

Association that: "In the belfry of the Wesleyan Chapel, on the west side of Woodhouse Moor, there are narrow, horizontal openings through which the setting sun can send his rays. . . . On Saturday, 26th April, between 7.15 and 7.30 p.m. I was so exceptionally fortunate as to observe, through the openings, no fewer than three green and redflashes. The red ones were seen just as the base of the sun successively revealed itself below each of the upper edges of three openings. The green ones were seen just as the top of the sun disappeared behind each of the lower edges of the openings. Moving aside afterwards, in order to watch the actual sunset on the true horizon, distant some three miles, I observed a beautiful bluish green flash just as the sun's top sank out of sight at 7h. 23m. The sky was singularly clear, and there was a cool fresh breeze from north-east."

April 26-29, 1928. Dust Fall.—A great fall of dust took place in eastern Europe, travelling in a west-north-west direction from the coast near the Sea of Azov, as far as the upper Weichsel. The darkness was so great that artificial light was in use all day, and in southern Russia the fallen dust formed heaps like snow drifts a foot or more in depth, but farther to the north-west the depth was less than a sixth of an inch. The origin of the dust is unknown, but it occurred with an easterly wind, and was heaviest where this wind reached the coast from the open sea.

### Societies and Academies.

#### LONDON.

Linnean Society, Mar. 20.—C. Tate Regan: A new Ceratioid fish (*Caulophryne* sp.), female with male, from off Madeira. The fish represents a new species of the genus *Caulophryne*, distinguished from *C. jordani* Goode and Bean by the greater number of dorsal and anal rays and by the filaments on the stem of the illicium. Although distended by a recently-swallowed fish larger than itself, it took a bait, and was caught on a long line off Madeira. The specimen is a female, 210 (145 + 65) mm. long, with a dwarfed and parasitic male 21 (16 + 5) mm. long attached to its abdomen.—Lieut.-Colonel J. Stephenson: On an Oligochæta worm parasitic in frogs of the genus *Phrynomerus*. A specimen of a Nigerian frog, *Phrynomerus microps*, recently examined had a number of small worms hanging out in a cluster of about a dozen from the anterior angle of each eye and from under the neighbouring part of the lower lid. The worms belonged to a new species of the genus *Nais* of the freshwater family Naididæ. In a second species of the genus *Phrynomerus* (*bifasciatus*), from Beira, Portuguese East Africa, the Harderian (lacrymal) glands were found to be distended and transformed into a sac containing a number of small worms; these belonged to the same species as the preceding. This discovery prompted the stripping of the mucous membrane from the roof of the mouth of the first frog, from Nigeria, when it was discovered that in it also the Harderian glands contained a number of the worms. Oligochæta are rare as external, and still rarer as internal parasites.

Society of Public Analysts, April 2.—Ella M. Collin: The separation of cadmium and copper in spelter and zinc ores by internal electrolysis. The most satisfactory method is to deposit the copper first from a sulphate solution containing a small excess of sulphuric acid, to dissolve the copper in excess of nitric acid, and to electrolyse the solution at 70°. The original sulphate solution is readjusted with ammonia, sulphuric acid, and sodium acetate, and the cadmium

electrolytically deposited. The anodes are of zinc, and a 5 per cent solution of zinc sulphate acidified with sulphuric acid is used in the anode compartments.—A. F. Lerrigo: Routine detection of nitrates in milk. A modification of the diphenylamine test is capable of detecting the addition of 5 per cent of a water containing about 0.5 part of nitric nitrogen per 100,000. The test is regularly applied in Birmingham to all samples of milk containing less than 8.5 per cent of solids-not-fat.—J. C. Ghosh: The determination of titanium as phosphate. The prepared ore or clay is fused with sodium carbonate, and the mass treated with boiling water, which dissolves aluminium and silica as sodium salts, leaving sodium titanate in the residue. This is hydrolysed and is then dissolved in either sulphuric or hydrochloric acid, and when boiled yields a precipitate of metatitanic acid. This is dissolved, the solution just neutralised with ammonia, and the titanium precipitated and weighed as phosphate.

#### LEEDS.

Philosophical and Literary Society, Mar. 4.—J. E. Roberts: Note on the critical potentials of the hydrogen molecule. The observed critical potentials of the hydrogen molecule are considered in the light of the potential energy curves for the various states and the Franck-Condon principle. The most probable energy change requires 12.8 volts, though this is not, strictly speaking, a critical potential, the latter being in the region of 12 volts. A further potential between 8 and 9 volts reported by Jones and Whiddington is probably due to the excitation of the triplet states with consequent dissociation of the molecule and emission of the continuous spectrum.—J. E. Roberts and R. Whiddington: The passage of electrons through argon. Excitation potentials of argon have been investigated experimentally by the magnetic spectrum method already described. The three sharp loss lines have been examined photo-metrically, and found to be much narrower than the corresponding loss lines in the case of certain diatomic molecules. In order of intensity, the losses in volts of the lines are 11.6; 14.1; 13.0, and this is the descending order of their intensities.—E. C. Stoner: (1) Free electrons and ferromagnetism. The question is considered as to whether ferromagnetism may be due to 'free electrons', that is, electrons forming an 'electron gas' as in Sommerfeld's theory of conductivity. For spontaneous magnetisation to occur, the change in the interaction energy associated with magnetisation must exceed the increase in the kinetic energy of the electrons. On this basis, it is shown that the Curie temperature  $\theta$  would have a minimum value depending on the saturation intensity  $I_0$ . To a sufficient approximation  $\theta > 6.74 \times 10^2 \times I_0^{2/3}$ . This gives  $\theta > 43,160^\circ$  for nickel (observed  $640^\circ$ ) and correspondingly large values for other ferromagnetics. It is concluded that ferromagnetism is not due to free electrons, but to interchange interaction electrons as in Hasenbergs theory. If the 'magnetic' electrons are the same as the conduction electrons, as Dorfmann's thermo-electric measurements indicate, it follows that conductivity may be due to interchange electrons. The bearing of this on the theory of the magnetic and electric properties of metals is indicated. (2) The interchange interaction theory of ferromagnetism. Considering the atoms in a crystal as separate systems interacting with neighbouring atoms, a very simple treatment of the interchange interaction theory of ferromagnetism is given. The method differs from that of Heisenberg, who considers the whole crystal as a single system. The terms which make the original formulæ unsatisfactory

as a representation of the experimental results do not appear. The final expressions of the magnetisation energy are formally equivalent to those given by the Weiss theory, if the classical assumption of continuous orientations of the carriers is appropriately modified. The agreement with the observations on ferromagnetics is very satisfactory.—H. Burton: Mobile anion tautomerism (Pt. 5):  $\gamma$ -phenyl- $\alpha$ - $p$ -dimethyl-amino-phenylallyl alcohol. Attempts to prepare the above alcohol have resulted in the formation of a mixture of products, which on treatment with hydrochloric acid furnishes a crimson coloration. The cause of the colour is discussed.—E. Cockerham: Some observations on cambial activity and seasonal changes in starch content of sycamore (*Acer Pseudoplatanus*). The activity of the cambium in producing both xylem and phloem has been followed throughout the year in all parts of the stem and root of *Acer Pseudoplatanus*. Cambial activity is found to initiate in the buds in the spring, and from thence to work basipetally downwards on to the main roots. In the distal region in the root this seasonal activity is thus superimposed upon a very slow cambial activity which seems to be practically continuous in this region of the root. Fluctuations in starch content are discussed in relation to these data.—H. L. Newby and W. H. Pearsall: Observations on nitrogen metabolism in the leaves of *Vitis* and *Rheum*. Ratio of protein to soluble nitrogen changes with the age of the leaf, and increases when the water content of the leaf is caused to fall. The diurnal fluctuations in this ratio are correlated with changes in acidity, increases in acidity being associated with increases of the proportion of protein.—Rosa M. Tupper-Carey: Observations on the anatomical changes in tissue bridges across rings through the phloem in trees. In a zigzag bridge of phloem left across a ring upon a tree, the new xylem and phloem in the horizontal portion of the bridge is eventually formed with its elements extended in a horizontal direction. The developmental changes in the cambium are followed in detail, which bring about this alteration in direction of the elements which differentiate from the cambium.—R. G. S. Hudson: The age of the *Lithostrotion arachnoideum* fauna of the Craven Lowlands. The recorded horizons of the various species of the *L. arachnoideum* fauna are noted, and the faunal assemblage is considered to be of  $S_2$  age. The bearing of this determination on the age of the Clitheroe-Pendle succession is discussed. Various *Lithostrotions* are also re-described.

## PARIS.

Academy of Sciences, Mar. 10.—The president announced the death of Camille Viguier, *Correspondant* for the Section of Anatomy and Zoology.—A. Cotton and G. Dupouy: Measurements of magnetic double refraction with the large Bellevue electromagnet. Details of the methods employed for determining the field strength, and of the apparatus used in the optical measurements.—Lucien Daniel was elected *Correspondant* for the Section of Botany.—Paul Lévy: The probability and the asymptotic frequency of the different values of the complete and incomplete quotients of a continued fraction.—Elie Cartan: The linear representations of the group of rotations of the sphere.—Georges Giraud: Certain problems at the limits concerning equations of the elliptic type.—Paul Flamant: The reduction and the independence of the conditions imposed on families of abstract vectors.—Georges Valiron: Integral functions defined by a class of Dirichlet series.—P. Dupin and M. Teissié-Solier: The distribution of the pressures round an immersed cylinder. An experimental study

of the distribution of the pressures on a cylinder immersed in a current of water, the results in non-turbulent flow being compared with those obtained with turbulent flow.—Alex. Véronnet: The displacement of the poles and the deviation of the continents.—Corps: The interpretation of the Sagnac and Michelson experiments.—Henri Mineur: The field of gravitation of a variable mass.—F. Joliot: The electrical properties and the structure of the metallic films obtained by thermal and cathodic projection. A study of the causes of the resistance changes in these films: the presence of occluded gas, slowing down the recrystallisation of the metal, would appear to be the principal cause of the diminution of electrical resistance.—H. Pélabon: The copper oxide rectifier. The results are given of a study by metallographic methods of a copper oxide-copper rectifier.—D. Chalonge and Ny Tsi Zé: The variations of the continuous spectrum of the hydrogen molecule with the conditions of excitation.—G. Déjardin and R. Ricard: The first spark spectrum of mercury (Hg II).—A. Smits and Mlle. C. H. Macgillavry: Remarks on the note of Mlle. Maracineanu. The authors have not verified the results of Mlle. Maracineanu in all respects, but only so far as concerns the measurements relating to the radioactivity of lead from the roof of the Paris Observatory. Details of a very sensitive method for detecting traces of mercury in lead are given.—H. Deslandres: Remarks on the preceding communication.—Pierre Poulenc: The alkaline bromo salts of rhodium.—Marcel Godchot and Mlle. G. Cauquil: The methyloxyheptanols. Details of the properties of three alcohols obtained by the reduction of the two methyl-cycloheptanones described in an earlier communication.—R. Cornubert and R. Humeau: An ultimate property of the carbonyl group. It has been shown that the ketone  $\gamma$ -methyl- $\alpha\alpha'$ -tetrapropylcyclohexanone gives neither an oxime, phenylhydrazone, nor tertiary alcohol with magnesium methyl iodide, and can only be characterised by reduction to the secondary alcohol and transformation into the acetate. Another ketone,  $\beta$ -methyl- $\alpha\alpha'$ -tetrapropylcyclohexanone, has now been found to possess similar abnormal properties, but this also can be converted by reduction into the secondary alcohol.—Léon Piaux: Some quaternary iodides derived from phenylaminoacetic acid and the corresponding betaines.—O. Munerati: Observations on the duration of the cycle of the beetroot.—H. Bierry: Glycogen, glucidic reserves, in the starving animal.—Mlle. G. Cousin: The diapause of *Lucilia sericata*. Experiments on *L. sericata* have given results at variance with the views of Roubaud. The diapause (arrest of larval evolution) can always be traced to external conditions.—H. Colin and E. Guéguen: The sugar of the Floridae. The sugar of the marine Floridae is a compound of  $\alpha$ -galactose and has nothing in common with trehalose.—M. Javillier and Mlle. L. Emerique: The vitamin activity of carotene. Crude carotene, arising from leaves of spinach, has the physiological property of vitamin A. It is active in very small doses, less than 0.01 mgm. per day. The activity of carotene remains high after keeping for forty years. It still remains an open question whether the physiological effects of carotene are due to the substance itself or to some adsorbed substance.—A. Leulier and L. Revol: The distribution of cholesterol and its esters in the suprarenal capsules.—J. Nicolas: Ulcerated X-ray epithelioma cured by diathermocoagulation.

## PRAGUE.

Czech (Bohemian) Academy of Sciences and Arts (Second Class, Natural Science and Medicine), Jan. 10.—J. Milbauer: Studies in the preparation of vege-

table charcoal (1). The action of calcium chloride as activator. The decolorising power of charcoal depends on the tissue of the initial material and the temperature and duration of burning. The best material is that with a great content of cellulose.—M. Mikan: Cremona correspondence in quadridimensional space given by four correlations.—V. Spaček: Complex swings of the magnetic declination needle.—E. Votoček and F. Valentin: Studies in the series of rhodose (*d*-galacto-methylose).—E. Votoček and V. Kučerenko: Studies in the series of fucose (*l*-galacto-methylose). In both the above communications the optical rotation of the derivatives of rhodose, epirhodose, fucose, epifucose are studied and an entire agreement is found with the Hudson's rule; this confirms Hudson's rule also in the series of methyl-pentoses.—V. Pospíšil: Experimental studies on the pressure effect of light upon microscopic particles.—O. Michal: The *K*-absorption and the satellites of the ferromagnetic elements. The wave-length of the *K*-absorption edge is negligibly affected, when varying the crystalline diffraction grating.—J. Klíma: The construction of flecnoidal lines on the skew planes of fourth order.—F. Herles: The significance of the segment *RT* and of the wave *T* in the electrocardiogram for the diagnosis of pathological changes in the myocardium.

## WASHINGTON, D.C.

National Academy of Sciences (Proc., Vol. 15, No. 12, Dec. 15, 1929).—Chas. W. Metz and M. Louise Schmuck: (1) Unisexual progenies and the sex chromosome mechanism in *Sciara*. It has been shown previously that sex of individual depends on the sperm, but the types of sperm functioning depend on the zygotic constitution of the female. Both characteristics are determined by the sex chromosomes, of which there appear to be three kinds.—(2) Further studies on the chromosome mechanism responsible for unisexual progenies in unisexual progenies in *Sciara*. Tests of 'exceptional' males. Such individuals, to be expected on the hypothesis put forward above, were found.—M. Demerec: Changes in the rate of mutability of the mutable miniature gene of *Drosophila virilis*. The lines of mutable miniature are described and the rate of change from one to the other determined.—L. J. Stadler: Chromosome number and the mutation rate in *Avena* and *Triticum*. Cultivated oats and wheat are polyploid forms and treatment with X-rays produces very few mutants, as judged by seedling characters, in contrast with cultivated barley (normal chromosome content) in which many mutants are produced. This appears to be connected with reduplication of chromosomes in polyploid species.—Donald A. Johansen: A proposed phylogeny of the Onagraceae based primarily on number of chromosomes.—Delmer C. Cooper: The chromosomes of *Buginvillaceae*.—Robert F. Weill: New results from the study of cœlenterate nematocysts (preliminary note). A comprehensive study of nematocysts from 109 species has been made; the nematocysts are of taxonomic value.—Harold Osterberg: An interferometer method of observing the vibrations of an oscillating quartz plate. One mirror of the interferometer is replaced by the crystal, which is mounted so that reflection occurs at the surface to be examined.—Jenny F. Rosenthal and F. A. Jenkins: Perturbations in band spectra (2). Perturbations in the Angström bands of carbon monoxide are discussed.—Marie J. Weiss: On groups defined by  $A^q=1$ ,  $B^{-1}AB=A^2$ ,  $B^e=A^*$ .—Tracy Yerkes Thomas: On the existence of integrals of Einstein's gravitational equations for free space and their extension to *n* variables.

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## Official Publications Received.

## BRITISH.

- Imperial Department of Agriculture for the West Indies. Report on the Agricultural Department, Grenada, for the Period 1926 to 1928. Pp. ii+12. (Trinidad.) 6d.
- Board of Education. Educational Pamphlets, No. 79: Report of an Inquiry into the Teaching of the Geography of the British Empire in certain types of Schools. Pp. 29. (London: H.M. Stationery Office.) 4d. net.
- The Economic Proceedings of the Royal Dublin Society. Vol. 2, No. 26: Experiments on the Establishment of Rice Grass (*Spartina Townsendii*) in the Estuary of the Lee. By Prof. H. A. Cummins. Pp. 419-421+plate 28. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) 6d.
- Report of the Marlborough College Natural History Society for the Year ending Christmas 1929. (No. 78.) Pp. 120+5 plates. (Marlborough.) To Members, 3s.; non-Members, 5s.
- Transactions of the Royal Society of Edinburgh. Vol. 56, Part 2, No. 19: Chromosome Linkage and Syndesis in *Enothera*. By David G. Catcheside. Pp. 467-484+3 plates. (Edinburgh: Robert Grant and Son; London: Williams and Norgate, Ltd.) 3s. 6d.
- Government of India: Department of Industries and Labour. Note on the Functions, Organisation and Present Developments of the Indian Meteorological Department. Pp. 12. (Delhi: Government of India Press.)
- The Mining Institute of Scotland. Fifty-second Annual Report of the Council, 1929-1930. Pp. 4. (Glasgow.)
- Asiatic Society of Bengal. Presidential Address, 1930. By U. N. Brahmachari. Pp. 12. Annual Report for 1929. Pp. 80. (Calcutta.)
- Journal of the Chemical Society. March. Pp. iv+321-569+xii. (London.)
- Department of Agriculture, Madras. Bulletin No. 89: The Conduct of Field Experiments. By R. O. Iliffe and B. Viswa Nath. Pp. vii+51. (Madras: Government Press.)
- Transactions of the Geological Society of South Africa. Vol. 32, containing the Papers read during 1929. Pp. iv+190+9 plates. 42s. Proceedings of the Geological Society of South Africa: containing the Minutes of Meetings and the Discussions on Papers read during 1929; to accompany Vol. 32 of the Transactions, January-December 1929. Pp. iii+lx. (Johannesburg.)
- The Indian Forest Records. Silviculture Series, Vol. 15, Part 1: Classification of Thinnings. Pp. vii+8 plates. (Calcutta: Government of India Central Publication Branch.) 14 annas; 1s. 6d.
- Transactions of the Institute of Marine Engineers, Incorporated. Session 1930, Vol. 42, March. Pp. 105-203. (London.)
- Clifton College Scientific Society. Report for the Years 1926-29. Pp. 24. (Bristol.)
- Souvenir, Henry Hill Hickman Centenary Exhibition 1830-1930 at the Wellcome Historical Medical Museum, 54 Wigmore Street, London, W.1. Pp. 85. (London: The Wellcome Foundation, Ltd.)
- Indian Central Cotton Committee: Technological Laboratory. Technological Bulletin, Series B, No. 5: A Comparison of some Methods of Testing the Breaking Strength of Single Cotton Fibres. By Harirao Navkal and K. R. Sen. Pp. 10. (Bombay.)
- Ministry of Health. Eighth Report of the Advisory Committee on the Welfare of the Blind to the Minister of Health, 1928-29. Pp. 34. (London: H.M. Stationery Office.) 6d. net.
- Ministry of Health. Final Report of the Departmental Committee on Ethyl Petrol. Pp. 91. (London: H.M. Stationery Office.) 1s. net.
- Proceedings of the Royal Society. Series A, Vol. 127, No. A804, April 1. Pp. 240. (London: Harrison and Sons, Ltd.) 8s.
- Tanganyika Territory: Department of Agriculture. Annual Report 1928-29. Part 1: Agricultural Administration and Progress. Pp. 46. 2s. Part 2: Agricultural Investigation. Pp. 36. 2s. (Dar es Salaam: Government Printer.)
- Scottish Marine Biological Association. Annual Report 1928-29. Pp. 24. (Millport.)
- The Scientific Proceedings of the Royal Dublin Society. Vol. 19 (N.S.). No. 34: Responses of Plant-Tissues to Electric Currents. By Prof. H. H. Dixon and T. A. Bennet-Clark. Pp. 415-420. 6d. Vol. 19 (N.S.). No. 35: Electrical Properties of Oil-Water Emulsions with Special Reference to the Structure of the Plasmatic Membrane. By Prof. H. H. Dixon and T. A. Bennet-Clark. Pp. 421-440. 1s. 6d. Vol. 19 (N.S.). No. 36: Studies in Peat. Part 4: Low Temperature Carbonisation under various Conditions. By Colm O'Sullivan and Joseph Reilly. Pp. 441-446. 6d. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.)

## FOREIGN.

- Memoirs of the College of Science, Kyoto Imperial University. Series A, Vol. 13, No. 1, January. Pp. 100. (Tokyo and Kyoto: Maruzen Co., Ltd.)
- Proceedings of the United States National Museum. Vol. 77, Art. 3: A Revision of the North American Species of Ichneumon-Flies of the Genus *Odontomerus*. By R. A. Cushman. (No. 2826.) Pp. 15. (Washington, D.C.: Government Printing Office.)
- Annalen van de Sterrewacht te Leiden. Deel 16, Stuk 4: Discussion of Old Eclipses of Jupiter's Satellites. By W. de Sitter. Pp. 80. (Leiden.)
- Publikationer og mindre Meddelelser fra Københavns Observatorium. Nr. 67: Fortgesetzte Untersuchungen über asymptotische Bahnen im Probleme Restreint; Über das System periodischer, in Bezug auf die  $\zeta$ -Achse unsymmetrischer, asymptotischer Bahnen. Von Elis Strömgrén. Pp. 61+2 Tafeln. (København: Bianco Lunos Bogtrykkeri A.-S.)
- Occasional Papers of the Bingham Oceanographical Collection, Peabody Museum of Natural History, Yale University. No. 3: On the Osteology and Classification of the Piculate Fishes of the Genera *Aceratias*, *Rhynchoeratas*, *Haplophryne*, *Laevoeratas*, *Allector* and *Lipactis*; with Taxonomic and Osteological Description of *Rhynchoeratas longipinnis*, new species, and a special Discussion of the Rostral Structures of the *Aceratiidae*. By Albert Eide Parr. Pp. 23. (New Haven.)