Societies and Academies.

PARIS.

Academy of Sciences, July 11.—The president announced the death of M. Mittag-Leffler, *correspondant* in the Section of Geometry.—E. **Cartan**: The Rieman forms of geometries with semi-simple fundamental group.—G. **Pfeiffer**: Systems of partial differential equations of the first order with several unknown functions possessing the integral of Hamburger.—**Soula**: The comparison of the two functions $\Sigma a_n z^n$ and $\Sigma z^n/a_n$.—Ernest **Esclangon**: Observations of the partial eclipse of the sun of June 29, 1927, made at the Strasbourg Observatory. The results of measurements of the times of first and second contacts are given. The weather conditions were very favourable.—Th. **Moreux**: Observations of the eclipse of the sun of June 29, 1927, at Bourges.—Raoul **Ferrier**: The limit of application of the theory of the vector potential.—P. **Lasareff**: The law of viscosity of H. Le Chatelier. This formula expressing the viscosity η of glass as a function of the temperature t, namely, $\log (\log \eta/\eta_0) = N - Mt$, where η_0, M, and N are constants, has been applied to the experimental data of Stott for glass, of Thorpe and Rodger for amyl alcohol, and of Deriaguine and Khananov for solutions of sugar in glycerol. The formula applies in all these cases.—Félix **Michaud**: Binary mixtures of volatile liquids. The case where the two components form a compound.—Emmanuel **Dubois**: The Volta effect. A metal becomes electronegative with respect to its initial state if it is heated (in a vacuum) to a sufficiently high temperature. The saline impurities which are normally found on the surface of a metal, and probably also in the body of the metal, may take an important part in these variations.—Nicolas **Perrakis**: The magnetic study of vanadium tetroxide and trioxide; the measurement of the atomic moment of trivalent and tetravalent vanadium. Whilst vanadium in the state of tetroxide possesses within two well determined intervals of temperature two different moments, the one of 8 and the other of 14 magnetons, in the state of trioxide it possesses a moment of 9·5 magnetons.—Edgar Pierre **Tawil**: Some observations in resonance made on piezo-electric quartz.—R. **Descamps**: The natural rotatory power, in the ultraviolet, of aqueous solutions of the neutral tartrates of sodium, potassium, and ammonium.—L. **Andrieux**: A new method of preparing boron. On electrolysing at 1100° C. a mixture of boric anhydride (2 mol.), magnesia (1 mol.), and magnesium fluoride (1 mol.) in a carbon crucible with an iron cathode, there is obtained a deposit on the cathode which consists mainly of boron. After powdering, treating with hydrochloric acid and drying in a vacuum, this deposit contains 92 per cent. of boron.—Josef **Hrdlička**: The influence of the preliminary lighting and the disagreement with the law of reciprocity in photography.—Mlle St. **Maracineanu**: the special effect of polonium, sunlight, and electricity at high voltage on lead. The results of the experiments described suggest that the formation of a new radioactive substance occurs in the lead sheet.—**Deslandres**: Remarks on the preceding communication. These results are of great interest but very complex, and their exact interpretation requires much additional research.—Albert **Portevin** and Etienne **Pretet**: Study of the velocity of solution of the ultra-light magnesium alloys. A discussion of the methods available for measuring quantitatively the rate of solution.—F. **Bourion** and E. **Rouyer**: Determination of some complex compounds by the boiling-point method.—**Pariselle**: The polarimetric and electrometric study of the alkaline aluminotartrates. A double phenomenon of mutarotation.—Charles **Prévost**: A new class of tautomeric compounds; the ionic theory of tautomerism.—Mlle Jeanne **Lévy** and P. **Weill**: The reality of the semipinacolic transposition. The study of anisylmethylethylglycol. From the experiments described it is concluded that the transformation of anisylmethylethylglycol into a ketonic product different from that furnished by the aldehydoketonic transposition of anisylmethylbutanal demonstrates the reality of the semipinacolic transposition. In the semipinacolic transposition the ethyl radical shifts more easily than the methyl radical.—Edouard **Roch**: The western extremity of the Djebilets massif (Morocco).—P. **Russo**: The presence of Archæocyathus in the Djebel Ighoud (Western Morocco).—V. **Agafonoff**: The zones of the soils of France.—J. **Dufay**: The intensity of the green line of the polar aurora in the spectrum of the nocturnal sky.—Edouard **Salles**: The fixation of the radioactivity of the air by the terrestrial electric field.—Henri **Coupin**: The carbon nutrition of *Penicillium glaucum* by means of various carbon compounds of the aromatic series. Compounds of the aromatic series are much less favourable than compounds of the fatty series for securing the carbon nutrition of *Penicillium glaucum*, and this is probably true also for other moulds.—M. **Bridel** and Ch. **Aagaard**: Is melezitose a combination of saccharose with glucose? The experiments described do not confirm the view of Kuhn and van Grundherr that melezitose is a combination of saccharose and glucose.—A. **Demolon** and G. **Barbier**: Elective ionic absorption in colloidal clay.—Mme Lucie **Rabdoin** and René **Fabre**: Comparative researches on the glutathione content of some tissues and blood in the normal pigeon, the under-fed pigeon, and the pigeon deprived of B vitamin.—C. **Arnaudi**, W. **Kopaczewski**, and M. **Rosnowski**: The physico-chemical antagonisms of micro-organisms.

CAPE TOWN.

Royal Society of South Africa, May 18.—Lancelot T. **Hogben**: A method for the study of dissociation of hæmocyanin. An elaboration of the method proposed by Pantin and Hogben (1925) for studying the dissociation of the oxyhæmocyanins is described. It is possible to plot a five-point dissociation curve within a quarter of an hour with sera of arthropods and molluscs which can be kept indefinitely in the laboratory with prescribed precautions.—Sir Thomas **Muir**: The theory of Hessians from 1883 to 1914.—S. H. **Haughton**: Note on some features of part of the Orange River valley. Dealing with the geographical features of the Orange River and its northern tributaries, the gorge-like nature of the valley and its independence of the geological structure of the country were discussed; and the unity of the Great Fish River and the lower part of the Orange was suggested.—A. J. H. **Goodwin**: Archæology of the Vaal River gravels. Ever since the discovery of diamonds in the Vaal River gravels, stone implements of a large almond-shaped type have been discovered and submitted to various museums, especially the McGregor Museum, Kimberley. The gravels are situated at intervals along the Vaal River, sometimes at a considerable distance from the river, and at various levels above the river bed. They are disjointed, and form various small groups, each of which is a time sequence in itself. The lowest gravels are the latest, and are often in actual process of formation. The highest are probably the earliest. These terraces cannot be dated with any degree of accuracy, but from the fossils discovered we must

regard the earliest (highest) as being of Lower Pleistocene age. The implements appear only in the lower terraces, and must therefore be regarded as of later date than the Lower Pleistocene, owing to the complete lack of such implements in the oldest terraces. These implements are of a type similar to those described by Péringuey as of 'Stellenbosch' type, but the technique approximates more closely to the culture described by Mr. C. van Riet Lowe, from Fauresmith, O.F.S., due possibly to the similarity of material. The Vaal River sites also show that the smaller implements, popularly called 'Bushman,' are of far later date than the large almond-shaped types.—P. R. v. d. R. **Copeman**: Studies in the growth of grapes (Part ii.): Relationship between sugar and acid in the juice. There is a very high degree of negative correlation between these two factors. The regression lines are not, however, linear, but the acid may be expressed in terms of the sugar by means of the equation $(y-a)^n = A/x - B$, where x and y are the sugar and acid respectively and a is the minimum acidity. This equation is only applicable during the period of decrease of acidity.

GENEVA.

Society of Physics and Natural History, June 16.—L. **Duparc**: Some chromite deposits of Thessaly. The author has examined several deposits now being worked in the Katarini region as well as the outcrops in the vicinity. These are basic segregations in the serpentinised peridotites.—Amé **Pictet** and Hans **Vogel**: The synthesis of maltose. This substance has been obtained by heating in a vacuum at 150° C. a mixture of α-glucose and β-glucose. At this temperature the α-glucose is transformed into glucosane; the β-glucose is not dehydrated and it forms an addition product which is maltose.—G. **Menkès**: Researches on the action of vitamins on the fungi. Experiments made on various cultures of Aspergillus show that an alcoholic extract of tomato containing vitamin principles, principally factor B, accelerates the growth of the mould and facilitates the assimilation of sugar, in agreement with results of observations made on animals.—M. **Hausmann**: The synthesis of ethyl galactoside in media with different pH. The author proves by experiments on the synthesis of ethyl-galactoside by means of emulsin, that the variations of the pH of the medium influence the ferment in its synthetic functions and that this influence is identical with that exercised on hydrolysis.—M. **Hausmann**: The molecular proportions to be observed in the cresol blue reaction (tyrosinase). In testing for the best molecular proportions for the formation of the colouring matter known as cresol blue produced by the action of the tyrosinase ferment on a mixture of glycocine and paracresol, the author shows that an equimolecular proportion of these two substances is clearly not the best, and that the optimum is attained by a mixture of four molecules of p-cresol with one molecule of glycocine.—Ch. G. **Boissonnas** and E. **Briner**: The oxidation of nitrogen by ozone. By experiments carried out at the ordinary pressures and at temperatures between 20° C. and 200° C., as well as in experiments under a pressure of 120 atmospheres, it is shown that ozone is incapable of oxidising nitrogen.

SYDNEY.

Linnean Society of New South Wales, May 25.—C. P. **Alexander**: The interpretation of the radial field of the wing in the Nematocerous Diptera, with special reference to the Tipulidæ. A new interpretation of the radial field of the wing in the Diptera.—Dudley **Moulton**: New gall-forming Thysanoptera of Australia. Four new species belonging to four different genera, one of which is new, are described.—Miss H. **Claire Weekes**: Note on reproductive phenomena in some lizards. An omphaloplacenta and an allantoplacenta occur in the scincid lizards *Lygosoma quoyi*, *Egernia whitei*, and *E. striolata*. The allantoplacentation in *L. quoyi* more closely resembles that found among the Mammalia than any hitherto recorded in a reptile, there being a partial degeneration of maternal and fœtal epithelial tissue allowing for a close proximity of maternal and fœtal bloodstreams. Corpora lutea occur in the ovaries of all the above species and in *Tiliqua scincoides*. The extra-embryonic mesoderm in all four species dips into the yolk-sac endoderm and grows round the yolk-sac embedded in its substance, and not over its surface as is usually the case.—J. **McLuckie** and A. H. K. **Petrie**: An ecological study of the flora of Mount Wilson (Part iv.). Habitat factors and plant response. The two factors of outstanding significance in controlling the distribution of the vegetation at Mount Wilson are aspect and moisture-content of the soil. The Malayan Rain-Forest flora (Ceratopetalum-Doryphora Association) is a mesophytic community which has survived in the most favourable habitats provided by the basalt residuals and the deep sandstone gorges which dissect the area.

Royal Society of New South Wales, June 1.—A. R. **Penfold** and F. R. **Morrison**: A critical examination of *Eucalyptus dives* and the occurrence of a number of varieties thereof as determined by chemical analysis of the essential oils (Part i.). Three varieties, indistinguishable from the type on morphological grounds, have been determined by chemical analysis.—J. C. **Earl**: The preparation of tetramethylethylene. A new method utilising several known reactions has been devised. The scheme of reactions is: amylene hydrate ⟶ trimethylethylene ⟶ trimethylethylene chlorohydrin ⟶ dimethyl*iso*propylcarbinol ⟶ tetramethylethylene. The yield is good, and the process can be interrupted at any stage without risk of deterioration of the intermediate products.—Sir George H. **Knibbs**: Protogenesis and ex-nuptial natality in Australia. The maximum frequency of ex-nuptial births occurred during the period 1899 to 1907; it may be subject to long-period oscillations. The frequency both of nuptial and ex-nuptial cases at the beginnings and endings of the reproductive life, show that both growth and decay are approximately but not exactly exponential. Both commence at about 12 years of age, but the relative frequency, compared with the numbers at risk, is much less for ex-nuptial cases than for nuptial. At age 16·4 the actual numbers are, however, equal. The actual phenomena of nuptial first-births, according to the ages of the mothers, can be represented by three co-ordinates, x denoting age, y denoting the duration of marriage, and z denoting the relative frequency of first-births corresponding to particular ages and durations of marriage. The protogenesic surface discloses the continuity of the phenomena for intervals of less than nine months from marriage with those for all intervals up to 27 years. Fertility varies with age and with time. For births within 9 months of marriage, it was greatest for say 1910·0 and also for 1919·0 for age 21, the numbers for 10,000 women of that age being respectively 1281 and 1248. For all first births it was for age 22 for 1910·0, 23 for 1915·5 and for 1922·5, the respective numbers per 100,000 mothers being 9401, 9363, and 8706. The averages for the year 1917·2 were 1256 and age 21 for births up to 9 months after marriage, and 910 for age 23 for all first births. These are maximum ages and

fertilities. The maximum intensity of the gonad urge would appear to be for age 21·3 years both nuptially and ex-nuptially.

WASHINGTON, D.C.

National Academy of Sciences (*Proc.*, Vol. 13, No. 5, May).—Joel H. **Hildebrand**: A quantitative treatment of deviations from Raoult's law. Plotting log N_2 against N_1, where N_2 is the mole fraction of the solute, shows that many solvents give with each solute a characteristic group of curves. Dealing with binary mixtures, an extension of Raoult's law is obtained from which several physico-chemical quantities can be calculated.—Oliver R. **Wulf** and Richard C. **Tolman**: The thermal decomposition of ozone. Homogeneous decomposition can be made to proceed so as to be closely of the second order with respect to ozone; the specific rate for different samples may vary considerably but is generally, for ozonised oxygen, inversely proportional to the total pressure. This is considered to be due to the inhibiting effect of oxygen on the decomposition.—C. M. **Cleveland**: Concerning points of a continuous curve that are not accessible from each other.—O. E. **Glenn**: Recent progress of investigations by symbolical methods of the invariants of bi ternary quantics.—C. F. **Roos**: A dynamical theory of economic equilibrium. For equilibrium in a co-operative society, a functional operator must be maximised; for a competitive society, partial maxima of several functional operators must be obtained.—Lester R. **Ford**: (1) On the foundations of the theory of discontinuous groups of linear transformations. The concept of the isometric circle of a linear transformation is applied to such groups. (2) On the formation of groups of linear transformations by combination.—Erich F. **Schmidt**: A stratigraphic study of the Gila-Salt region, Arizona. The ancient pottery falls into three groups, Gila polychrome, black-on-white, and red-on-yellow. The distribution of the sherds with depth in the excavations indicates that the Lower Salt (red-on-yellow) is older than polychrome and was probably made by the builders of Pueblo Grande. The red-on-yellow was synchronous with the black-on-white.—Charles F. **Meyer** and Aaron A. **Levin**: The infra-red absorption spectra of acetylene (C_2H_2), ethylene (C_2H_4) and ethane (C_2H_6). The range 3μ and 15μ was examined and the absorption bands are found to show definite structure. Acetylene has a band ($13\cdot7\mu$) showing an intense central Q-branch, an R-branch showing well-marked alternation of intensity of the lines, and a P-branch with less marked alternations.—G. W. **Fox**, O. S. **Duffendack**, and E. F. **Barker**: The spectrum of CO_2. A continuous flow method was used. A stream of pure carbon dioxide was passed slowly into the discharge tube and subjected to electron bombardment in a force-free space before reaching the filament. None of the bands generally attributed to carbon monoxide was observed. The carbon dioxide spectrum extends from 5000 Å.U. to 2800 Å.U. and consists of bands of various types.—Gilbert N. **Lewis**: The entropy of radiation. Assuming that radiation can be divided into slices of constant entropy independent of the presence of other slices, and that the chance of a particle being in a selected volume is a linear function of the number of particles already in that volume, Planck's entropy equation is obtained as a first approximation and a further approximation is indicated.—Carl **Barus**: Linear elements of the electromagnetic pinhole graphs.—Edwin H. **Hall**: Thermionic emission and the "universal constant" A. An equation for thermionic emission is derived by utilising the dual theory of conduction. In form it is similar to Richardson's equation, but the factor corresponding to A is variable.—H. **Bateman**: Lagrangian functions and Schrödinger's rule.—F. D. **Murnaghan** and K. F. **Herzfeld**: Two remarks on the wave-theory of mechanics. The degree of arbitrariness in the wave-equation and the energy-frequency relation are discussed.—K. T. **Compton** and C. C. **Van Voorhis**: Heats of condensation of positive ions and the mechanism of the mercury arc. If neutralisation of the ion occurs at or just outside the surface of the electrode, half the energy is lost by radiation and a portion by reflection. Then the heating of the cathode is given by $\phi_+ = r\,V_i + L - \phi_e$, where V_i is the heat of recombination of an ion and an electron, L the latent heat of condensation of the neutral gas, ϕ the heat of evaporation of an electron, and r is a factor less than 0·5 by an amount depending on the reflecting power of the electrode. In the mercury arc, the electrons are drawn out by the intense space charge (Langmuir) and mercury is lost from the cathode as drops consisting of numbers of atoms.—R. J. **Lang**: Series spectra of silver-like atoms. The first members of each of the four ordinary series for In III., Sn IV., and Sb V. have been identified.—J. B. **Green** and R. A. **Loring**: Term-structure and Zeeman effect of the arc spectrum of tin (preliminary report).

Official Publications Received.

BRITISH.

University of Bristol. The Annual Report of the Agricultural and Horticultural Research Station (The National Fruit and Cider Institute), Long Ashton, Bristol, 1926. Pp. 149+8 plates. (Bristol.)

Journal of the Chemical Society: containing Papers communicated to the Society. July. Pp. iv+iv+1401-1758. (London: Gurney and Jackson.)

Observations made at the Royal Observatory, Greenwich, in the Year 1925. Astronomy, Magnetism and Meteorology. Under the Direction of Sir Frank Dyson. Pp. 10+Axxii+A58+iv+B22+C20+Dix+D97+6+Exxvi+E106+5 plates+18. (London: H.M. Stationery Office.) 40*s.* net.

Determinations of Effective Wavelengths of Stars made at the Royal Observatory, Greenwich, in the Years 1920 to 1925, under the Direction of Sir Frank Dyson. Pp. 58. (London: H.M. Stationery Office.) 4*s.* 6*d.* net.

Cape Astrographic Zones, Vol. 9. Catalogue of Rectangular Coordinates and Diameters of Star-Images derived from Photographs taken at the Royal Observatory, Cape of Good Hope. Commenced under the Direction of Sir David Gill; Completed and prepared for Press under the Direction of S. S. Hough. Zone −49°. Pp. xxxvi+452. (London: H.M. Stationery Office.) 55*s.* net.

Ceylon Journal of Science. Section A: Botany. Annals of the Royal Botanic Gardens, Peradeniya. Edited by A. H. G. Alston. Vol. 10, Part 3, July 1st. Pp. 243-319. (Peradeniya: Department of Agriculture; London: Dulau and Co., Ltd.) 3 rupees.

Empire Cotton Growing Corporation. Report of the Executive Committee, to be submitted at the Meeting of the Administrative Council on July 27th, 1927. Pp. 12. (London.)

Technical College, Bradford. Diploma and Special Day Courses, Session 1927-28. Pp. 206+26 plates. (Bradford).

Aeronautical Research Committee: Reports and Memoranda. No. 1077 (Ae. 258): Lateral Stability with special reference to Controlled Motion. By H. M. Garner. (A.2.a. Stability Calculations and Model Expts., 121.—T. 2387.) Pp. 19+5 plates. 1*s.* net. No. 1080 (Ae. 260): Note on the Reduction of Performance Tests to the Standard Atmosphere. By R. S. Capon. (D.1. Special Technical Questions, 197.—T. 2398.) Pp. 8. 4*d.* net. No. 1084 (Ae. 263): A Paradox in Fluid Motion. By Dr. H. Lamb. (A.1 a. Dynamical Similarity, etc., 64.—T. 2371.) Pp. 4. 3*d.* net. (London: H.M. Stationery Office.)

Journal of the Indian Journal of Science. Vol. 10A, Part 1: i. Some Reactions of Carone, by Kottiazath Narayana Menon and John Lionel Simonsen; ii. A Synthesis of Morindone, by Ramkanta Bhattacharya and John Lionel Simonsen; iii. Derivatives of Acenaphthpyridine, Part 1, by Srikumaran Unni Nair and John Lionel Simonsen. Pp. 13. 12 annas. Vol. 10A, Part 2: Oils and Fats from the Seeds of Indian Forest Plants. Part viii: The Oil from the Seeds of *Thevetia neriifolia* (Juss.), by Ramkanta Bhattacharya and P. Ramaswami Ayyar; Part ix: The Oil from the Seeds of *Cerbera odollam* (Gaertn.); Part x: The Oil from the Seeds of *Holarrhena antidysenterica*; Part xi: The Oil from the Seeds of *Anona squamosa* (Linn.), by Ramachandra Vishnu Ghanekar and P. Ramaswami Ayyar. Pp. 15-31. 12 annas. (Bangalore.)

Department of Commercial Intelligence and Statistics, India. Agricultural Statistics of India, 1924-25. Vol. 2: Area, Classification of Area, Area under Irrigation, Area under Crops, Live-Stock, and Land Revenue Assessment in certain Indian States. Pp. vii+87. (Calcutta: Government of India Central Publication Branch.) 1.4 rupees; 2*s.*

Department of Agriculture, Trinidad and Tobago. Guide to the Royal Botanic Gardens, Trinidad. By R. O. Williams. Pp. iii+30+vi+12 plates. (Trinidad, B.W.I.: Government Printing Office, Port-of-Spain.) 1*s.*