

The maps of the three routes deserve a word of praise. They have been plotted with great care, and the notes along the route are so numerous and full of information, that they form an admirable epitome of the whole work. The few illustrations are interesting; that especially of the Spinifex Desert gives one a good idea of this horror of Australian exploration.

OUR BOOK SHELF

Official Guide-book to the Manchester Aquarium. By the Curator, W. Saville Kent, F.L.S., F.ZS. Third edition. Twentieth thousand. (Michaelmas, 1875.)

THE Manchester Aquarium, situated in the Alexandra Park of that city, has now been opened to the public for more than two years, and has attained considerable success, although we believe it has not quite realised the expectations formed of it by its original promoters. Next to the Brighton Aquarium, that of Manchester is the largest amongst the six principal institutions of this kind existing in the country. The series of tanks, including the deep sea, shallow, and fresh-water groups, is sixty-eight in number, surpassing that of any other aquarium, while their linear frontage falls little short of 700 feet, which is but slightly less than that of the well-known establishment at Brighton. The building itself is of the plainest possible design, and at first sight seems as if it had been originally destined for a church of some kind. It consists of a high central oblong nave and two narrow side aisles. Being lofty and well lighted, however, it affords excellent accommodation for the smaller tanks which line it on both sides, as well as for the two fine large tanks, upwards of forty feet in length, which are situated at the two extremities. The proprietors of the Manchester Institution have been moreover fortunate in securing the services of a competent scientific naturalist as its director, an advantage shared by few if any of the sister establishments. Mr. W. Saville Kent transferred his services from Brighton to Manchester some two years ago. One of the last things he did at Brighton was to prepare the excellent Handbook to the Aquarium there which has been already noticed in this journal. We have now before us a copy of the third edition of the same author's "Guide-book to the Manchester Aquarium," prepared somewhat after the same fashion. After a few words of introduction describing the building and the general management, the sixty-eight tanks and their contents are discussed successively. A large amount of information upon the various fishes and other animals which they contain is thrown together in a very popular and readable form, and woodcuts are introduced illustrating the more attractive and noticeable objects exhibited. The Guide-book is concluded by a chapter on the principles of management of aquaria generally, which cannot fail to be of service to those who are interested in such matters, and which proves that Mr. Kent is fully master of the subject of which he treats.

Elementary Science Manuals. Botany for Schools and Science Classes. By W. J. Browne, M.A. Lond. (Belfast: W. Mullan, 1875.)

AN unfavourable impression of this little book is created at first sight by the obvious imitation, in the style in which it is got up, of Macmillan's series of "Science Primers." Such a plagiarism may generally be taken as a confession on the part of author or publisher that the work has not sufficient merits of its own to stand without adventitious assistance. This, however, is not the case in the present instance; and our depreciatory criticisms are almost exhausted. We had, it is true, marked certain passages in the margin for correction; but they are but few. The most important is the resurrection of the old blunder (twice over) of the existence of "spongioles" at the

extremities of the root-fibres; and this is the more remarkable as the work from which the illustrative woodcut is copied does not make this mistake. The statement in the preface, however, that the book "contains all the subjects required for the First B.Sc. Examination in the University of London," must be taken *cum grano*. There is no index; and the deficiencies have therefore to be made out by careful inspection; but we find no description whatever of the process of fertilisation (although there is a diagram to represent the entrance of the pollen-tube into the embryo-sac), and no adequate one of that of respiration, this term being erroneously applied, as is so often the case, to the process of assimilation. But what can you expect for eightpence? You get, at all events, a great deal for your money; and the morphological and structural portion is on the whole so well done as to render the little book of great use to the beginner. Indeed we do not know any purely elementary work in which this part is more satisfactory. A few technical errors will doubtless be noticed and corrected in future editions. The illustrations, seventy-six in number, though not new, are very good and serviceable.

A. W. B.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

Hoffmeyer's Synoptic Weather Charts

WILL you kindly draw the attention of your readers to the fact that the second year of Capt. Hoffmeyer's synoptic charts of the weather in Northern Europe and Atlantic, commencing with Dec. 1874, is now about to be issued.

The subscription, as before, will be 12s. 6d. per quarter, including postage of the monthly parts.

I shall be glad to receive names of gentlemen who are willing to encourage the undertaking, which is carried on at Capt. Hoffmeyer's own expense. ROBERT H. SCOTT, Director

Meteorological Office,
116, Victoria Street, London, S.W.

Collomia

ON reading Mr. Duthie's communication (vol. xii. p. 494) on the capsules and seeds of *Collomia*, I presumed that some one would be ready to indicate the use of the mucilage and threads of the seed-coat; but I now notice that Mr. Bennett (vol. xii. p. 514) supposes that it "still remains to be discovered." An obvious and sufficient explanation will be found in A. Gray's "Structural and Systematic Botany," as far back as the edition of 1845. In the later editions, all of them now old, it is twice referred to. On p. 40, after mentioning that these gelatinous threads, or the like, occur on many seeds or seed-like fruits of various orders, it is said: "They may subserve a useful purpose in fixing light seeds to the ground where they lodge, by means of the moisture of the first shower they receive." And on p. 321, where forms of this apparatus are described, it is added: "This minute mechanism subserves an obvious purpose in fixing these small seeds to the moist soil upon which they lodge, when dispersed by the wind."

The seed of a *Collomia* or *Gilia*, when wetted, forms a *limbus* of three or four times its diameter; this would involve a multitude of grains of sand, and ballast the seed most effectually in the situations where or at the time when alone it could germinate.

A. GRAY

Herbarium of Harvard University,
Botanic Garden, Cambridge, Mass., Nov. 16

Sir Thomas Millington and the Sexuality of Plants

IN your article last week on the Oxford Botanic Garden, reference is made to Sir Thomas Millington, the Savilian Professor of Botany, as having in 1676 "first divined the fundamental fact of sexual reproduction in flowering plants." In a review in the columns of the *Academy*, of the English edition of

Sachs's "Text-book of Botany," by Prof. E. R. Lankester, the Savilian Professor is also spoken of as having "discovered the sexuality of plants." It would interest students of the history of botany to know to what extent the writer of either of these articles is able to corroborate this statement by reference to Sir Thomas Millington's writings. In his recently published "History of Botany," Prof. Sachs gives the following account of this alleged discovery:—"In all histories relating to the subject of sexuality, a certain Sir Thomas Millington—otherwise unknown in the history of botany—is mentioned as deserving of the credit of having first indicated the stamens as the male sexual organs. The only information, however, which we have in support of this is contained in the following statement by Grew in his 'Anatomy of Plants,' 1682, p. 171, ch. 5, § 3:—"In conversation on this subject"—viz., on the part played by the stamens (termed by Grew the 'attire') in the formation of seeds—"with our learned Savilian Professor, Sir Thomas Millington, he gave it as his opinion that the 'attire' serves as the male organ for the production of the seed. I at once replied that I was of the same opinion, gave him some reasons for it, and answered some objections which might be made to it."* In the first edition of Grew's work, 1671, he attributes no sexual function to the stamens; but in the edition of 1681 he thus continues, in substance:—"It appears firstly, that the 'attire' serves to separate certain superfluous portions of the sap in order to prepare for the production of the seed. Just as the foliature (floral leaves) serves to carry away the volatile saline particles of sulphur, so the 'attire' serves to diminish and adjust the atmospheric portions, in order that the seed may become more oily and its principles better fixed. The flowers have therefore usually a more powerful odour than the 'attire,' because the saline is stronger than the atmospheric sulphur, which is too subtle to affect the senses. An analogy drawn from the animal kingdom follows, which is hardly quotable; but Sachs points out how wonderfully any germ of truth in Grew's hypothesis was corrupted by the chemical theories and strivings after a false analogy of the day. It is difficult to see that there was really any advance in this hypothesis upon the state of knowledge in the time of Theophrastus (B.C. 371-286), who distinctly recognised some individual plants as male, others as female. Whatever merit also is due to Millington must, unless there is other record of his services, be at least equally shared with Grew.† It does not appear, however, that either of these botanists even attempted to confirm their conclusions by experiment. The merit of the first discovery of the true function of the stamens is assigned by Prof. Sachs to the German botanist Camerarius, in his "De sexu plantarum epistola," published in 1694. This tract closes with an ode, reminding one of Darwin's "Loves of the Plants," beginning thus—

"Novi canamus regna Cupidinis,
Novos amores, gaudia non prius
Audita plantarum, latentes
Igniculos, Veneremque miram."

ALFRED W. BENNETT

6, Park Village East, London, Nov. 29

The Late Eclipse

ON my return from India I should like to say a few words about some letters which appeared in the *English Mechanic* during my absence. Mr. Proctor, and a writer signing himself "A Fellow of the Royal Astronomical Society," comment in these letters on the result of the late Eclipse Expedition. It would be better if these discussions were postponed until the results are published by the Royal Society, but if writers who have not heard anything beyond a few short telegrams take it upon themselves to enlighten the public as to the value of photographs which they have not seen, a few remarks of one who has seen them become necessary.

If the telegrams written by me have given rise to the misunderstanding, I am sincerely sorry for it. I have had no personal interest either in the success or the failure of the expedition. The Royal Society has done me the honour to entrust me with the task of carrying out a programme sanctioned in detail by the Eclipse Committee. This I have done to the best of my ability, and in wording the telegrams in question I avoided, carefully any expression which might have raised expectations, not to be fulfilled.

* I have not Grew's work at hand, and am therefore retranslating Sachs's translation.

† Grew was born in Coventry in 1628, and died in 1711; in 1677 he was appointed Secretary to the Royal Society.

filled on the arrival of the photographs. If the impression has been propagated that the expedition has not obtained any results of great importance, it is the fault of those who, thinking I had an interest in exaggerating the importance of the results, have taken away from the meaning of my words, which in reality remained far below the truth.

There cannot be the slightest doubt that the photographs obtained by the prismatic camera are full of interest and importance. They solve the question in which part of the spectrum the chief photographic rays of the corona are situated. They open out almost an entirely new field of inquiry, answering questions which could never have been answered by any other method, and suggesting new questions to be answered hereafter.

I should have liked to postpone the question whether it is possible to photograph in all its details the spectrum of the corona in the time available during eclipses, until Mr. Proctor's long-promised mathematical solution has appeared. As, however, we have had to wait for it already a considerable time, I venture to submit to your readers the following considerations:—The prismatic camera is a spectroscope without collimator. It has given us photographs after one minute's exposure, and would have done so in less time under more favourable atmospheric conditions. If we add a collimator and telescope to this camera, we shall have an arrangement similar to that which actually was employed for the photographs of the spectrum. If the lens of the telescope is, as regards diameter and focal length, like that of the camera; if, further, the focal length and diameter of the collimator lens is such that it would collect all the light which passed through the objective of the telescope, if the slit plate was removed, the only diminution the intensity of the light would be caused by the absorption through the two additional lenses and by the diffraction of the slit. The influence of diffraction can be reduced to a minimum by suitably altering the aperture of the collimator lens and by using a slit not too narrow. We should thus have an instrument capable of photographing the spectrum of the corona in one minute.

This is not the place to discuss whether the failure of the spectroscopic cameras was due to atmospheric causes, to the instruments employed, or finally, to my own fault. It will, I believe, be found hereafter, that the experience gained by even these failures will prove useful on future occasions.

In enumerating the results of the expedition the photographs of the corona and the sketch taken by the Hon. H. N. Shore ought not to be forgotten. The time observations were conducted with as much accuracy as the instruments permitted.

Sunnyside, Upper Avenue
Road, N.W., Nov. 20

ARTHUR SCHUSTER

Lommel's Optics

I AM indebted to Prof. W. N. Hartley for a correction in my review of Lommel's Optics, the proof-sheets of which did not reach me in time for revision. The translator of the work is evidently right in using the term naphthalin red for the body which exhibits the fluorescent spectrum depicted in Fig. 6 in the article. The substance in question, Prof. Hartley states, is also called Magdala red, and has the elegant chemical name of Azotrinaphthyldiamine. I am also obliged to my friend Prof. H. M'Leod for pointing out that the mode of exhibiting the formation of the rainbow described by Prof. Lommel, is to be found in Jamin's "Cours de Physique" (tome 2, p. 782), although the substitution of a spherical flask filled with water for a solid glass globe, as described by Jamin, is more appropriate and convenient. Pouillet (tome 2, p. 769) also gives, I see, a somewhat similar experiment, using a cylindrical glass vessel filled with water.

W. F. B. ("the Reviewer of Lommel's Optics")

The Rainfall

IN NATURE, vol. xiii., p. 70, under the head of "The Rainfall," you allude to the extraordinary rainfall for 1875 in Great Britain, and call it a plague of rain; you further call attention to the astonishing fall of 1287 inches for each of the three hours between 4 and 7 A.M. on the 1st of September last, at Sikawei, in China; and to the total quantity that fell there during the twenty-four hours that elapsed between 4 P.M. on August 31 and the same hour on the day following, viz. 8'59 inches.

I believe that a very heavy rainfall indeed was registered in South Devon in September last, the fall in one hour and in a total of twenty-four being unprecedented; but I have mislaid