supposed recent Voles of the Forest Bed I have come to consider as extinct species; the Pliocene Crag types, on the other hand, while entirely absent from the West Runton Fresh-water Bed, were found in the East Runton Forest Bed mixed with types of the former; this leads to the assumption that the Crag types have been washed into the East Runton deposit. The latter explanation, which I did not explicitly formulate at the time, receives strong support from the fact that at East Runton we find likewise a West Runton species of Beaver, together with a Pliocene species (*Castor plicidens*, Maj.), the inference to be drawn being that the provenance of the latter is the same as that of the Pliocene Voles, mingled at East Runton with the West Runton types.

If I am right in my deductions, it follows that the Vole fauna of the Forest Bed will, by the elimination of recent as well as of Pliocene types, prove to have been much more homogeneous than hitherto supposed. This being the case with one restricted group, it appears to call for a revision of all the other mammalian remains.

For many years I have entertained the suspicion that there must be something wrong with our lists of the Forest Bed Mammals. In plain language, the association of recent with Pliocene mammalian species, culminating in the assumption of the musk-ox having been a contemporary of the prototypes of the Upper Pliocene Val d'Arno fauna, is a faunistic impossibility. I therefore deny such an association of which there is no analogy in any other part of the world, although this has been assumed on erroneous determinations, e.g. with regard to the mammalian fauna of Leffe (Upper Lombardy).

I very much doubt whether in the end a single one of the supposed 24 recent species, out of a total of 45 Forest Bed Mammals, will remain, though in some cases it is not possible, for the present, to detect differences between a fragmentary fossil and the corresponding living species.

C. I. Forsyth Major.

AN *ORTHIS* FROM LADOCK QUARRY, CORNWALL.

Sir,—In the Memoirs of the Geological Survey, England and Wales, Explanation of Sheet 346, 1906, p. 35, the following paragraph occurs:—"A fossil has been found in the Ladock Quarry and placed in the Truro Museum. It is an *Orthis*, which Dr. Ivor Thomas, who examined it, thinks is probably new." The occurrence of a fossil in this quarry was so interesting and unlooked for that it seemed impossible to accept it without further evidence. Opportunity for investigation did not occur until April last, when I spent ten days with Mr. Upfield Green working over his promised section of the country between Newquay and Porthluney. The fossil in question was found by Bennett, a stonebreaker, on a pile of stones midway between Ladock and Grampound Road, and *not in the quarry at all.* He told me himself that his son broke the stone, and he noticed this fossil with the remains of several other impressions of shells. He preserved only this one specimen, which was an internal cast, and gave it to Mr. Minard, of Grampound, who afterwards deposited it in the Truro

Museum. The specimen has since been sent to London for examination, and casts were made for the British Museum and for Jermyn Street, as it was felt that the specimen might become of importance in future discussion. Bennett was positive in his assertion that the material on the stone heap came from Ladock Quarry, but Mr. J. O. Clemmow, of Ladock, who has been at some trouble in the matter, writes me as follows, under date 30th May, 1908 :—"As a large quantity of stone from the South Coast, near the Helford River, has been brought into the immediate neighbourhood and broken for the roads, I should say *that considerable doubt exists as to where the stone which produced* this fossil was quarried."

The fossil seems to me to be the internal cast of a species of *Spirifer* of Taunusian age, and its appearance is suggestive of some southern locality, possibly the Looe area, and certainly not such as one would expect from the Ladock stone. A sharp look-out is now being kept for any trace of life from the Ladock Quarry, but the men working it have never seen a single shell. Nor has any sign of life ever been seen by either Mr. Upfield Green or myself in numerous visits, except some black flat grass-like markings, which Mr. Newell Arber would not venture even to call 'plant-remains.'

As the occurrence of this fossil has been so definitely given in print, it seemed worth while to investigate the story while those concerned in the statement were accessible, as endless trouble is occasioned by these records in after years when it is impossible either to prove or disprove them. C. Davies Sherborn.

A NOTE ON GRANITE AND A NOTE ON RIPPLEMARK.

Sir,—Since the appearance of my letter on granite in the March number of the Magazine, I have submitted to a physicist the drawings of inclusions in two Dartmoor rocks, which appeared in my paper in the Magazine in March, 1904. (Copies enclosed.) I sought to ascertain the significance of their disproportionate contents of chlorides and of water. This is the reply :—

"At the temperature when the water, with salt, etc., is above its critical point, the salt and water vapour would form a homogeneous mixture, and enclosures of this homogeneous mixture should show on cooling the same proportions of dissolved salt, crystallized salt, and liquid water."

The inference is that the enclosures referred to caught up their contents when the temperature was under the critical point of the salt and water, whatever that may exactly be. It would be higher, I am told, than that of plain water.

From the above it would appear that the chlorides of the western granites are as good records of the temperature of crystallisation as the carbonic acid inclusions of some other rocks.

To turn to a totally different subject, I should like to point out that in the paper by the late Dr. Sorby, just published in the Q.J.G.S., an incidental remark will clear up nearly sixty years of uncertainty. Dr. Sorby mentions that the depth of water in which he observed the