

earlier he had been allotted the Murchison medal) at the hands of Prof. W. W. Watts, then president. It was remarked that Prof. Brøgger was an accomplished chemist, skilful mineralogist, and great petrologist. His researches on the Cambrian and Ordovician rocks of his own country had indicated that he was a gifted palaeontologist and stratigrapher. His detailed mapping and interpretation of the structure of the Christiania area and his explanation of the origin of the Christiania Fjord had proved him to be a tectonic geologist of a very high order.

The EARL OF IVEAGH, whose interest in the movements of science and appreciation of its needs are well known, has been Chancellor of the University of Dublin since 1908.

Prof. PORTER, dean of the Faculty of Science in University College (University of London), occupies there the chair of physics. Honorary secretary of the Institute of Physics, he is a past president of the Röntgen Society and of the Faraday Society.

Prof. F. G. BANTING was born at Alliston, Ontario. Educated at the Alliston Public and High Schools, he graduated in the medical faculty of the University of Toronto. From a physiological post in the University of Western Ontario, London, Canada, he returned to Toronto to become a lecturer in pharmacology. He now occupies the chair of medical research established lately in the University. Prof. Banting, with Prof. J. J. R. MacLeod, received in 1923 the distinction of the Nobel prize in physiology and medicine for their discovery of insulin.

Prof. BENEDICT, who occupies the chair of applied mathematics and astronomy, and is dean of the College of Arts in the University of Texas, was born at Louisville, Kentucky, U.S.A. He was educated at the Universities of Texas, Harvard, and Virginia. Sometime an assistant in the Leander McCormick Observatory of the University of Virginia, he also held a mathematical professorship in Vanderbilt University.

Prof. LIVERSIDGE, the veteran chemist and mineralogist, was born at Turnham Green, Middlesex. His studies were pursued at the Royal School of Mines, South Kensington, Royal College of Chemistry, and Christ's College, Cambridge. Appointed so far back as 1873 to the chair of chemistry in the University of Sydney, he occupied that post for thirty-five years. He has rendered distinctive service to science and technical education in Sydney, and also far beyond its boundaries. He was a founder of the Australasian Association for the Advancement of Science, and was its honorary secretary for a number of years; afterwards he became president. Prof. Liversidge has written numerous memoirs on chemistry and mineralogy. He is Hon. LL.D., Glasgow.

Sir ARTHUR STANLEY, who was educated at Wellington College, entered the diplomatic service, filling various posts before retirement. He is chairman of the Joint Council of the British Red Cross Society and Order of St. John, and is also treasurer of St. Thomas's Hospital. Sir Arthur is especially interested in the work of the British Empire Cancer Campaign. He is a Commander of the Legion of Honour.

Prof. BARR, Regius professor of civil engineering and mechanics in the University of Glasgow from 1889 until 1913 (earlier he held a similar chair at the Yorkshire College, Leeds), was born at Glenfield, Renfrewshire. In collaboration with Prof. W. Stroud he has invented several types of range finders. Of these, one designed for use at sea is extensively employed in the British Navy. Prof. Barr is Hon. LL.D., Glasgow and Birmingham.

Societies and Academies.

LONDON.

Royal Society, November 4.—H. C. H. Carpenter and S. Tamura: Experiments on the production of large copper crystals. Crystals exceeding 4 in. in length have been grown in polycrystalline copper strip of section 0.5 in. \times 0.125 in. by the method of critical strain followed by appropriate heat treatment. These crystals, however, are not, strictly speaking, single crystals, since they contain numerous twins which may be oriented in so many as three directions. It has not been found possible to produce large copper crystals by this method without at the same time producing twins. The complete removal of strain in recrystallised copper strip is only achieved by prolonged heating. On account of the presence of twins, the large crystals thus prepared only possess about one-third of the ductility of polycrystalline copper. Their tenacity, however, is almost the same. Their ductility is still more inferior to that of single-crystal copper prepared direct from the liquid which is free from twins.

H. C. H. Carpenter and S. Tamura: The formation of twinned metallic crystals. The principal cause of twinning seems to be crystal growth. Deformation is an indirect cause of twinning, merely because it causes subsequent growth on annealing. In some cases the orientation of annealing twins indicates that they have grown along certain crystallographic directions; most frequently they are rectilinear. The capacity for forming annealing twins appears to be closely related to the atomic arrangement in the crystal lattice. Those metals which crystallise in the face-centred cubic, tetrahedral cubic, and face-centred tetragonal lattices produce annealing twins after suitable treatment, whereas metals possessing other atomic arrangements have not been found to produce them. Metals which crystallise in the close-packed hexagonal lattice, *e.g.* zinc and cadmium, have no possible planes of twinning, and what is called twinning in these metals is probably parallel growth.

G. I. Taylor and C. F. Elam: The distortion of iron crystals. Specimens cut from crystals of iron were subjected to uniform distortion both in compression and in tension, and the distortion analysed and the orientations of the crystal axes determined by X-rays. Distortion is due to slipping in a direction parallel with the perpendicular to a {111} plane. This plane of slip had different orientations with respect to the crystal axes in different specimens, and its orientation round the direction of slip was determined chiefly by the direction of stress. A uniform shear, for which the direction of slip is a crystal axis while the plane of slip is not a crystal plane, arises from a condition of slipping in which the particles of the material stick together in rods instead of in planes. This conception of the mechanism of distortion in iron accounts for the fact that the general direction of the slip lines which appear on a polished surface coincides with the trace of the plane of slip and has no direct connexion with the crystal axes.

W. Rosenhain and A. J. Murphy: The metallography of solid mercury and amalgams. Carbon dioxide snow has been employed to attain the low temperature required, and specimens having a smooth surface have been obtained by solidification against a glass surface or by polishing. The cast surfaces have been etched electrolytically in hydrochloric acid and examined microscopically.

C. F. Elam: Tensile tests of large gold, silver and copper crystals. Crystals of gold, silver and copper

8 in. long and 0.25 in. in diameter have been prepared by lowering a graphite tube full of the molten metal slowly through an electric tube furnace, so that freezing proceeds from the bottom upwards. The position of the crystal axes was determined by means of X-rays, and the rods extended in a tensile testing machine. The crystal axis of the specimen moved in the same direction as in aluminium during extension. As these metals have the same crystal structure as aluminium, it was concluded that distortion was similar in every case, and that gold, silver and copper crystals distort by slipping on a (111) plane in a (110) direction. The crystals all harden during the process of deformation, but when the shear stress is plotted against the extension, the form of the curves is different for each metal.

R. E. Gibbs: The polymorphism of silicon dioxide and the structure of tridymite. The structure of tridymite was similar to that of ice, *i.e.* D_{6h}^4 , with four molecules per cell, in which $a=5.03$ and $c=8.02$. The framework can be considered as a close-packed arrangement of oxygen atoms of diameter about 2.6, whilst the silicon atoms occupy the spaces between four neighbouring oxygens. It is probable that the structures are ionic in nature, being variations of a two-to-one packing of oppositely charged ions. Possible modes of β - β transitions lead to the idea that these sluggish changes are characterised by a change of partners between neighbouring ions. On other hand, the α - β transition, at least in the case of quartz, is merely a small atomic rearrangement not sufficiently drastic to involve a change of neighbours. The α -states are probably created by distortions of the β -forms involving lower symmetry and possibly larger cells. α -tridymite is orthorhombic, having a cell $a=9.9$, $b=17.1$, $c=16.3$, in which the units must be polymerised groups $n\text{SiO}_2$, where n is larger than two and probably equal to eight. The existence of a third form α' of tridymite resembling the ordinary α -form was confirmed.

Twenty-six papers were read by title only.

Royal Microscopical Society, October 20.—A. Piney: A method of silver impregnation of Zenker-fixed sections. The method is only a modification of Bielchowsky's technique and is designed to apply to tissues fixed in mercuric chloride solutions. The essential point is the removal of all traces of the mercuric salt, followed by removal of the iodine, which was employed for this purpose. The wax is removed from the section with xylol, and the section is then placed in 0.4 per cent. iodine in 80 per cent. spirit for 10 minutes. Some of the iodine is removed by soaking the section for 30 minutes in 70 per cent. alcohol, but the remainder is got rid of by immersion in 0.25 per cent. sodium thiosulphate dissolved in 50 per cent. alcohol (not in water as recommended by Heidenhain). The section is now washed in water for an hour, and then immersed in 0.25 per cent. potassium permanganate in water, swilled in distilled water, placed in 5 per cent. aqueous oxalic acid for 20 minutes, washed for 2 hours in running water, and then stained by the Bielchowsky method. Toning with 1 per cent. gold chloride and fixation with 5 per cent. hypo are an advantage, as is also counterstaining with Weigert's iron hæmatoxylin and van Gieson's solution. The method is particularly adapted for the demonstration of reticular fibrils in hæmatopoietic tissues.

PARIS.

Academy of Sciences, October 11.—V. Grignard and P. Muret: Pyrosulphuryl chloride. In the production of this substance by the reaction between sulphur

trioxide and carbon tetrachloride there are difficulties in purification. Utilising the reaction between carbon tetrachloride and chlorosulphonic acid, the conditions have been studied with the view of obtaining a purer product. The decomposition resulting from rise of temperature has also been studied.—**Henri Jumelle:** New observations on tombak tobacco. The identification of the species is complicated by the fact that there are several tombak tobaccos. One tobacco sold under that name has proved to be *Nicotiana rustica*. It contains a high proportion of nicotine (6-12 per cent.) and may be of service as a source of nicotine for viticultural or horticultural purposes.—**T. Rado:** The calculation of the area of curved surfaces.—**Paul Flamant:** The continuity of the distributive transmutations and the extension of a transmutation defined for polynomials.—**Paul Dumanois:** The importance of the combustion yield in internal combustion engines. According to the theory of combustion and detonation developed by the author in previous communications, a mixture of petrol and methyl alcohol should give a higher efficiency than petrol alone. Experimental proof of this is now given: the fuel used contained 70 per cent. of methyl alcohol and gave an increase of 15 per cent. in efficiency over pure petrol.—**Th. de Donder:** The application of the quantification deduced from the Einsteinian gravific.—**L. Meunier and G. Rey:** The action of ultraviolet light upon wool. Under the action of sunlight or the mercury vapour lamp, the condition of the sulphur in the wool is changed; part is converted into sulphur dioxide, which is partially oxidised to sulphuric acid. These changes can be followed by an indicator such as methyl red. Reactions of the insoluble wool with nitroprusside, quinone, alloxan and ninhydrin are also described.—**W. J. Richards:** The effect of α -rays on supersaturated solutions. It might be expected that α -particles would produce crystallisation in supersaturated solutions. Negative results were obtained with solutions in water of sodium sulphate, potassium sulphate, calcium chromate and lithium carbonate. Negative results were also obtained with aqueous sugar solutions and with fused salol.—**Louis Grenet:** The limiting states of alloys.—**M. Ballay:** The Ludwig-Soret phenomenon in alloys. The concentration changes produced in solutions unequally heated are shown experimentally to exist in alloys, and this phenomenon must be taken into account in a general discussion of the phenomena of segregation.—**V. Hasenfratz and R. Sutra:** Some derivatives of harmalol and harmol.—**Marcel Frère-jacque:** Vaillantite, an agent of sulphomethylation. Formation of a new active camphorsulphonic acid.—**H. Prophète:** Contribution to the study of the wax of flowers: rose wax. Study of its unsaponifiable matter.—**Germain Chalaud:** The first phase of the evolution of the gametophyte of *Fossombronia pusilla*.—**Jean Jacques Trillat:** The action of X-rays of long wave-length on micro-organisms. The case of *B. prodigiosus*. These researches showed the bactericidal influence of primary X-rays of long wave-length.—**Auguste Lumière and Félix Perrin:** A new class of hypnotics. The dialkylphenylacetamides. Dipropyl-, propylallyl-, and diallylphenylacetamide have been prepared and possess hypnotic properties, but the ratio of their active dose to the toxic dose is rather high.—**Javillier and H. Allaire:** Phosphorus ratios in the tissues.

ROME.

Royal National Academy of the Lincei: Communications received during the holidays.—**G. Fubini:** The theory of R surfaces and their transformations.—

Giorgio Dal Piaz: The discovery of a supposed vein of post-glacial volcanic rock in the neighbourhood of Bressanone (Upper Adige).—Giuseppe Corbellini: A class of variety characterised by means of parallelism.—V. Hlavaty: Local parameters in a Riemann variety.—J. Soula: Functions defined by Dirichlet's series.—Oscar Zariski: The development of an algebraic function in a circle containing several critical points.—Filippo Burzio: Order of magnitude of quantities relative to the second ballistic problem. A formula for ballistic nutation.—A. Weinstein: Liquid jets with given walls.—Bruto Caldonazzo: An extension of Bernoulli's theorem. This theorem, which is valid for the stationary motion of a perfect fluid, is extended to meet certain cases of variable motion.—Mentore Maggini: Interferometric measurements on the four large satellites of Jupiter. Observations on the changes of figure and on the axial inclinations of these satellites are described.—Vasco Ronchi: Further concerning "flying shadows." D'Arturo's criticisms of the author's conclusions are refuted.—Franco Rasetti: The Doppler effect in sensitised fluorescence.—G. Wataghin: The ballistic hypothesis and the Doppler effect. The two treatments as yet known of the Doppler effect both lead to results unfavourable to the ballistic theory of this effect.—G. Natta and F. Schmid: Oxides and hydroxides of cobalt (ii). The crystalline structure of the saline oxide of cobalt. The oxide Co_3O_4 crystallises in the monometric system and is isomorphous with magnetite. The size of the elementary cell of the crystalline lattice, which is of the spinel type, is 8.02 \AA.U. and contains eight molecules. The density is calculated to be 6.21, which lies among the somewhat discordant experimental values.—E. Repposi and V. Gennaro: The minerals of the serpentine of Piossasco (Piedmont). The mineral species so far identified in this serpentine are ilmenite, magnetite, calcite, aragonite, diopside, granite, vesuvianite, chlorite, titanite, perovskite, apatite, and, probably, gavite.—Sabato Visco: The behaviour of the hepatic glycogen in fasting animals treated with insulin. The administration of insulin to fasting rabbits diminishes the loss in weight. The liver and spleen increase in weight, whereas the heart, kidneys, suprarenal capsules and lungs show slight and variable changes in weight. The amount of glycogen in the liver is increased very considerably by treating the fasting animal with insulin.

SYDNEY.

Linnean Society of New South Wales, August 25.—C. H. Anderson: A revision of certain Australian Rhenopodiaceæ. The paper embodies a critical examination of the two species, *Bassia tricornis* (Benth.) F.v.M. and *Bassia enchylanoides* F.v.M. A new genus is proposed to take in one of the species, and the other is transferred to the genus *Kochia*.—E. Cheel: Notes on *Melaleuca pubescens* Schauer and *M. Preissiana* Schauer. The author's view is that *M. pubescens* Schauer has priority, that the Victorian plants are merely forms of *M. pubescens*, and that the Western Australian plants known as "Ironwood" are glabrous forms of the same species.—Rev. H. M. R. Rupp: Description of a new species of *Diuris* from Barrington Tops, N.S.W. The species described as new is closest to *D. spathulata*, from which it differs in its venation, more prominent lateral lobes of the labellum, and in its short and thick column.—A. M. Lea: On some Australian Curculionidæ. The paper contains descriptions of two new genera and sixty-five new species, one of which belongs to *Rhinomacer*, a genus now first recorded as Australian.

Official Publications Received.

BRITISH AND COLONIAL.

Aeronautical Research Committee: Reports and Memoranda. No. 1019 (Ae. 220): Note on a Hot-Wire Speed and Direction Meter. By L. F. G. Simmons and A. Bailey. (C. I. Accessories, Instruments, 90.—T. 2083.) Pp. 7+7 plates. 9d. net. No. 1027 (Ae. 225): Test of Two Aerofoils, R.A.F. 27 and R.A.F. 28. By A. S. Hartshorn and H. Davies. (A. 8. a. Aerofoils-General, 104.—T. 2257.) Pp. 10+6 plates. 9d. net. No. 1088 (M. 47): Report on the Accelerated Ageing of 'Y' Alloy. By S. L. Archbutt and J. D. Grogan. (B. I. a. Metals, 55.—T. 2251.) Pp. 10+4 plates. 9d. net. (London: H. M. Stationery Office.)

South Australia. Department of Mines: Geological Survey of South Australia. Bulletin No. 12: Clay and Cement in South Australia. By R. Lockhart Jack. Pp. 120+4 plates. (Adelaide: R. E. E. Rogers.)

Annual Report for the Year 1925 of the South African Institute for Medical Research, Johannesburg. Pp. 37+2 plates. (Johannesburg.)

Development Commission. Sixteenth Report of the Development Commissioners for the Year ended the 31st March 1926. Pp. 157. (London: H. M. Stationery Office.) 3s. net.

Our Heritage—The Empire: a Report on some Aspects of a Tour of the King's Overseas Dominions undertaken chiefly in the Interests of Empire Migration and Settlement, 1925-1926. By Commissioner David C. Lamb. Pp. 40. (London: The Salvation Army.)

Report of the Progress of the Ordnance Survey for the Financial Year 1st April 1925, to 31st March 1926. Pp. 8+5 plates. (London: H. M. Stationery Office.) 3s. 6d. net.

Transactions of the Leicester Literary and Philosophical Society, together with the Council's Report and the Reports of the Sections, 1925-26. Vol. 27. Pp. 66. (Leicester.)

Smoke Abatement League of Great Britain. Seventh Report, covering the Nine Months October 1st, 1925, to June 30th, 1926. Pp. x+22. (Manchester.)

British Museum (Natural History). Picture Postcards. Set C17: British Sea Birds, Series No. 1, Gulls. 5 cards in colour. Set C18: British Sea Birds, Series No. 2, Auks and Cormorants. 5 cards in colour. (London: British Museum (Natural History).) 1s. each set.

FOREIGN.

Instituts scientifiques de Buitenzorg: "s Lands Plantentuin." Treubia: recueil de travaux zoologiques, hydrobiologiques et océanographiques. Vol. 7, Livraison 3, Septembre. Pp. 217-330. 2.50 f. Vol. 8, Livraison 3-4, Juillet. Pp. 199-512. 5.00 f. (Buitenzorg: Archipel Drukkerij.)

CATALOGUES.

Microscopes and Accessories. Pp. 92. (London: C. Baker.)

Diary of Societies.

SATURDAY, NOVEMBER 13.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Rev. E. M. Walker: The Study of History (2).

PHYSIOLOGICAL SOCIETY (at the London School of Medicine for Women), at 4.—R. T. Grant: An Observation on the Function of the Pericardium. —A. Levin: Fatigue, Retention of Action Current and Recovery, in Nerves of the Spider Crab.—T. Lewis and H. M. Marvin: Herpes Zoster and Antidromic Impulses.—R. W. Gerard, Prof. A. V. Hill, and Y. Zotterman: Energy Liberation of Nerve as a Function of Frequency of Stimulation.—R. W. Gerard: The Two Phases of Nerve Heat Production.—M. Lowenfeld, S. T. Widdows, M. Bond, and E. Taylor: Variations in Composition of Early Human Milk and Factors Influencing Them.—D. Woodman, E. E. Hewer, and M. L. Keene: Time of Appearance of Digestive Enzymes in the Human Fœtus.—W. C. Collis, D. Rendel, and E. Dahl: Points in the Technique of the Ethyl Iodide Method.—Demonstrations by A. Levin: An Improved Device for Time-marking and Similar Purposes.—E. E. Hewer and M. F. L. Keene: Pineal and Choroid Plexus in the Human Fœtus.—G. Briscoe: Records of Different Types of Respiratory Movements.

MONDAY, NOVEMBER 15.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION (at British Medical Association, Tavistock Square), at 4.—Dr. A. Adler: The Cause and Prevention of Neurosis.

ROYAL GEOGRAPHICAL SOCIETY (at Lowther Lodge), at 5.—J. A. Steers: The East Anglian Coast.

INSTITUTION OF ELECTRICAL ENGINEERS (Tees-Side Sub-Centre) (at Cleveland Technical Institute, Middlesbrough), at 7.—J. Rosen: Address.

INSTITUTION OF AUTOMOBILE ENGINEERS (Scottish Centre) (at Royal Technical College, Glasgow), at 7.30.—J. E. Southcombe: Recent Research on Friction and Lubrication.

ROYAL INSTITUTE OF BRITISH ARCHITECTS, at 8.—H. V. Lanchester: Bridges and Traffic.

ARISTOTELIAN SOCIETY (at University of London Club), at 8.—J. C. McKerrow: Evolution and Contingency.

ROYAL SOCIETY OF ARTS, at 8.—Prof. H. L. Callender: Recent Experiments on the Properties of Steam and High Pressures (Howard Lectures) (1).

HUNTERIAN SOCIETY OF LONDON (in Cutlers' Hall, Warwick Lane, E.C.), at 8.45.—Sir Humphry Rolleston, Dr. G. Little, Dr. L. Williams, and others: Discussion on Medicine and the Press.

TUESDAY, NOVEMBER 16.

ROYAL INSTITUTION OF GREAT BRITAIN, at 5.15.—Dr. G. W. C. Kaye: The Acoustics of Public Buildings (Tyndall Lectures) (3).

ROYAL STATISTICAL SOCIETY (at Royal Society of Arts), at 5.15.—Viscount D'Abernon: German Currency: The Collapse and Recovery, 1920-1926 (Inaugural Address).

ZOOLOGICAL SOCIETY OF LONDON, at 5.30.—Dr. G. D. Hale Carpenter: The Biology of *Glossina palpalis* in connexion with Sleeping Sickness.