Council's Report and the Reports of the Sections, 1930-31. Vol. 32. Pp. 78+9 plates. (Leicester.)

University of Manchester: Faculty of Technology. Prospectus of University Courses in the Municipal College of Technology, Manchester, Session 1931-32. Pp. 360. (Manchester.)

British Museum (Natural History). Picture Post-Cards. Set F39: British Orchids, Series No. 7. 5 cards in colour. 1*s.* Set F40: British Orchids, Series No. 8. 5 cards in colour. 1*s.* Set F41: British Orchids, Series No. 9. 5 cards in colour. 1*s.* Set F42: British Flowering Plants. Series No. 13. 5 cards in colour. 1*s.* Set F43: British Flowering Plants, Series No. 14. 5 cards in colour. 1*s.* (London: British Museum (Natural History).)

Journal of the Indian Institute of Science. Vol. 14A, Part 3: i. Cantharidin from *Mylabris pustulata* Fb., India, by B. H. Iyer and P. C. Guha; ii. The Fatty Acids from Oil of Cantharis (*Mylabris pustulata* Fb., India), by B. H. Iyer and P. Ramaswami Ayyar. Pp. 31-45. 1 rupee. Vol. 14A, Part 4: i. Amylase from Rice; ii. Dialysis of some Cereal Amylases. By Vinayak Narayan Patwardhan and Dattatreya Vishnu Karmarkar. Pp. 47-57. 12 annas. (Bangalore.)

Department of Agriculture, Straits Settlements and Federated Malay States. General Series, No. 5: Report and Proceedings of the Second Inter-Departmental Agricultural Conference held at Kuala Lumpur, Federated Malay States, 27th October to 1st November 1930. Pp x+79. 1 dollar. Scientific Series, No. 6: Stem-Rot of the Oil Palm in Malaya. By A. Thompson. Pp. iii+23+7 plates. 50 cents. Scientific Series, No. 7: Two Citrus Fruit Borers, by H. T. Pagden; The "Green Scale" of Coffee, *Coccus* (*Lecanium*) *viridis* Green, by N. C. E. Miller. Pp. 29. 50 cents. (Kuala Lumpur.)

Hydrographic Publication H.D. 302: Report on the Tides, Currents and Tidal Streams in the Southern Part of Torres Strait. Prepared under the direction of Rear-Admiral H. P. Douglas. Pp. 16. (London: H.M. Stationary Office; J. D. Potter.)

The Journal of the Institution of Electrical Engineers. Edited by P. F. Rowell. Vol. 69, No. 417, September. Pp. 1045-1188+xxvi. (London: E. and F. N. Spon, Ltd.) 10*s.* 6*d.*

India: Meteorological Department. Scientific Notes, Vol. 3, No. 26: Some Statistical Relations of Temperature and Pressure in the Upper Atmosphere over Agra (1926-29) and Batavia (1910-15). By S. Gopal Rao. Pp. 83-88. 4 annas; 5*d.* Scientific Notes, Vol. 3, No. 28: Horizontal Gradients of Pressure and Temperature in the Upper Atmosphere over India calculated from Pilot Balloon Winds. By A. Narayahan. Pp. 115-120. 6 annas; 8*d.* (Calcutta: Government of India Central Publication Branch.)

FOREIGN.

The Science Reports of the Tôhoku Imperial University, Sendai, Japan. First Series (Mathematics, Physics, Chemistry), Vol. 20, No. 3, July. Pp. 323-488. (Tokyo and Sendai: Maruzen Co., Ltd.)

Proceedings of the United States National Museum. Vol. 79, Art. 16: Descriptions of a New Genus and Eight New Species of Ichneumon-Flies, with Taxonomic Notes. By C. F. Muesebeck. (No. 2882.) Pp. 16. (Washington, D.C.: Government Printing Office.)

Conseil International de Recherches: Union Géodésique et Géophysique Internationale: Section d'Hydrologie Scientifique. Bulletin N. 16: Note e comunicazioni della Sezione nazionale italiana. Pp. 55. Bulletin N. 17: Notes et comunications. Pp. 44+14 planches. Bulletin N. 18: Réunion plénière de la Section (Stockholm, Août 1930). Pp. 32. (Venezia.)

Bulletin of the American Museum of Natural History. Vol. 61, Art. 8: Notes on Amphibians from Fukien, Hainan and other Parts of China. By Clifford H. Pope. Pp. 397-611+plates 13-22. (New York City.)

U.S. Department of Agriculture. Circular No. 176: Observations on the Satin Moth and its Natural Enemies in Central Europe. By R. C. Brown. Pp. 20. (Washington, D.C.: Government Printing Office.) 5 cents.

U.S. Department of Commerce: Bureau of Standards. Bureau of Standards Journal of Research. Vol. 7, No. 2, August, R.P. Nos. 339-347. (Washington, D.C.: Government Printing Office.)

Publications of the Allegheny Observatory of the University of Pittsburgh. Vol. 8, No. 3: Wave Lengths in the Spectra of the Vacuum Copper Arc. By Keivin Burns and Prof. Francis M. Walters, Jr. Pp. 37-38. Vol. 8, No. 4: Wave Lengths in the Spectra of the Vacuum Iron Arc. By Keivin Burns and Prof. Francis M. Walters, Jr. Pp. 39-64. (Pittsburgh.)

U.S. Department of Commerce: Bureau of Standards. Research Paper No. 327: Special Refractories for use at High Temperature. By Wm. H. Swanger and Frank R. Caldwell. Pp. 1131-1143. (Washington, D.C.: Government Printing Office.) 10 cents.

Smithsonian Miscellaneous Collections. Vol. 85, No. 4: Mexican Mosses collected by Brother Arsène Brouard, III. By I. Thériot. (Publication 3122.) Pp. 44. (Washington, D.C.: Smithsonian Institution.)

Proceedings of the United States National Museum. Vol. 79, Art. 13: Notes on and Descriptions of some American Moths. By Carl Heinrich. (No. 2879.) Pp. 16+7 plates. (Washington, D.C.: Government Printing Office.)

Transactions of the San Diego Society of Natural History. Vol. 6, No. 25: Age of the Orbitoid-Bearing Eocene Limestone and Turritella Variata Zone of the Western Santa Ynez Range, California. By W. P. Woodring. Pp. 373-387. Vol. 6, No. 26: A New Subspecies of Peromyscus from the Gulf Coast of Lower California, Mexico. By Laurence M. Huey. Pp. 389-390. (San Diego, Calif.)

Instituts scientifiques du Buitenzorg: "'s Lands Plantentuin". Treubia: recueil de travaux zoologiques, hydrobiologiques et océanographiques. Vol. 13, Livraison 2, Août. Pp. 169-292. (Buitenzorg: Archipel Drukkerij.) 2.50 f.

Svenska Hydrografisk-Biologiska Kommissionens Fyrskeppsundersökning år 1930. Pp. 46. (Göteborg: Elanders Boktryckeri A.-B.)

Airgraphics. By Alexander McAdie. Pp. iii+37+7 plates. (Cambridge, Mass.: Blue Hill Observatory.)