

in the one hand, and Sings and Lyell on the other, has supplied so crucial a test. Nor can we regard the few pages of Mr. Kuyler on the microscopic characters of several specimens brought to him by the author, confident as they are in themselves, as affording anything like an adequate discussion of the nature of the Kansas limestones.

There are not, indeed, wanting indications in the work below us that the author has severely approached in his searching the scientific questions connected with his subject as to equally himself for giving anything like authoritative opinions concerning them. Thus on page 107 we find his speaking of a crinoid as "composed of a protocrinus, pro-lithothrix, and of doleritic lava." Again, so far as we are gathered from the work before us, the hypotheses of deviation centers and eruption centers are of about equal value. We are informed simply that "the opinion of geologists is divided as to the manner in which a volcano is formed;" and then follows a statement of the several hypotheses. Shortly after the concluding reasoning of Sings, and the pertinent observations of Lyell on his itself, as detailed in the celebrated memoir read before the Royal Society in 1854, it is strange to find such language used upon the subject, more especially when we recollect that no attempt was ever made by Lyell's opponents to discredit his observations or to reply to his deductions. We should almost as soon expect to read in modern work on astronomy that the opinion of astronomers is divided as to whether the earth moves round the sun or the sun round the earth.

We find so much to praise in this little book, especially in the clear statement of the history of the crinoidal and its trilobites, and the illustrations so carefully selected and selected from those of larger works which are not only accessible to general readers, that we regret we cannot express more unqualified appreciation of that portion of the book which calls for special notice in the pages of this journal. We can only hope that in a second edition the author may find an opportunity, which he will not neglect, of considerably lengthening and very greatly enriching this scientific portion of his work; and in order to do so, without at the same time impairing its popular character, we can scarcely suggest a better example for him to follow than the work of Prof. Phillips, to which we have alluded at the commencement of this article.

LETTERS TO THE EDITOR

The Editor has not felt himself compelled to publish opinions expressed by his correspondents. Neither says he is indebted to others, or is indebted to the authors of rejected manuscripts. He writes to him of anonymous communications.

The Editor expressly requests correspondents to keep their letters as short as possible. He promises on his part to do so great that it is impossible otherwise to secure the appearance of any communications containing interesting and novel facts.

The Texas-Hepherdian Plant

The explanation given by Prof. Faxon (*ibid.*, *ibid.*, 1876) of the observations made at Washington in 1876 of this rare plant is not beyond doubt for the reason that Mr. Faxon's observing field, it is to be seen, however, that Mr. Faxon's opinion is that the record is full and complete, and that his changes in the explanation were based on facts. This record is in hand, and in figures were issued and published. They are arranged out, and the corrected figures is put by the side of the original ones, while at the bottom of the page is a note with pen and ink, and

in Mr. Faxon's handwriting, stating the changes that were made. Prof. Faxon's original description of the plant was made without knowledge of the observations made.

Such criticisms are unnecessary, however, for we find it is to build theories before we are sure of the facts. They may also be a means of avoiding a waste of labor. It is known to me that at least two American astronomers, armed with powerful telescopes, have been searching quite assiduously for a trans-Neptunian planet. These searches have been carried by the late Prof. Francis B. Rowland's tables of Uranus and Neptune already begin to differ from observation. In this connection the case of Mr. Dawkins on the errors of Leverrier's tables of Saturn is interesting. But we are to labor from these errors of the planetary tables the existence of a trans-Neptunian planet? It is possible that such a planet may exist, but the probability is, I think, that the differences are caused by errors in the elements of these planets. My observations of the satellites of Saturn are not yet finished, but they indicate that Faxon's case of Saturn is nearly correct. Now Leverrier has distributed this case by about 1/10, and it seems probable that this distribution was caused by some error in his theories of Jupiter and Saturn.

A few years ago the search was frequently made that the tables of astronomers on the solar system were finished, and that hereafter they could see their whole attention to selected astronomy. Today we have the lunar theory in a very discouraging condition, and the theories of Mercury, Jupiter, Saturn, Uranus, and Neptune, all in need of continuing attention, unless Leverrier's theories of the last two planets shall stand the test of observation. But what, all, such a condition of things is only the natural result of their not accurate series of observations which make evident the small inaccuracies in the motions, and bring to light the errors of theory.

Washington, March 7

ALGER HALL.

Rats and Water-Casts

Mr. Faxon says, in NATURE, vol. xii, p. 101—

"A ship's captain told me on this date, in the old days, before the use of iron tubes on board ship became general, the rat used to attack the water-casts, eating the stems so that they could not let the water through the vessel without actually sucking a hole in it. If any one could substantiate this it would have an important bearing on the question under consideration."

Capt. Whittaker, when First Lieutenant on board H.M.S. *Albatross*, told me that when he was a midshipman it was his duty, as one of the high ships to see that certain vessels on deck were always kept full of water, in order to prevent the rats parading holes through the water-casts, and that through such holes plenty of the water in a cast would leak away.

CAROLINE BARRETT.

Title of Chapter

I enclose two letters to Kew in reply upon this subject. Many years ago I took some pains to ascertain the present location of this at Chapter, for I forgot the accuracy of the common statement that it was situated just east of the river. At the time I made the inquiry the books were kept at Chapter, and the books were taken to the river. The river was being constructed. I was acquainted with Mr. C. G. Jones, one of the engineers on the work, and he, with great care, took notes of the work which had been made from time to time recording the very high tide, some of them going back many years. He found the highest of them to be some distance below which I have no record above My feet above ordinary tides. I think this may be well seen. It is corroborated in a paper by the general Anatomical Society, on "Title and Water, in the" *Encyclopedia Britannica*, vol. v, p. 101, paragraph 1, last edition. He says: "That, at the entrance of the Bristol Channel the whole tide at spring-tides is about eighteen feet, at neap-tides about thirty feet, and at Chapter about fifty feet."

W. R. CHAMBERS.

New Lodge, Gloucestershire, March 10

Migrations of Birds

Prof. Kew was in his article on Migrations of Birds (*Nature*, vol. xii, p. 411) has cited one, and a very important one, in the flight of which birds of passage are captured. This journey, this is important. The following table of Darwin's will show