

advanced students produce papers dealing with subjects of research which are accepted by leading scientific journals in Europe. In the past years the Government of India has contributed generously to the capital requirement of the University of Calcutta, which also draws an annual sum, the capitalised value of which is 36½ lakhs, and generous gifts have been received recently from the late Sir Taraknath Palit and Dr. Rashbehari Ghosh. In Bombay the contributions of few public-minded citizens to the proposed Royal Institute of Science have totalled nearly 25 lakhs, while Sir Chinubhai Madhav Lal has endowed the Institute of Science of Ahmedabad with six lakhs, giving a further two lakhs to the Gujerat College, with which it is associated. Lord Hardinge also dealt with the question of university buildings and libraries. The universities of India have recently made laudable efforts, which have been substantially aided by the Government, to provide for themselves local habitations in the shape of buildings befitting their dignity, and libraries where their alumni may learn the use of books and the methods of investigation and research which collections of books alone make possible. Calcutta has not been behindhand. Thanks to the generosity of the Maharaja of Darbhanga, the University is now possessed of a handsome library. The students of the Law College are accommodated in a hostel towards which the Government contributed three lakhs. The Government has also made a grant of eight lakhs for the purchase of a valuable site which abuts on the University buildings, and the acquisition of which should permit of further extension.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, March 26.—Dr. A. Russell, vice-president, in the chair.—Prof. A. W. Porter and F. Simeon: The change of thermal conductivity with fusion. The change in question was determined for mercury and for sodium by finding the temperatures at different points of a cylinder of the metal contained in a glass tube. The ends of the cylinder were maintained at such temperatures that the metal was liquid half-way down its length, the remaining part being solid. The temperatures were taken by means of thermo-electric junctions inserted in narrow tubular depressions which had been formed in the glass tube by forcing a knitting needle down into the locally heated glass. The ratio of the thermal conductivity for solid and liquid was estimated from the slope of tangents drawn to the temperature-curve on each side of the melting point. The values of these ratios are of the same order as the ratio of the corresponding values of the electrical conductivities. The mean value for mercury is 3.91, and for sodium 1.31.—Dr. J. A. Fleming: An instrument for the optical delineation and projection of physical curves such as hysteresis, resonance, and characteristic curves. This instrument is designed for projecting on to a screen or photographing on a plate such curves as magnetic hysteresis, resonance, or characteristic curves which can be performed slowly, or are non-periodic or non-repetitive.—Dr. P. Phillips and J. Rose Innes: The stability of some liquid films. The authors give a simple method of calculating the equilibrium form of a thin film which is a surface of revolution. They then consider the stability for certain kinds of displacement of three classes of such films, viz., the sphere, the cylinder and the catenoid. The mathematics used is quite elementary throughout and the

treatment is rigorous.—Prof. A. W. Porter and E. Talbot Paris: A demonstration of the green-flash of the setting of an artificial sun. A large disc of card mounted so that it can be slowly rotated has a hole, 1 in. in diameter, cut in it about 2 in. from the periphery. This is covered with red gelatine films, and is illuminated from behind so as to form an artificial sun. The front of the disc is covered with white Bristol board and is moderately illuminated by a lamp in front. This sun is viewed through a rectangular aperture (4 in. wide) in a blackened board, the lower edge of the aperture serving as the horizon. When the disc is rotated the artificial sun sets and green after-images are obtained of characters varying according to the amount that the eye has been exposed to the bright sun. If the sun is not viewed until immediately before the complete setting the after-image represents simply the disappearing segment to which it is due. The authors claim that this phenomenon is what is often described as the green-flash at sunset, though they are ready to admit that other (but probably rarer) phenomena also go under the same name.

MANCHESTER.

Literary and Philosophical Society, March 23.—Mr. F. Nicholson, president, in the chair.—T. A. Coward: A note on the behaviour of a blackbird—a problem in mental development. The author referred to the habit of certain birds—individual, not specific—which when stirred by spring rivalry will fight with their own reflections as seen in windows, and spoke, in particular, of a male blackbird which for more than a month has been daily assaulting its own image in a particular window. A blackbird, presumably the same, behaved in a similar way at the same window all through last spring. Attention was directed to the psychological problem presented by a bird with an excellent memory but without any apparent power of learning by experience. The recollection of this visionary antagonist was stimulated by the seasonal sexual activity and died down with the normal waning of this force.—A. W. Rymer Roberts: Two cases of parallelism in the Aphidæ. Parallel series of aphids may co-exist on the same or on different plants, having the same ancestry but differing in habits and sometimes also in form. The phenomenon was first brought in prominence by Cholodkovsky's recent researches on Chermes. Though there exists some doubt, in the light of more recent research, whether the instances principally relied upon are not those of distinct biological species, other instances have been discovered of as many as four parallel forms being descended from the winter-form on the secondary host-plant in certain species of Chermes. Parallelism exists also in other groups, as in the Pemphiginæ, two instances observed being (1) *Thecabius affinis*, a species migrating between poplars and Ranunculus, and (2) *Hamamelistes tullgreni*, so far only found on birch. *T. affinis* has been found continuing to live over the winter on Ranunculus after the migrating individuals have returned to the poplar. *H. tullgreni* has been observed in England for the first time during the past year. Certain of its forms resemble scale insects. It has so far only been found upon birch, but winged individuals fly from that to some other plant, leaving wingless individuals to continue the race on the birch, both being descended from a single ancestress by parthenogenesis.

EDINBURGH.

Royal Society, March 1.—Prof. Hudson Beare, vice-president, in the chair.—H. Levy: The resistance of a fluid to a body moving through it. In this paper

it was shown that trails of vortices following in the wake of a body moving through a fluid did not form a stable system, so that the theory recently advanced by Karman, which was based upon a suggestion made originally by Kelvin, did not seem to be tenable. The paper also contained an interesting development of the method of finding the stream lines with certain definable forms of boundary.—F. D. Miles: The electrical conductivity of aqueous hydrochloric acid, saturated with sodium chloride; and on a new form of conductivity cell. Within the range of concentration (15 to 27 per cent. of hydrogen chloride) the specific conductivity is lowered by saturation with salt. The salt-saturated acid of maximum conductivity was prepared by adding salt to a solution containing 21.9 per cent. of hydrogen chloride, whereas the best conducting solution of hydrogen chloride alone contains only 19.1 per cent. of that substance. The conductivity cell described was specially suitable for solutions which are saturated or contain volatile constituents.—F. D. Miles: The reaction between sodamide and hydrogen. At temperatures near to 250° C. these substances react according to the formula, $\text{NaNH}_2 + \text{H}_2 = \text{NaH} + \text{NH}_3$.

March 15.—Prof. Bower, vice-president, in the chair.—Dr. J. H. Ashworth: The larvæ of *Lingula* and *Pelagodiscus*. Sixteen larvæ of *Lingula analima* were taken by him last year in the surface waters of the southern part of the Red Sea, and one in the Indian Ocean about 4° south of Colombo. The latter is noteworthy because of the depth of water (2200 fathoms) in the locality where the larva was taken. The larvæ varied from 0.5 to 1.6 mm. in length. Descriptions were given of the alimentary canal, calomoducts (nephridia), and statocysts, and of the changes in shape of the shell valves as growth proceeds. An account was also given of the anatomy of the larva of *Pelagodiscus (Discinisca) atlanticus*, based on six specimens, about 0.4 mm. in length, which were taken in October last a few miles west of Cape Cormorin in water of 40 fathoms. Adult specimens of this Brachiopod have almost entirely been recorded from deep water. Blochmann has denied the presence of statocysts in both *Lingula* and *Pelagodiscus*, but these organs were certainly present in both genera.—C. Cochrane: The reflective power of pigments in the ultra-violet. The diffuse reflection from the prepared strip of pigment, which was illuminated by a complete iron-arc spectrum, was photographed, a similar photograph of the reflection from a contiguous strip of white cardboard being simultaneously taken as a standard of comparison. More than thirty different pigments were experimented with, and of these the greater number showed selective reflection in the higher ultra-violet. There were, however, marked exceptions, such as Chinese white, the reflective power of which rapidly diminished as the wave-lengths became shorter.—Dr. W. T. Gordon: Archæocyathinæ collected by the Scottish National Antarctic Expedition. The specimens were obtained in a block of limestone dredged in the Weddell Sea, and associated with them were remains of calcareous algæ and sponges. The Archæocyathinæ can be grouped under the genera Archæocyathus, Spirocyathus, Coscinocyathus, Syringocnema, and Protopharetra. The fauna shows striking similarity with that described by Taylor from the Cambrian rocks of South Australia.

PARIS.

Academy of Sciences, April 6.—M. Ed. Perrier in the chair.—G. Bigourdan: The instrumental undulations of images; their daily and annual variation and their

relation with the general state of the atmosphere. A discussion of the causes and means of elimination of the irregular movements of the focal images of stars.—Paul Appell: The approximate inversion of certain real integrals, and on the extension of Kepler's equation and Bessel's functions.—L. E. Bertin: Calculation of the increase of velocity or of range of submarines resulting from increase of their dimensions. Data furnished by ordinary vessels are not directly applicable to submarines. It would appear that the maximum speed and range will be reached for a submarine having a displacement at the surface of 1000 tons.—Maurice Hamy: Radiography in the hospital at the Institute. Radiographs of all the wounded are made as they enter the hospital in the same attitude on two distinct plates, the bulb being moved a distance of 7 cm. The negatives, examined in a specially constructed stereoscope, show the position of the metallic fragment or damaged bone in relief, by means of which the operation is much simplified.—M. Guignard: The formation of pollen.—J. Bosler: The rotation of the solar corona. Measurements of the red line of wavelength 6374.4 on the east and west borders gave by the application of the Doppler-Fizeau principle a tangential velocity of 3.7 kilometres per second, with a possible error of 25 to 30 per cent. This agrees well with the determination of W. W. Campbell, who by applying the same method to the green line 5303 obtained a velocity of 3.1 kilometres per second. Hence the corona moves in the same sense as the direction of movement of the sun, and apparently with a higher velocity.—H. Deslandres: Remarks on the preceding communication and on problems connected with the rotation of the solar corona. The study of the corona throws light on the important question of a corpuscular radiation emitted by the sun and received by the earth, but increase of knowledge in this direction must necessarily be slow, since the corona is only observable during eclipses.—Daniel Berthelot: The temperature-coefficient of photochemical reactions. For the changes studied, the decomposition of lævulose and the decomposition of a mixture of oxalic acid and ferric chloride the rate of photochemical change is increased by a rise of temperature, but the coefficient is very much smaller than that of an ordinary chemical change.—Henri Coupin: The resistance of marine bacteria to the action of salt. Marine bacteria have tolerance for a considerable range in the proportion of salt in the water in which they develop, as they can support 8 per cent., and are content with as little as 0.3 to 0.2 per cent. They adapt themselves better to proportions lower than the normal sea-water salt-content than to more concentrated solutions.—C. Sauvageau: The development and the biology of *Saccorhiza bulbosa*.—J. Bergonié: The detection and localisation of magnetic projectiles by an electromagnet actuated by an alternating current. The vibration of the flesh immediately over the metallic fragment gives an accurate indication of its position. Details are appended of several operations successfully carried out by this means.—MM. Belot and Maxime Ménard: The use of the Coolidge tube in the medico-surgical applications of the X-rays. The Coolidge tube is based on the discharge of independent electrons and details are given of a pattern made in France by Pilon. The advantages obtained, as compared with the ordinary tube, are the regularity in working, the long period of regular working, the possibility of regulating the tube without modifying the vacuum, the fixed point of impact on the cathode, and the homogeneity of the bundle of X-rays.—Miramond de Laroquette and Gaston Lemaire: Tables of the coefficients of magni-

fication of radiographic images utilisable for the localisation of projectiles in the tissues.—Pierre Delbet and H. Vaquez: Chondrectomy in certain irreducible dilations of the right heart.

BOOKS RECEIVED.

British Museum (Natural History). Report on Cetacea Stranded on the British Coasts during 1914. Pp. 16. (London: British Museum (Natural History); Longmans and Co.) 1s. 6d.

British Museum (Natural History). British Antarctic (*Terra Nova*) Expedition, 1910. Natural History Report. Zoology. Vol. i., No. 2. Natural History of the Adelle Penguin. By Staff-Surgeon G. Murray Levick. Pp. 55-84+plates i-xxi. (London: British Museum (Natural History); Longmans and Co.) 5s.

Memoir on the Economic Geology of Navanagar State in the Province of Kathiawar, India. By E. H. Adye. Pp. xxvi+262. (Bombay: Thacker and Co., Ltd.)

The Manchester Museum. Museum Handbooks: The Stela of Sebek-khu. By T. E. Peet. Pp. 21. (Manchester: University Press.) 2s.

The Plateau Peoples of South America. By A. A. Adams. Pp. 134. (London: G. Routledge and Sons, Ltd.) 3s. 6d. net.

An Amateur's Introduction to Crystallography. By Sir W. P. Beale. Pp. vii+220. (London: Longmans and Co.) 4s. 6d. net.

The Panama Canal. By R. E. Bakenhus, Capt. H. S. Knapp, and Dr. E. R. Johnson. Pp. xi+257. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 10s. 6d. net.

Heating and Ventilating Buildings. By Prof. R. C. Carpenter. Sixth edition. Pp. xiv+598. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 15s. net.

DIARY OF SOCIETIES.

THURSDAY, APRIL 15.

ROYAL INSTITUTION, at 3.—The System of the Stars: Star Colour and its Significance: Prof. A. S. Eddington.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Power Supply of the Central Mining-Rand Mines Group: J. H. Rider.

LINNEAN SOCIETY, at 5.—Experiments and Observations bearing on the Interpretation of Form and Coloration in Plants and Animals: C. F. M. Swynnerton.

INSTITUTION OF MINING AND METALLURGY, at 8.—The Precipitating Action of Carbon in Contact with Auriferous Cyanide Solutions: W. R. Feldtmann.—Cyaniding of Gold-Silver Ores at Waihi Grand Junction: N. Carless.—The Effect of Mineralised Waters in Cyanide Plants: T. B. Stevens and W. S. Bradley.

FRIDAY, APRIL 16.

ROYAL INSTITUTION, at 3.—The Russian Idea: S. Graham.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—President's address: Dr. W. Cawthorne Unwin.

SATURDAY, APRIL 17.

ROYAL INSTITUTION, at 3.—Modern Artillery: Lieut.-Col. A. G. Hadcock.

MONDAY, APRIL 19.

VICTORIA INSTITUTE, at 4.30.—The Zoroastrian Doctrine of a Future Life: Prof. J. Hope Moulton.

TUESDAY, APRIL 20.

RÖNTGEN SOCIETY, at 8.15.—Late Radium and X-Ray Burns: Dr. N. S. Finzi.—A New Alpha Ray Effect: F. H. Glew.

ROYAL STATISTICAL SOCIETY, at 5.15.—The Progress of Friendly Societies and other Provident Institutions during the Ten Years 1904-1914: Sir Edward Brabrook.

WIRELESS SOCIETY, at 8.—Methods of the Measurement of the Strength of Wireless Signals: Dr. E. W. Marchant.

WEDNESDAY, APRIL 21.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—A Study of the Moving Waves of Weather in South America: H. Helm Clayton.—The Correlation between Changes in Barometric Height at Stations in the British Isles: E. H. Chapman.

THURSDAY, APRIL 22.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: Deep Water Waves, Progressive or Stationary, to the Third Order of Approximation: Lord Rayleigh.—A Chemically Active Modification of Nitrogen, produced by the Electric Discharge. VI.: Hon. R. J. Strutt.—The Difference between the Magnetic Diurnal Variations on Ordinary and Quiet Days at Kew Observatory: Dr. C. Chree.—The Effects of Different Gases on the Electron Emission from Glowing Solids: F. Horton.—Heats of Dilution of Concentrated Solutions: W. S. Tucker.—The Origin of the "4686" Series: T. R. Merton.

ROYAL INSTITUTION, at 3.—The System of the Stars: The Stellar System in Motion: Prof. A. S. Eddington.

FRIDAY, APRIL 23.

ROYAL INSTITUTION, at 9.—Military Hygiene and the War: Major P. S. Lelean.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.

PHYSICAL SOCIETY, at 5.—The Theories of Voigt and Everett Regarding the Origin of Combination Tones: Prof. W. B. Morton and Miss Mary Darragh.—Experiments on Condensation Nuclei Produced in Gases by Ultra-Violet Light: Miss Maud Saltmarsh.—The Self-Induction of Solenoids of Appreciable Winding Depth: S. Butterworth.

SATURDAY, APRIL 24.

ROYAL INSTITUTION, at 3.—Modern Artillery: Lieut.-Col. A. G. Hadcock.

CONTENTS.

	PAGE
Colour Vision	169
The Experimental Method in Medicine and Surgery. By Stephen Paget	170
Pure Mathematics. By G. B. M.	171
Psychology and Philosophy	172
Our Bookshelf	173
Letters to the Editor:—	
The Thermionic Current.—Prof. A. S. Eve	174
A Mistaken Butterfly.—Prof. E. E. Barnard	174
British Supply of Drugs and Fine Chemicals. By Prof. H. B. Baker, F.R.S.	174
Home Forestry and the War. (<i>Illustrated.</i>)	176
The Carnegie Trust	178
Inexact Analogies in Biology. By Dr. F. A. Bather, F.R.S.	178
Prof. Otto N. Witt. By Sir T. E. Thorpe, C.B., F.R.S.	179
Notes	180
Our Astronomical Column:—	
Comet 1915a (Mellish)	184
The Chromospheric Spectrum without an Eclipse	185
The Rotation of Nebulæ	185
The "Scientific American" and Astronomy	185
Experimental Study of the Mechanism of Writing. (<i>Illustrated.</i>)	185
Flora of Aden. By F. C.	187
Ornithological Notes. By R. L.	188
Mountain Geology	188
Blood-Parasites and Fleas	189
Changes of Relative Levels of Land and Sea. By J. W. J.—Preliminary Report on a Shaler Memorial Study of Coral Reefs. By Prof. W. M. Davis	189
Formulas for Glass Manufacture	192
University and Educational Intelligence	193
Societies and Academies	194
Books Received	196
Diary of Societies	196

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