

### Birthdays and Research Centres.

Feb. 3, 1872.—Prof. F. J. COLE, F.R.S., professor of zoology, University of Reading.

My chief studies at present are concerned with the history of zoological discovery.

Feb. 4, 1875.—Dr. LUDWIG PRANDTL, For.Mem.R.S., director of the Kaiser Wilhelm Institute for Research on Fluid Flow at Göttingen.

In the Wilbur Wright Lecture before the Royal Aeronautical Society in May 1927, I pointed out that after the very satisfactory explanation of the lift on aerofoils and of all similar related problems, it is necessary to investigate the problem of resistance more closely, and that turbulence is an important factor in connexion with this latter question. Turbulence is that internal unrest in fluid motion which produces a continual mingling of fluid particles from the neighbourhood of the wall with those somewhat farther away, and as a result, frictional forces are increased, but the stream-line pattern approximates more closely to the form calculated for ideal fluids.

During the last few years, the investigations in my Göttingen Laboratory have gone into the properties of turbulent flow in great detail, and have, in fact, produced several important explanations. But much remains to be done, and much more work is necessary before the experimental results can be explained with the desired clarity.

Feb. 5, 1866.—Sir ARTHUR KEITH, F.R.S., Hunterian professor and Conservator of the Museum of the Royal College of Surgeons.

I am continuing my lifelong search for evidence bearing on the origin of man and of anthropoid apes. Especially am I concerned with factors which regulate or influence development and growth.

Feb. 6, 1852.—Dr. CONWY LLOYD MORGAN, F.R.S., emeritus professor of psychology in the University of Bristol.

One who enters on his eightieth year is not likely to be able to furnish an interim report of any new investigation now in progress. More probably he asks himself: What should I do were I near the start of my life-work instead of fast approaching its close?

Realising that comparative psychology is still in its infancy, I should concentrate attention for another lifetime on the earlier stages in the evolutionary genesis of mind in its natural process of concrescence. I should still urge that, since maturity is, in each individual, a novelty emergent on infancy, it does not accord with sound method in science to account for infantile (and even embryonic) occurrences in terms of mature processes if, on the available evidence, such processes are not as yet emergent in that instance of concrescent advance which is under scientific consideration.

Feb. 6, 1871.—Lieut.-Col. J. STEPHENSON, F.R.S., Indian Medical Service (retd.), formerly lecturer in zoology in the University of Edinburgh.

The main objects of my anatomical and systematic work on the Oligochæta are: (1) the tracing out of the course of evolution within the group—certain families, for example, the Megascolecidae, allow lines of descent to be traced within them with more and more certainty as our knowledge of the anatomy and distribution of their members increases; (2) to contribute to the science of palæogeography by means of an increasingly accurate knowledge of the earthworm faunas of the several regions of the globe. Since earth-

worms for the most part spread only by their own slow progression in the ground, to a life in which they are absolutely confined, a knowledge of the distribution of the various genera affords valuable material for determining the configuration of the land in former epochs.

### Societies and Academies.

LONDON.

Royal Society, Jan. 22.—P. M. S. Blackett and F. C. Champion: The scattering of slow  $\alpha$ -particles in helium. Mott has calculated the scattering of  $\alpha$ -particles by helium atoms on the assumption that the particles interact according to the inverse square law, that they have no nuclear spin, and that they obey the Einstein-Bose statistics. It is found that the scattering should vary periodically with changing angle and velocity; in fact, an interference pattern should be obtained the scale of which depends on the velocity. This theory has been tested by photographing the collisions between slow  $\alpha$ -particles and helium atoms in a Wilson chamber. The results are in complete agreement with Mott's theory.—W. A. Bone, R. P. Fraser, and F. Lake: Explosions of mixtures of acetylene and electrolytic gas. The disturbing influence of successive additions of acetylene upon the uniformity of the initial flame movement in an explosion of electrolytic gas attains a maximum when 20 per cent of acetylene is present in the medium, thereafter declining, and eventually disappearing when 30 per cent of acetylene is present. There is a primary selective partial combustion of acetylene,  $C_2H_2 + O_2 = 2CO + H_2$ , in the flame front, followed, behind the flame front, by either (i), when sufficient oxygen is present, a highly luminous combustion of the nascent carbon monoxide, or (ii) otherwise, by a thermal decomposition of any unburnt acetylene. The explosion of a  $C_2H_2 + O_2 + 2H_2$  mixture is differently affected by an equal dilution with argon or nitrogen.—W. A. Bone and R. P. Fraser: Flame speeds in the inflammation and detonation of  $CO-O_2$  mixtures. In the initial phase of 'inflammation', and in the final stage of 'detonation', the maximum flame speed for moist mixtures at atmospheric pressure is obtained with a *circa*  $3CO + O_2$ , instead of a theoretical  $2CO + O_2$  mixture. Dilution of the medium with either argon, helium, or nitrogen does not materially alter the proportions of carbonic oxide and oxygen in the maximum-speed mixture. Hence the point of maximum flame speed is principally determined by the concentration of carbon monoxide, and the combustion of moist carbonic oxide is conditioned by a prior 'excitation' of its molecules, which are then rendered combustible.—C. V. Jackson: Interferometric measurements in the arc spectrum of iron. Ten lines in the spectrum of the iron arc in air, between  $\lambda 4000$  and  $\lambda 4400$ , have been measured by interferometric comparison with the red line of cadmium or with the secondary standards of neon. Sixty-eight lines in the spectrum of the iron arc in air between  $\lambda 2300$  and  $\lambda 3100$  have also been measured interferometrically. The results are in good accord with the wave-lengths recommended by the International Astronomical Union in 1928.

EDINBURGH.

Royal Society, Jan. 12.—J. W. Gregory: The Dalradian rocks of Scotland and the structure of the Southern Highlands. The Dalradian rocks can be traced across the Southern Highlands of Scotland from Argyll to the Moray Firth and the coast south of Aberdeen. The author in 1910 rejected the

generally accepted conclusion that the oldest Dalradian rocks outcrop along the southern border of the Highlands, and that there is an ascending series to the Moine gneiss to the north. He regards the slates and grits to the south as a younger but still pre-Palaeozoic series (the Lennoxian), and as composed of Dalradian debris; the Dalradian band as consisting of five series, with the youngest to the north; and the Dalradian beds as having been deposited on the southern flank of a land composed of the Moine. The evidence for these conclusions is submitted in detail. The author regards the beds as in their original order, except where locally inverted as in Ben Lui and near Callander. He correlates the north-eastern Dalradian and Lennoxian rocks south of the Moray Firth with those of Perthshire and south-west Scotland, from which they are separated by the granites of the Cairngorms and western Aberdeenshire.—J. Weir: The British and Belgian Carboniferous Bellerophon-tida. Eighty-two forms are discussed under nine genera. The Bellerophon-tid faunas of various horizons and facies are tabulated and discussed, and attention is directed to assemblages of stratigraphical value in the Scottish Carboniferous succession and equivalent rocks in the north of England, with special reference to stages in the evolution of *Euphemus urei*, *Bucaniopsis decussatus*, and *Tropidocyclus oldhami*.—Elsie J. Cadman: Life history of *Didymium nigripes*. *Didymium nigripes* is a species belonging to the slime-fungi or Mycetozoa found growing on germinating beet-seeds, and it also grows frequently on dead leaves of many kinds. The spores germinate readily, each spore giving rise to two swarm-cells, because germination is preceded by a division within the spore-coat. At the division four chromosomes are present, and there are distinct centrosomes. After several divisions the swarm-cells withdraw their flagella and become transformed into myxamoebae. The myxamoeba possesses no flagellum and no bleparoplast and cannot become a swarm-cell again. They fuse in pairs to form zygotes. A plasmodium which may be slightly bigger than those in its neighbourhood, either because it possesses a great number of nuclei or has engulfed a larger number of myxamoebae, can exert some form of attraction on the smaller plasmodia around it, and they coalesce with it in large numbers. A large plasmodium, therefore, rapidly increases in size, and continues to do so by coalescing with the smaller plasmodia in its neighbourhood. Chromosome numbers were fully investigated.—R. Crookall: The genus *Lyginorachis* Kidston. This genus was instituted by the late R. Kidston, of Stirling, to include petrified leaf-stalks with a structure similar to that of the well-known Coal Measure plant *Lyginopteris oldhamia*. Though Kidston recognised and named two species of *Lyginorachis*, he described neither. In his admirable "Studies in Fossil Botany", Dr. D. H. Scott described, but did not figure, *L. papilio* from the Cementstone Group (Calceiferous Sandstone Series) of Norham Bridge, Tweedside. The second species was appropriately named by Kidston *Lyginorachis taitiana*. It was referred to, but not described, by Dr. Scott. Fortunately, Kidston had prepared excellent photomicrographs of both forms, and these are used to illustrate the paper.—J. Geronimus: Some problems involving the per-symmetric determinants.

## ROME.

Royal National Academy of the Lincei: Communications received during the vacation.—F. Enriques: Algebraic surfaces.—G. Barba: Generalised parallelism.—F. Odone: Rotation and divergence of a vector; gradients of a homograph in general curvilinear co-

ordinates.—Maria Pastori: Further on the partial derivation of tensors.—P. Cattaneo: A class of cyclic varieties.—M. G. Bouligand: General expression for the solidarity between the problem of the minimum of an integral and the corresponding Hamilton-Jacobi equation.—G. Andreoli: Pseudo-limits of functions, pseudo-continuity, etc.—M. Manarini: Lines of curvature and geodetics of a surface.—S. Finikoff: The "suites" of M. Fubini.—G. Bozza: Action of certain apparatus for blowing gases.—G. A. Barbieri: Complex thiocyanates of quadrivalent molybdenum. Various difficulties are encountered in the preparation of these compounds, but a number of them have now been obtained by carefully oxidising the corresponding trivalent molybdenum derivatives by means of potassium ferricyanide.—Giambattista Dal Piaz: New genera and new species of artiodactyls in the Venetian oligocene. Investigation of the numerous fossil artiodactyls of the Basle Museum indicates that the genus *Anthracochærus* occupies a completely isolated systematic position and shows a tendency to diverge from the complex type of *Anthracotheridae* and to approach in some respects that of certain primitive *Sindæ*. It is concluded that the Monteviale artiodactyl is not related to any of the numerous phylogenetic lines of the *Anthracotheridae*, but represents a type of which neither the eocene ancestors nor any oligocene successors are known.—G. Brunelli: Monotonous rotifer planktons in an elevated Apennine lake. The plankton of Lake Scanno consists mainly of *Cyclops strenuus* Fischer and of large masses of the rotifer *Asplanchna priodonta* Gosse.—Teodoro Perri: Behaviour of the optical vesicle of *Triton* grafted into embryos of *Rana esculenta* (Destruction and power of recovery).—Giulio Cotronei and Aldo Spirito: Zoological constitution and grafts. New experiments between Anura and Urodela (4).—G. Mezzadrolì and E. Vareton: Action exerted by radium on the germination of seeds. Experiments in which barley, wheat, peas, and beans were subjected to the influence of the  $\gamma$ -rays of radium show that the effect of a short exposure on the germination of the seeds is beneficial and that of a long one injurious. When 3.9 mgm. of radium was used, benefit became appreciably apparent after 5 minutes and reached a maximum after 30 minutes. With one-half of this amount of radium, the exposure must be quintupled. The best result obtained consisted of increases of 30 per cent in the number of seeds germinated, 80 per cent in the total height, and 80 per cent in the weight of the plants. The stimulating effect is still active two months after the irradiation.

## SYDNEY.

Royal Society of New South Wales, Oct. 1.—H. G. Roggatt: Thrust faults and compression joints in the Muree beds, near Grasstree, New South Wales. The beds in which the faults and joints occur, consist of sandstone and conglomerate—competent rocks—overlain and underlain by shale and mudstone—incompetent rocks—constituting an ideal series for the development of compression phenomena. Stress in a sandstone member is expressed by sharply defined faults which pass upward into conglomerate as monoclinical or slightly overturned folds. These thrust faults are inclined to the horizontal at an angle of about 30°. Joints are developed in two sets, one parallel to the faults and one inclined thereto at 120°. The fractures appear to obey Mohr's theory of rupture and furnish striking practical confirmation of Hartmann's law. Since the direction of thrust is known, the orientation of the strain ellipsoid is known, showing that the axis of maximum compression lies in the acute angle between the shear planes. Experimental determination of the angle of friction of the sandstone confirms

the view that the principal factor tending to reduce the fracture angle to less than 45° is the internal friction of the rock itself.—A. J. Matheson: The geology of the Wellington district, N.S.W., with special reference to the origin of the Upper Devonian Series. The oldest rocks are of Silurian age, comprising shales and limestones in which are interbedded a great volcanic series. The limestone occurs on two horizons and both are coralline; the upper limestone is the more highly fossiliferous and is the youngest of the Silurian rocks. It passes by a gradation through an arenaceous type into a calcareous sandstone and, finally, into sandstone itself; the sandstone series, in its upper part, contains *Lepidodendron Australe* and *Spirifer disjunctus*, and is, therefore, of Upper Devonian age. Sandstones are characteristically red in colour, and it is suggested that they were deposited under arid conditions. They are intruded by the Wuuluman granite.—G. F. K. Naylor: The history of the development of the present drainage system in the Marulan district. Theories involving river capture were advanced by Andrews in 1904 and by Woolnough and Taylor in 1906. Andrews suggested that the old Shoalhaven was beheaded by a tributary of the Hawkesbury, while the other writers postulated an old Wollondilly beheaded by a newly formed coastal stream. The theory now being put forward suggests that the present Shoalhaven-Kangaroo system originally flowed in a westerly direction away from the coast, in a manner analogous to the present Upper Nepean system. Capture and reversal by a coastal stream which developed as a result of the post-Tertiary uplift is regarded as having brought about the present river distribution.—A. R. Penfold and F. R. Morrison: Notes on the essential oils from some cultivated Eucalypts (2). The species consisted of *E. Australiana*, *E. Macarthuri*, *E. citroidora*, *E. Smithii*, *E. dives*, and *E. dives* variety 'A' and variety 'B'. Leaves from the trees of an avenue of *E. bicostata*, near Sydney, show considerable variation in size and shape although grown from the seed of one tree collected at Jenolan, New South Wales. The yield of oil varied from 1.23 to 2.4 per cent and the cineol content from 38 to 65 per cent. The species is really a form of *E. globulus* confined to the mainland of Australia and should have been named *Eucalyptus globulus* variety *bicostata*. The chemical constituents of the oil are similar to those of *E. globulus*, namely, isovaleric aldehyde, *d*- $\alpha$ -pinene, cineol, eudesmol, etc.

Official Publications Received.

BRITISH.

British Chemicals and their Manufacturers: the Official Directory of the Association of British Chemical Manufacturers (Incorporated). Pp. 405. (London.) Free.

The British Chemical Plant Manufacturers' Association. Official Directory of Members, 1931, with a Classified List of their Manufactures and Services. Pp. 151. (London.) Free.

County Borough of Southport: Meteorological Department. The Fernley Observatory, Southport: Report, and Results of Observations for the Year 1929. By Joseph Baxendell. Pp. 28. (Southport.)

The National Capital. The Presidential Address of Sir Josiah Charles Stamp delivered to the Royal Statistical Society, November 18, 1930. Pp. 24. (London: Royal Statistical Society.) 1s. 6d.

The Observer's Handbook for 1931. Published by the Royal Astronomical Society of Canada. Twenty-third Year of Publication. Pp. 77. (Toronto.)

Food Fakes: Ancient and Modern. By E. Gabriel Jones. Pp. 24. (London: Institute of Chemistry.)

Catalogue of the Twenty-first Annual Exhibition of Electrical, Optical and other Physical Apparatus, January 6, 7 and 8, 1931. Pp. 160+xl. (London: The Physical Society and the Optical Society.) 6d.

The Proceedings of the Royal Society. Series A, Vol. 130, No. A813, January 1. Pp. 289-481. (London: Harrison and Sons, Ltd.) 10s.

Department of Scientific and Industrial Research: Water Pollution Research. Summary of Current Literature. Vol. 4, Part 1, January 1931. Abstracts Nos. 1-188. Pp. 135. (London: H.M. Stationery Office.) 1s. 3d. net.

Uganda Protectorate. Annual Report of the Geological Survey Department for the Year ended 31st December 1929. Pp. 44. (Entebbe: Government Printer.) 3s.

Commonwealth of Australia: Council for Scientific and Industrial Research. Bulletin No. 48: Black Disease (infectious Necrotic Hepatitis) of Sheep in Australia: a Toxemia induced by a Specific Bacterium (*B. oedematis*) in Hepatic Lesions resulting from the Migration of young Liver Flukes (*F. hepatica*). By Dr. A. W. Turner. Pp. 141. (Melbourne: H. J. Green.)

The Indian Forest Records. Entomology Series, Vol. 14, Parts 11 to 14: On some Indian Coleoptera. Part 11: A new Genus and a new Species of Melasidae and a New Species of Elateridae, by E. Fleutiaux; Part 12: A new Genus and Two new Species of Longhorn Beetles from India (Coleoptera: Cerambycidae: Subfamily Lamiinae), by W. S. Fisher; Part 13: Immature Stages of Indian Coleoptera (7), by J. C. M. Gardner; Part 14: Three new Species of Lycidae, by R. Kleine. Pp. iii+17+3 plates. (Calcutta: Government of India Central Publication Branch.) 1 rupee; 1s. 9d.

FOREIGN.

United States Department of Agriculture. Circular No. 145: *Tiphia popillivora* Rohwer, a Parasite of the Japanese Beetle. By J. L. King and J. K. Holloway. Pp. 12. 10 cents. Technical Bulletin No. 215: A Biological Study of *Trichogramma minutum* Riley as an Egg Parasite of the Oriental Fruit Moth. By Alvah Peterson. Pp. 22. 5 cents. (Washington, D.C.: Government Printing Office.)

Report of the Director of the Institute for Biological Research. V., 1929-1930. Pp. 11. (Baltimore, Md.: Johns Hopkins University.)

Memoirs of the College of Science, Kyoto Imperial University. Series A, Vol. 13, No. 6, November. Pp. 369-397. (Tokyo and Kyoto: Maruzen Co., Ltd.) 1.00 yen.

The Science Reports of the Tôhoku Imperial University, Sendai, Japan. First Series (Mathematics, Physics, Chemistry). Vol. 19, No. 4. Pp. 365-472. (Tokyo and Sendai: Maruzen Co., Ltd.)

U.S. Department of Commerce: Coast and Geodetic Survey. Serial No. 481: Results of Observations made at the United States Coast and Geodetic Survey Magnetic Observatory at Sitka, Alaska, in 1923 and 1924. By W. N. McFarland. Pp. ii+102+10 plates. (Washington, D.C.: Government Printing Office.) 50 cents.

Mitteilungen des Geologischen Instituts der Landbouwhogeschool in Wageningen (Holland). No. 16: i. Vergleichende mikroskopische, physikalische und chemische Untersuchungen von einem Kalkstein- und einem Löss-Bodenprofil aus den Niederlanden; ii. Vergleichendes Studium von einem Kalkstein-Bodenprofil aus Holland und einem Kalkstein-Bodenprofil aus Java. Unter Mitwirkung von Prof. A. Te Wechel, Dr. L. Möser und C. van Aggelen. Bearbeitet von Prof. J. van Baren. Met een Beknopte Samenvatting in de Nederlandsche Taal. Pp. 105+20 Tafeln. (Wageningen: H. Veenman en Zonen.)

CATALOGUE.

Radio-Malt. Pp. 14. (London: The British Drug Houses, Ltd.)

Diary of Societies.

FRIDAY, JANUARY 30.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Dr. D. Hunter: Changes in the Bones in Hyperparathyroidism and Hypertyroidism.

INSTITUTION OF ELECTRICAL ENGINEERS (West Wales (Swansea) Sub-Committee) (at Corporation Electricity Showrooms, Swansea), at 6.—J. Urmston: The Electrical High-Pressure Testing of Cables and the Localisation of Faults.

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS (at Mining Institute, Newcastle-upon-Tyne), at 6.—C. F. Christensen: The Whaling-Factory Ship *Vikingen*, with some Notes on Whaling.

JUNIOR INSTITUTION OF ENGINEERS (Informal Meeting), at 7.30.—W. Fish: Modern Methods of Production of Small Machined Work.

ROYAL INSTITUTION OF GREAT BRITAIN, at 9.—Prof. G. M. Trevelyan: The First Defence of Gibraltar by the English, Oct. 1704-April 1705.

ROYAL AERONAUTICAL SOCIETY (Hull and Leeds Branch).—Col. the Master of Sempill: Gliding and Soaring.

SOCIETY OF DYERS AND COLOURISTS (Scottish Section).—D. K. Colledge: Dyeing for the Scottish Tweed Trade.

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY (Chemical Section).

SATURDAY, JANUARY 31.

BRITISH MYCOLOGICAL SOCIETY (in Botanical Department, University College), at 11 A.M.—Dr. A. S. Horne: (a) Nuclear Division in *Spongospora*; (b) Preliminary Study of the Fungus Flora of the Air.—N. M. Nitimargi: Factors Influencing Spore Formation.—L. N. Seth: Factors Influencing Fungal Growth.—W. C. Moore and Dr. A. Smith: Notes on Some Interesting Fungi Recently Recorded.—A. A. Pearson: A Fungus Foray in Spain.

MATHEMATICAL ASSOCIATION (at Bedford College for Women), at 3.—Annual Meeting.

ROYAL INSTITUTION OF GREAT BRITAIN, at 3.—Dr. E. Cammaerts: Flemish Art (2): Breughel.

MONDAY, FEBRUARY 2.

ROYAL SOCIETY, EDINBURGH, at 4.30.—Sir E. A. Sharpey-Schafer: Observations on the Relative Rate of Growth of the Nails of the Right and Left Hands respectively: on Seasonal Variations in the Rate, and on the Influence of Nerve Section upon it.—Dr. F. J. W. Whipple: A Note on the Secular Changes of Rock Temperature on the Caltan Hill.—To be read by title.—Prof. E. L. Ince: Zeros and Turning Points of the Elliptic Cylinders.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—H. H. Woollard: The Potency of the Pharyngeal Entoderm.

ROYAL INSTITUTION OF GREAT BRITAIN, at 5.—General Meeting.

SOCIETY OF ENGINEERS (at Geological Society), at 6.—H. W. Towse: Presidential Address.