

while Mr. Fletcher, paymaster, and Dr. Simpson are collecting the insects and land plants. I may say at once that the latter are of the type which one would expect to find on purely oceanic islands, but their distribution from island to island is interesting, as well as their preferences for sand or rock, drought or moisture, &c., most of the islands having definite zones with their peculiar plants.

"It is really as yet too early to say anything about the reefs here, as there are one or two places which I have not yet been able to visit. What strikes one, however, very forcibly is the comparative absence of life on them. Of course there are in places plenty of corals, but the number of species is quite limited. There is a fair number of the usual Alcyonaria, but Sponges, Hydroids, and Tunicates are very few in species and in quantity. Turbellaria are very rare, while Molluscs, Echinoderms, and Crustacea are few in species and, except certain common forms, not numerous. Ptychodera we have obtained, as well as a few Sipunculids, but Amphioxus and Thalassema we have not found. At Minikoi in two tides I have brought to the camp as great a variety of animals as Cooper and I have obtained here working ten tides up to the present. Indeed, life here is strictly limited in variety, and, when the marine collections have been fully worked up, one is inclined to anticipate, even so early, that some definite light will be thrown on the distance to which the larvæ of marine animals can cross the open ocean, on the distribution, in fact, of marine animals. The same, too, is true as well of the marine plants, nullipores alone being common.

"I am now endeavouring to work up the physical conditions of the atoll so as to find, if possible, whether there is any physical cause for the comparative paucity of free-living animals. I am sending Cooper in the ship tomorrow to Diego Garcia, where he will have four or five days while she is coaling to examine the land and reefs. I remain here, but I hope by the time of his return, in about twelve days, to have finished my work and to move on to Peros Banhos, while the *Sealark* is sounding between the banks and round the Chagos Archipelago."

#### The Problem of the Random Walk.

I HAVE to thank several correspondents for assistance in this matter. Mr. G. J. Bennett finds that my case of  $n=3$  can really be solved by elliptic integrals, and, of course, Lord Rayleigh's solution for  $n$  very large is most valuable, and may very probably suffice for the purposes I have immediately in view. I ought to have known it, but my reading of late years has drifted into other channels, and one does not expect to find the first stage in a biometric problem provided in a memoir on sound. From the purely mathematical standpoint, it would still be very interesting to have a solution for  $n$  comparatively small. The sections through the axis of Lord Rayleigh's frequency surface for  $n$  large are simply the "cocked hat" or normal curve of errors type; for  $n=2$  or 3 they do not resemble this form at all. For  $n=2$ , for example, the sections are of the form of a double U, thus UU, the whole being symmetrical about the centre vertical corresponding to  $r=0$ , but each U itself being asymmetrical. The system has three vertical asymptotes. It would be interesting to see how the multiplicity of types for  $n$  small passes over into the normal curve of errors when  $n$  is made large.

The lesson of Lord Rayleigh's solution is that in open country the most probable place to find a drunken man who is at all capable of keeping on his feet is somewhere near his starting point!

KARL PEARSON.

#### Proposed Magnetic and Allied Observations during the Total Solar Eclipse on August 30.

In response to my appeal for simultaneous magnetic and allied observations during the coming total solar eclipse, cooperative work will be conducted at stations distributed practically along the entire belt of totality and also at outside stations, nearly every civilised nation participating.

These observations will afford a splendid opportunity for further testing the results already obtained. All those

who are able to cooperate are invited to participate in this important work.

The scheme of work proposed embraces the following:—  
(1) Simultaneous magnetic observations of any or all of the elements according to instruments at the observer's disposal, every minute from August 29, 22h., to August 30, 4h., Greenwich mean astronomical time.

[To ensure the highest degree of accuracy attainable, the observer should begin work early enough to have everything in complete readiness in proper time. See precautions taken in previous eclipse work as explained in the journal *Terrestrial Magnetism* (vol. v., p. 146, and vol. vii., p. 16). It is essential, as shown by past experience, that the same observer make the readings throughout the entire interval.]

(2) At magnetic observatories, all necessary precautions should be taken so that the self-recording instruments will be in good operation, not only during the proposed interval, but also for some time before and after, and eye readings should be taken in addition wherever it be convenient.

[It is recommended that, in general, the magnetographs be run on the usual speed throughout the interval, and that, if a change in the recording speed be made, every precaution possible be taken to guard against instrumental changes likely to affect the continuity of the base lines.]

(3) Atmospheric electricity observations should be made to the extent possible by the observer's equipment and personnel at his disposal.

(4) Meteorological observations in accordance with the observer's equipment should be made at convenient periods (as short as possible) throughout the interval. It is suggested that, at least, temperatures be read every fifth minute (directly after the magnetic reading for that minute).

(5) Observers in the belt of totality are requested to take the magnetic reading every fifteen seconds during the time of totality, and to read temperatures as frequently as possible.

(6) At those stations where the normal diurnal variation cannot be obtained from self-recording instruments, it is desirable to make the necessary observations for this purpose on as many days as possible before and after the day of the eclipse, and to extend the interval of observations given above if conditions permit. In general, those who will have self-recording instruments have decided to run them for at least eight days before and after the day of the eclipse.

It is hoped that observers will send full reports of their work to me as soon as possible for incorporation in the complete monograph on this subject to be published by the Carnegie Institution of Washington.

L. A. BAUER.

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#### British Fruit Growing.

In your remarks on p. 297 (July 27) on the above subject, you mention "the diversity of yield from farms in the same neighbourhood . . . due presumably to differences of shelter and aspect." It is a remarkable thing that, so far as I know, nothing has ever been done to find out and publish the most suitable localities, as regards soil and climate, for orchard planting. It is a question of very great complexity, and can only be dealt with properly by officials appointed for that purpose; but its importance in fruit culture is so obvious that a considerable expenditure would be well repaid. Few people have any idea of the great climatic differences in localities within even a few hundreds of yards!

This house is on the south slope of the long range of Lower Greensand hills which runs parallel with the Chalk range the whole length of Kent from west to east. At this point the slope rises steeply from 200 feet above sea-level to 500 feet, my house being about 350 feet. I have carefully observed the effects of frost, &c., for the last six years, and it appears to me that the variations in temperature in the vertical limits mentioned are much greater than would be expected. Up to the 400-foot contour line the climate is singularly equable, which is proved not only by daily thermometrical observations, but by the