

African naturalists to settle this question. In Natal Mr. G. F. Leigh, the late Mr. A. D. Millar, and Miss Fountaine have been successful in breeding the two *Pseudacræas*, *lucretia* and *imitator*, but the latter, which is the only Natal member of Dr. Jordan's group, appears in a single form mimetic of *Planema aganice*, and is therefore incapable of supplying the desired test. I attempted to induce both Miss Fountaine and Mr. Millar to travel to Entebbe in order to decide the question. My friend Mr. W. A. Lamborn, who has done such splendid work in breeding Lepidoptera in the Lagos district, has reared *P. lucretia* and also *P. semire*—the latter, I believe, for the first time—but has not yet been successful in finding the larvæ or in obtaining the eggs of any local form of *P. eurytus*.

Lately, however, I have felt confident that success would be achieved by Dr. Carpenter, with his wide experience of breeding and residence in an exceptionally favourable locality. He first succeeded in finding and rearing the larvæ of *P. lucretia*, and then made many attempts to obtain eggs from captured females of the *hobleyi* group. Discouraged by many failures, he was beginning to despair when, some weeks past, he observed in the Bugalla forest a female *obscura* "with a touch of *hobleyi*," settling in an unusual position on a leaf of the food-plant of *lucretia*—almost certainly a Sapotaceous plant. The butterfly escaped, but Dr. Carpenter found the egg on the leaf, and hoped to rear the perfect insect before or during the meeting of the Second International Congress at Oxford (August 5-10), and he promised that if the offspring turned out to be *terra* or *hobleyi*, he would cable the result. He wrote that he anticipated *terra*, because this form is much the commonest on Bugalla.

Unfortunately the eagerly-expected butterfly did not emerge until after the meeting, but on August 19 I received a cable from Entebbe with the word "terra." Furthermore, Dr. Carpenter has now succeeded in obtaining eggs laid by known parents upon enclosed branches of the food-plant in the forest, so that we shall not have to wait long for evidence that is tolerably certain to afford direct proof of Dr. Jordan's conclusions as regards all the forms of the *hobleyi* group on the island, and is likely to establish the genetic relationship between them.

Dr. Jordan, Mr. Wiggins, Mr. Neave, and Dr. Carpenter are all to be warmly congratulated on the parts they have played in solving a bionomic problem of extraordinary interest and complexity.

E. B. POULTON.

St. Helens, Isle of Wight, August 28.

Wireless Telegraphy and Terrestrial Magnetism.

THE report in *The Times* of the discussion on wireless telegraphy at the British Association meeting in Dundee mentions the hypothesis—introduced apparently by Dr. Eccles—that several of the phenomena of the propagation of electric waves round the earth are largely influenced by the existence of an ionised layer in the atmosphere. The hypothesis seems analogous to, if not identical with, one made by several magneticians independently, with the object of explaining phenomena exhibited by the diurnal variation of the magnetic elements. This diurnal variation is now generally regarded as most probably due to electric currents in the upper atmosphere, and it has been suggested that the fact that the magnetic changes are normally larger by day than by night is due to an increased ionisation of the atmosphere due to sunshine.

The regular diurnal magnetic variations are much larger in years of many than of few sun-spots. The

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difference between the size of the day and night movements is relatively reduced in years of sun-spot maximum, and in all years during large magnetic storms. Again, the diurnal variation is much larger in high latitudes—where aurora abounds—than elsewhere, and the difference between day and night phenomena is there much reduced. Finally, it has been recently found that a substantial part of the magnetic sun-spot relationship may be explained by a direct connection between the amplitude of the diurnal magnetic range and the spotted area of the sun some four days previously. These phenomena, or at least some of them, have been ascribed to corresponding changes in the ionisation of the upper atmosphere.

The natural inference, in short, is that the ionisation is much enhanced in years of sun-spot maximum and during magnetic storms, and is substantially influenced by the sun-spot area four days previously. Also one would infer that in high latitudes the upper atmosphere is normally much more highly ionised than elsewhere. If wireless telegraphy is largely dependent on an ionised layer, then unless this layer is distinct from that which influences terrestrial magnetism, we should expect wireless phenomena to show peculiarities corresponding to those just described in terrestrial magnetism. My object in writing this note is to direct the attention of those in control of wireless installations to the field of research which is thus suggested. Wireless telegraphy may yet lend itself to the direct experimental investigation of the causes of a variety of the phenomena of terrestrial magnetism.

September 7.

C. CHREE.

On the Structure of the Stromatoporoid Skeleton, and on Eozoon.

I HAVE pointed out (*Annals Mag. Nat. Hist.*, September, 1912) that Stromatoporoids are Foraminifera, but I did not give an explanation of the structure of the skeleton. I now find that the clue to this structure lies in the "astrorhizæ" or stellate patterns on the surface of many of these fossils.

Each astrorhiza consists of a spiral series of chambers formed round a central and a circum-ambient chamber, and the existence of a number of astrorhizæ is due to budding—as in corals. Anyone who has been bewildered—as I have been—at the apparent complexity of Stromatoporoid structure will at once appreciate—I cannot forbear saying—the beautiful simplicity of this solution of a difficult problem, and will realise that these organisms have at last come to rest in their proper place. I am publishing in the October number of the *Annals* a revised classification of the group.

Eozoon canadense likewise is a colony-forming Foraminiferan, the unit in this case being a coiled Nummulitid shell. Convincing evidence for this statement also will be given in the October number of the *Annals Mag. Nat. Hist.*

In view of a possible recrudescence of the Eozoon controversy, it is very fortunate that the evidence in favour of the theory of organic origin is now so overwhelming that the former opponents of that theory will readily change their views. R. KIRKPATRICK.

British Museum (Nat. Hist.).

The Striation of Stones in Boulder Clay.

IN NATURE of September 5, Dr. A. Irving, in criticism of statements by Mr. Reid Moir, asks "how could the soft matrix of the Boulder Clay scratch a flint, or even hold a harder stone with sufficient grip to give it effect as a graving-tool?"