Messrs. McClean, Brooks and Walker, working with the 4⅝-inch De La Rue Coronograph, 8 feet focal length, obtained four pictures.

The same observers secured no results with the Voigtländer 4-inch objective, fitted with a Thorp replica grating.

Mr. Winkelmann, working with a telephoto lens of equivalent focal length of 5 feet 3 inches, obtained five pictures, showing various depths of corona.

Mr. Short (assisted by Mr. Caffin, purser of the *Taviuni*) worked a photoheliograph of about 7 feet focal length and a telephoto lens. Some of his results will also prove very useful.

It will thus be seen that while no spectroscopic results were secured, a very complete record of the form of the corona was obtained, and this was the chief object of the expedition.

With the exception of Raymond's refractor, all the objectives were fed from the 22-inch siderostat mirror taken out by Mr. McClean (see Fig. 1). The De La Rue and photoheliograph received the sunlight directly from the mirror, while the remainder were placed at right angles to the beam from the siderostat, and obtained their light by means of small mirrors placed in the path of the main beam.

Some of the original negatives, and glass positives of others, which have arrived from Auckland indicate at a glance what a magnificent sight the corona must have presented. No wonder the eclipse was not described as a dark one when such an extent of corona encircled the dark moon!

It has been stated, I do not know on what authority, that this eclipse resembled that of 1898. Mr. McClean's beautiful negatives do not in the least remind me of the form it took in that year. Mr. Raymond's description, as quoted above, "an irregular star of seven points," seems to define it very well, and that description could not be given to the form of the corona of 1898, which I observed in India.

In my opinion the photographs of the 1908 eclipse display a form which approaches more to that generally seen when the sun is most active, that is, a "maximum" corona, than to those of the "square" and "wind-vane" variety. Perhaps if it be classed as intermediate between a "maximum" and a "square" form, one cannot be far from wrong. In looking up the records of eclipses, I find that the drawing made by Mr. Weedon of the corona of 1860 July 18 (Memoirs, R.A.S., vol. xli., 1879, p. 543) more closely resembles that of 1908 than any I have been able to find. The year 1860 was a time of maximum sun-spot activity (and also probably a maximum of prominence activity, only no data are available to state this definitely).

Mr. McClean's photographs show several streamers more than one and a half lunar diameters in length. One striking feature of them is their great length and comparatively small breadth, giving them a very spiky appearance. Several prominences are also recorded on some of the negatives. Polar rifts are by no means clearly evident, and this is due possibly to the presence of some streamers in high latitudes.

As was to be expected, Prof. Campbell rendered considerable assistance to Mr. McClean's party, and Mr. McClean writes further in flattering terms of the cooperation of Mr. Mortimer, resident on the island, who rendered him "every assistance during the whole period we were on the island." He also expresses his deep obligations to Mr. A. B. J. Irvine, manager at Auckland of the Union S.S. Company, who did everything in his power to render the expedition a success.

Fortunately only one case of illness is reported. This was Mr. Raymond, who was confined to his bunk on board the *Taviuni* for four days owing to a severe attack of cholera. Although left very weak, he was able to rejoin the party ashore the day before the eclipse, and carry out his programme of sketching the corona as above mentioned.

In conclusion, it may be remarked that the results of the expedition are far more successful than one was led to believe from the previous information received, and the discussion of the photographs will form a valuable contribution to science.

WILLIAM J. S. LOCKYER.

## THE MUTATIONS OF ŒNOTHERA.[1]

THE name of an animal or plant may become famous for one of two reasons. Fame may be due either to the intrinsic interest of morphological or developmental characters of "intermediate," "primitive" or rare species, or to the fact that the form in question has been the material by means of which discoveries, which help in the revelation of the fundamental nature of living things, have been made. Examples of plants of the first class are Ginkgo, Ophioglossum, Coleochæte, and Anthoceros. Examples of animals of the first class are Peripatus, Archæopteryx, Acanthobdella, Ceratodus, Okapia, Sphenodon, Anaspides, and Tarsius. Thousands of specimens of an animal which is an example of the second class are daily hurled into the corner of the knacker's stable in the shape of *Ascaris megalocephala*. Thousands of specimens of a vegetable example of the second class could be gathered in a very short time on the sand-dunes along certain tracts of the coast of Lancashire in the shape of *Œnothera Lamarckiana*.

Yet these two classes of forms agree in one respect, that there is a certain magic about their names. Any contribution, however trivial, to a closer knowledge of such forms is regarded as worth publication. The importance of the material is held to compensate for the triviality of the contribution. We are not arguing that this should not be so, but merely pointing out that it is. A new fact, which, if it related to Periplaneta, would not be thought worth publishing will soon find its way into print if it relates to Peripatus.

Every biologist is familiar with, even if he does not take a critical interest in, the wonderful series of observations which have made *Œnothera Lamarckiana* a household word in the mouths of everyone interested in organic evolution. It is not surprising, therefore, to find this form subjected to an investigation which for minuteness and exhaustiveness is without parallel. Those who are familiar with the mutation theory might be excused for thinking that de Vries did not leave much to be done. But the memoir before us shows that, much as de Vries did, this is by no means the case; there is nothing in "Die Mutationstheorie" which for minuteness of detail compares with Dr. Shull's description of the fluctuations of Œnothera.

The memoir is illustrated by a series of beautiful heliotype plates of the various new elementary species to which Œnothera has given rise. Plate 5, which is here reproduced, shows at a glance the striking difference between two of these, *Œnothera lata* and *Œ. albida*—forms with which everyone who knows de Vries's work must be familiar.

The part of this memoir which has interested us most is that which deals with the origin of mutants from strains of Œnotheras different from that which

[1] "Mutations, Variations, and Relationships of the Œnotheras." By D. T. Macdougal, A. M. Vail, and G. H. Shull. Pp. 92. (Washington: Carnegie Institution, 1907.)

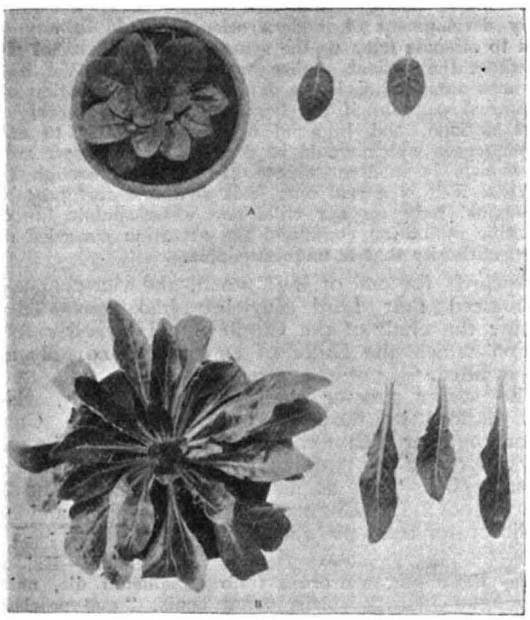
de Vries found at Hilversum and observed his classical series of mutations in.

Three of these strains, from widely different sources, may be referred to.

In September, 1904, Mr. E. P. Bicknell, of Nantucket City, sent two sheets of dried material to the Botanic Garden at New York. The seeds of these specimens were sown in sterilised soil in November of the same year, and amongst the seedlings raised six corresponded exactly to the mutant *Œ. albida* raised by de Vries.

Amongst the seedlings raised from a packet of seed supplied by MM. Vilmorin et Cie., of Paris, there were one *Œ. lata,* one *nanella,* and one *albida.*

Lastly, some plants and seeds of a form provisionally called *Œnothera "biennis"* (Linnæus) were sent over from this country by Mr. H. Stuart Thompson, who had collected the actual seed he sent near Bidston Junction, not far from Liverpool. The plants raised from these seeds proved to be identical with the *Œnothera Lamarckiana* of de Vries, and the strain turned out, like that studied by de Vries, to be in a mutable state, for it gave rise to no less than four of the mutants which appeared at Amsterdam—namely, *Œ. lata, oblonga, albida,* and *rubrinervis.* A. D. D.



A. Rosette of *Œnotnera lata*, four months old, separate leaves of the same age. B. Rosette of *Œnothera albida*, four months old, and separate leaves of the same age.

## THE INDIAN INSTITUTE OF SCIENCE.

IN a recent article on the Jubilee of the Calcutta University it was shown that considerable efforts have been made in Bengal during the last few years to raise the level and tone of university education, and to render it more thorough and practical. Similar efforts are also being made in other parts of India by the Universities of Madras, Bombay, the Punjab and Allahabad, so that it may be hoped that a fairly high standard of university education will be maintained in future in India. Other indications also show that India is becoming alive to the necessity of modelling its educational system on the most modern European lines from the lower forms up to the very highest. The Indian Institute of Science, which is now being started at Bangalore, in Southern India, is an instance in point, and shows how the most advanced of the thinkers in India have grasped the necessity for the prosecution of the very highest forms of post-graduate work. Bangalore, which has been finally chosen for the site of the new institute, has (for India) a most excellent climate; it is situated about 3000 feet above sea-level, and the temperature there is never excessive, so that the conditions for work will be most favourable.

The institute owes its inception to the munificent generosity of the late Mr. J. N. Tata, a Parsee millionaire, who gave (during his lifetime) property which brings in an annual income of about Rs. 1,25,000 (8333*l.*) for the creation of an institute to be devoted to original research. Before the arrangements as to the endowment had been completed Mr. J. N. Tata died, but his two sons, Mr. D. J. Tata and Mr. R. J. Tata, have generously continued the arrangements made by their father.

Considerable discussion ensued as to the best method of utilising this endowment, and a committee was first formed in India to discuss it. Later Sir William Ramsay was asked by Mr. Tata to visit India and advise on the subject, and still later a committee consisting of Prof. Masson and Col. Clibborn made a report as to the best site for the institute and the best scheme of work. The final scheme, however, has been largely worked out by Dr. Morris W. Travers, F.R.S., who was appointed director of the institute about two years ago.

The actual starting of the institute has been much facilitated by two munificent gifts from H.H. the Maharajah of Mysore, who has made a grant of half a square mile of land at Bangalore (in Mysore) for the purpose of the institute, and has also given an annual endowment of half a lakh of rupees (3333*l.*). This has also been supplemented by an annual grant of Rs. 87,500 (about 5833*l.*) from the Government of India, so that the institute will have an annual income of at least Rs. 2,62,500 (nearly 18,000*l.*) for its work.

In addition, too, the Maharajah of Mysore has given five lakhs of rupees, and the Government of India two and a half lakhs, for the erection of buildings, and these sums, together with the accumulations of interest, will give about ten lakhs of rupees (66,666*l.*), and the buildings are to be proceeded with at once.

The constitution of the governing body has been decided on, and the greater part of the detailed initiative has been left to a local committee, consisting largely of the director of the institute and professors of the staff. Practically only post-graduate work and research will be carried on in the institute, and from its nature and position it will be able to attract the cream of the graduates and intellect of India. Provision is to be made for about sixty students to be at work. The subjects which will be taken up are those which are likely to have an important influence in the development of the various arts and industries of India. To begin the work of the institute, for the present five subjects have been decided on: pure and applied chemistry, organic chemistry, bacteriology and the study of fermentation processes, and electrical technology. Probably a sixth (metallurgy) will be added shortly.

India is thus bringing itself into line with the most advanced European countries in the matter of high education, and it may be hoped that every possible success will attend the new institute in its work.