

"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 *Isoetes* 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. Drury 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. Lyard. 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 29.17μ . 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 Meshed, 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