"On the cause of Physiological Action at a Distance," by Prof. L. Errera (Brussels). The author referred to Elfving's observation, that sporangium-bearing filaments of *Phycomyces nitens* are attracted by iron, zinc, aluminium, and various organic substances, such attractions not being due to gravitation, light, moisture or contact, but to physiological action at a distance, as Elfving terms it.

The author has made numerous experiments which tend to show that the attraction is really hydrotropic, the filaments being attracted by hygroscopic and repelled by non-hygroscopic substances, for example :—

Any modification of iron which lessens its capacity of rusting at the same time diminishes its attraction on Phycomyces : thus, polished steel scarcely attracts, and nickled steel does not do so at all.

China clay, which is very hygroscopic, attracts energetically, while china exhibits no attraction. These experiments succeed also in a saturated atmosphere, which shows that hydrotropism is not due, as generally supposed, to differences in the hygrometric state of the air.

"Notes on the Morphology of the spore-bearing members in the Vascular Cryptogams," by Prof. F. O. Bower. The author explained by the help of a large series of diagrams his views already laid before the Royal Society, as to the homology of the fertile frond of Ophioglossum with the sporangium of Lycopodium. In support of the probability that the former may have been derived from some such type as the latter, by a process of partial sterilization of the sporogenous tissues, he adduced facts relating to Isoëtes and Lepidodendron, both of which show a sterilization of parts of the potential sporogenous tissue in the form of trabeculæ in the sporangium.

Mr. C. T. Druery sent in a communication, which was read and remarked upon by Prof. Bower. It related to a new example of apospory found in a young fern seedling, of which the second frond bore upon its margin a number of prothalloid growths. The occurrence of aposporous development at so early a stage in the development of the sporophyte had not hitherto been recorded.

"On the arrangement of buds in Lemna Minor," by Miss Nina F. Layard. The object of a series of observations made on budding duckweeds, was to ascertain whether any fixed rule is followed, both in the arrangement and order of production of the buds.

Prof. F. Schmitz read a paper on tubercles on the thallus of *Cystoclonium purpurascens* and other red seaweeds. The tubercles are constantly inhabited by bacteria, and appear to arise in consequence of infection by these organisms.

"Calamostachys Binneyana, Schimp.," by T. Hick. The object of the paper is to revise and extend our knowledge of the structure of this fossil fruit in the light of a number of preparations which have not been previously described. The central part of the axis, formerly described by Carruthers and Williamson as vascular, the author finds to be cellular, thus removing the chief ground for Williamson's reference of the spike to the Lycopodiaceæ. Round the cellular pith there are (usually) three primary vascular bundles, which are reduced to the condition of those met with in *Equisetum*, and the young shoots of *Calamites*, *i.e.* to as many carinal canals with annular and spiral vessels adhering to the margin.

As to the affinities, the conclusion arrived at is that the fruit is that of some form of *Calamites*—as Carruthers maintained long ago—and perhaps that of the type known as *Arthropitys*.

"Myeloxylon from the Millstone Grit and Coal-Measures," by Mr. A. C. Seward. Specimens of Myeloxylon (Brong.), [Stenzelia (Göpp.), Myelopteris (Ren.)] were described from a limestone of Millstone Grit age in North Lancashire, their minute structure being fairly well preserved, and showing collateral bundles, gum canals (?), and the hypodermal tissues characteristic of the genus. A much more perfect example from the Binney collection was referred to, of coal-measure age, in which not only the xylem but also the phloem elements had been mineralised in an unusual state of perfection.

It was pointed out that in the Binney specimen the position of the Protoxylem on the Phloem side of the bundles was clearly shown both in transverse and longitudinal sections. The affinities of Myeloxylon with Cycads and Ferns were briefly discussed, and the conclusion arrived at that this extinct genus, although differing in certain particulars both from Cycads and Ferns, should be placed much nearer the former than the latter.

SCIENTIFIC SERIALS.

THE *American Meteorological Journal* for September contains the conclusion of "Objections to Faye's Theory of Cyclones," by W. C. Moore. Only a few of the more essential characteristics of cyclonic storms have been considered, but from these the author concludes that it is evident that the generally accepted theory of convectional motion gives a more satisfactory explanation of the various phenomena than the theory advanced by M. Faye.—"Changes of Plane of the Mississippi River," by Prof. T. Russell. The author analyses a report by Colonel C. R. Suter, of the Mississippi River Commission relating to the improvement of the river and methods of preventing overflow.—"Thunderstorms in New England during the Year 1887," by R. de C. Ward. The difficulty of predicting thunderstorms is shown by the fact that in New England in 1887 the majority of storms occurred in the south-eastern quadrant of cyclones, while in the previous year the majority occurred in the southern or south-western quadrant. Only 40 per cent. of the summer thunderstorms of 1887 occurred in the southern part of cyclonic storms, while in the previous year the number was 70 per cent.—"Weather Forecasting at the Signal Office, June 30, 1891," by Prof. H. A. Hazen. At this date the weather service was transferred to the Agricultural Department, and the author has given the results of his experience by laying down certain fundamental rules which would be of service to a beginner in the work, as it has sometimes been suggested that it would be almost impossible for a forecaster to impart his knowledge to another.—"The Effect of Topography upon Thunderstorms," by R. S. Tarr. The author's observations have led him to believe that topography has a decided effect upon the path of thunderstorms when they are beginning. When, however, the storm has assumed more than local proportions, topography has in all probability very little effect upon its motion.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, Sept. 26.—M. Duchartre in the chair.—On the white rainbow, by M. Mascart. A new mathematical treatment of the subject shows that the diameter of drops giving the most perfect achromatism is $29{\cdot}17\mu$. With drops of 30μ the rainbow will appear the whiter, the more the apparent diameter of the sun hides the excess of blue intermediate between the achromatised points, as well as all the supernumerary arcs, by the superposition of several systems of fringes, so that there is only left an exterior border slightly tinged with red. The same will apply to drops slightly different in one sense or the other, but the achromatism persists longer if the diameter diminishes. The observation of clouds and fogs has shown that the diameter of the drops varies from 6 to 100μ, the last beginning to fall as rain. Thus the circumstances favouring the production of white rainbows are of very frequent occurrence.—Places of origin or emergence of the great cholera epidemics, and particularly of the pandemic of 1846–49, by M. J. D. Tholozan. From Dr. Arnott's communications to the Physico-medical Society of Bombay, from the documents of the Medical Committee of Bengal, and from the testimony of Ferrier, who was travelling in Afghanistan at the time, it is evident that the cholera epidemic which invaded Europe and America in 1847, 1848, and 1849 originated in Bokhara, whence it spread to Afghanistan and India, as well as westward. Bokhara, Samarkand, Balkh, and Kunduz were attacked at the end of the summer of 1844, Herat and Kabul in October, Jellalabad at the beginning, and Peshawur at the end of November. In the following summer the epidemic proceeded steadily eastwards into the "endemic area," reaching Jhelum and Lahore in May, 1845, Meerut in August, and Delhi and Agra in October, at the same time passing down the Indus to Kurrachee, and westwards to Meshhed, whence it proceeded in 1846 to Asterabad, Teheran, Recht, and Baku. A similar example of an eastward progress of cholera occurred in 1865, when the great epidemic of Mecca, after having invaded Mesopotamia and Transcaucasia, spread to Teheran, and took the easterly route by Khorassan. The writer expresses his firm conviction that the points of emergence of the choleraic epidemics must be considered as their points of origin. The idea that the different pandemic manifestations of cholera which

have depopulated Europe must have invariably come direct from India is no longer tenable. For Europe alone, two striking examples, in 1852 and 1869 respectively, have formally demolished the theories which regarded only things coming from the East as bearing any danger of contamination. The epidemic of 1852 came from within Poland and Germany. That of 1869-73 repeated the same things in Ukraine. Nowadays, when these facts have taken their place in science, some minds seek to diminish their importance by pointing out that these epidemics revived some previous epidemics which had their origin in India. But that which makes the spreading epidemic or the pandemic is the revival of the choleraic principle or germ with all its original attributes. Even in India similar revivals perpetuate the annual endemic, and the epidemics which appear every three, four, or five years. This is the main fact which governs the entire history of cholera, and upon which micro-biological research must proceed. What difference of morphology, of virulence, or of reproductive faculty is there between the germs of the epidemics which die out at their origin, and those of the epidemics which revive several times, and can invade the whole world without proceeding from India?—Application of a conventional system of rectangular co-ordinates to the triangulation of the coasts of Corsica, by M. Hatt. The trigonometrical network drawn for the hydrographic mapping of the coasts of Corsica describes a closed curve. The employment of the conventional system, which transforms into rectangular plane co-ordinates the polar co-ordinates reckoned on the sphere round an origin, offers numerous advantages. The suppression of the sphericity permits the application of processes of calculation which have been dealt with in a preceding communication on rectangular co-ordinates. On this account it was interesting to test on a larger scale the methods which had only been utilised for the determination of secondary points. The experiment has given satisfactory results, and exhibits the practical advantages of the new system of co-ordinates and the methods of calculation. K being the length of the geodetic line joining a point to the origin, and Z the angle made by this line with a fixed direction, the conventional co-ordinates are $x = K \sin Z$ and $y = K \cos Z$. These assumptions permit the rapid and easy calculation of tables of corrections.—On a new hydro-carbon, suberene, by M. W. Markovnikoff.—Action of piperidine and pyridine on the haloid salts of cadmium, by M. Léopold Hugo.

SYDNEY.

Royal Society of New South Wales, June 1.—General Meeting.—Prof. Warren, President, in the chair.—The following papers were read:—Oceanic philology, by Sidney H. Ray; a determination of the magnetic elements at the Physical Laboratory, University of Sydney, by S. Coleridge Farr; on certain geometrical operations, by G. Fleuri; analyses of the well, spring, mineral, and Artesian waters of New South Wales, and their probable value for irrigation and other purposes, by John C. H. Mingaye; remarks on the large sunspots visible at the present time, by H. C. Russell, F.R.S.

July 5.—Chemical and Geological Section.—Prof. Liversidge, F.R.S., in the chair.—The following papers were read:—Microscopic structure of some intrusive rocks in the neighbourhood of Sydney, by Rev. J. Milne Curran; notes on the occurrence of platinum and its associated metals in the Richmond River sands, also in lode material in the Broken Hill district, by John C. H. Mingaye.

July 6.—General meeting. Prof. Warren, President, in the chair.—Paper read:—On the ventilation of sewers and drains, by J. M. Smail.

July 15.—Medical Section.—Dr. Friaschi in the chair.—Paper read:—Recent work on the pathology of cancer, by Dr. G. E. Rennie.

August 3.—General Meeting.—Prof. Warren, President, in the chair.—The following papers were read:—Flying-machine work, and the $\frac{1}{8}$ I.H.P. steam motor weighing $3\frac{1}{4}$ lb., by L. Hargrave. The paper described the experimental work carried out by the author during the past twelve months. A compressed-air-driven flying-machine (No. 16) had no less than twelve trials, on one of which it flew 343 feet, the speed being a little over ten miles per hour. On the first trial it was fitted with a bi-plane, which was found to be a very stable form. Some curious experiments with a segment of a hollow cylinder were recorded. A description was given of a steam engine and boiler for a flying-machine, the total weight of which is $3\frac{1}{4}$ lb., including fuel and water; the indicated horse-power developed was 169. Nine detail drawings were shown, including those of an air-pump and small-pressure indicator. On the venom of the Australian black snake (*Pseudechis porphyriacus*), by C. J. Martin, Demonstrator of Physiology in the University of Sydney, and J. McGarvie Smith.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Euclid, Books 1 and 2: D. Brent (Percival).—Book B; or Arithmetical Chemistry, Part 2, new edition: C. J. Woodward (Simpkin).—Tenth Annual Report of the Fishery Board for Scotland: Part 3, Scientific Investigations (Edinburgh).—Survey of India Department, General Report 1890-91 (Calcutta).—Observations made at the Hong-Kong Observatory in the Year 1891: W. Doberck (Hong-Kong).—Geological Survey Department, Ottawa, Annual Report, new series, vol. 4 (Ottawa, Dawson).—Gemeinverständliche Vorträge aus dem Gebiete der Physik: Dr. L. Sohncke (Jena, Fischer).—The Student's Manual of Deductive Logic: K. R. Bose (Calcutta, Lahiri).—Lightning Conductors and Lightning Guards: Dr. O. J. Lodge (Whittaker).—Horn Measurements and Weights of the Great Game of the World: R. Ward (The Author, Piccadilly).—The Universal Atlas, Part 19 (Cassell). Imperial University of Japan, Calendars for Years 1890-91 and 1891-92 (Tokyō, Maruya).—London Inter. Sc. and Prelim. Sc. Directory, No. 3, July 1892 (London, University Correspondence College).—London Inter. Arts Directory, No. 5, July 1892 (London, University Correspondence College).—A Treatise on Analytical Statics, vol. ii.: Dr. E. J. Routh (Cambridge University Press).—Annual Report of the Department of Mines and Agriculture, N.S.W., 1891 (Sydney, Porter).—The Birds of Lancashire, 2nd edition: F. S. Mitchell (Gurney and Jackson).—Odorographia, a Natural History of Raw Materials and Drugs used in the Perfume Industry: J. Ch. Sawer (Gurney and Jackson).—A Text-book of Agricultural Entomology, 2nd edition: E. A. Ormerod (Simpkin).—Beneath Helvellyn's Shade: S. Barber (E. Stock).—Borneo; its Geology and Mineral Resources: Dr. T. Posewitz, translated by Dr. F. H. Hatch (Stanford).—How to make Common Things: J. A. Bower (S.P.C.K.).—A Short Manual of Inorganic Chemistry: Drs. A. Dupré and H. W. Hake (Griffin).—A Text-book of Coal-Mining: H. W. Hughes (Griffin).

PAMPHLETS.—L'Automobile e la Filosofia Naturale e Sperimentale; Note ed Osservazioni: G. Cassola (Napoli, Gargiulo).—Epidemic Pneumonia at Scotter and Neighbourhood: T. B. F. Eminson (Kimpton).—Contagious Foot-Rot in Sheep: Prof. G. T. Brown (Murray).

SERIAL.—Proceedings of the Liverpool Geological Society, Part 4, vol. vi. (Liverpool).—Natural Science, October (Macmillan).—Traité Encyc. de Photographie, premier suppt.: A. troisième fascicule: C. Fabre (Paris, Gauthier-Villars).—Journal of the Royal Agricultural Society of England, vol. iii. Part 3 (Murray).

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