

sent by far the stronger portion of the shower, will fall to the lot of American observers.

The calculated intensity of the shower is rather inferior to that of its prototype of 1868; besides, the first maxima fall early in the night, and may not, therefore, be seen at their best. Nevertheless, the present epoch is a well-defined one, and should yield satisfactory returns to the vigilance of meteor observers.

Of the minor showers associated with the period, the most interesting occur on November 16 between 13h. and 14h., and on November 17 from 13h. to 18h.

Dublin. JOHN R. HENRY.

The Rusting of Iron.

IN reference to the discussion on the rusting of iron in recent numbers of NATURE, I happen to have a curious specimen illustrating the accumulating of rust which may possibly be of some little scientific value. It is a horse-shoe which was dug up some years ago by a child out of the sand on the site of the battle of Prestonpans, near Edinburgh. It was given me by the child's father, who was with him at the time. The shoe is now very irregular and lumpy. The thickness of the naked iron can be made out at one spot, where it is partially denuded. It is just three-eighths of an inch. But with the mass of what I can only describe as rust, and, I presume, sand—some small pebbles are, too, imbedded in it—it is in one spot as thick as 2 inches, and in girth it there measures 6½ inches. No part of it is wholly clear of rust; the smallest girth is 4 inches.

The famous battle was fought on September 21, 1745, and the supposition is that the shoe, if not the horse, was lost there. The supposition is probable enough. If correct, the rust would represent the accumulation in a century and a half. I may add that I have some specimens of pig-iron which were turned out at foundries here fifty years ago, and have been in the open air ever since. They have just a brown coat, but the coat is of no perceptible thickness.

JOSEPH MEEHAN.

Creevelea, Drumkeeran, October 29.

PROTOZOA AND STATOZOA.¹

THE late publication of the first volume of this well-known series has enabled the authors to incorporate some of the results of the more recent researches upon their several subjects. Taken in conjunction with the earlier published volumes, the work seems to fulfil the purpose of providing an intelligible and adequate survey of the entire animal kingdom without giving undue prominence to particular groups.

Prof. Hartog's share in the work makes a well-timed appearance in the year which has witnessed something like a crisis in the history of protozoology. His chapters are full of suggestive comparisons and analogies, and their value is increased by the addition of copious footnotes. Some of the statements are not supported by references, as, for example, where he speaks of the presence of a contractile vacuole in the zoospores of algæ and fungi without mentioning any specific instances of this condition (p. 15).

The essential complexity of the simplest manifestations of living matter is made evident, and Prof. Hartog does not harmonise the vitality of protoplasm with the vagaries of a drop of oil or of a bubble. The segmentation of the oosperm of Metazoa and Metaphyta is compared with the sporulation of the Protista, both phenomena being characterised as brood-formations (p. 31).

In the second chapter the author begins with an

¹ "The Cambridge Natural History." Vol. i. Protozoa, by Prof. Marcus Hartog; Porifera (Sponges), by Igerna B. L. Sollas; Coelenterata and Ctenophora, by Prof. S. J. Hickson, F.R.S.; Echinodermata, by Prof. E. W. MacBride, F.R.S. Pp. xvii+671; illustrated. (London: Macmillan and Co., Ltd., 1906.) Price 17s. net.

interesting disquisition on the old belief in spontaneous generation as an explanation of the origin of the organisms of putrefaction, pointing out how this was due in part to the supposed inconstancy of species in Protista, and that this in turn resulted from the want of knowledge of their life-histories; how this knowledge was supplied in the first place by the Rev. W. H. Dallinger and Dr. Charles Drysdale for Protozoa, and for the Protophyta by F. Cohn and later by von Koch, who perfected the methods of culture devised by De Bary for the study of the fungi.

In his remarks on reproduction by syngamy, Prof. Hartog distinguishes between exogamy and endogamy, the rhizopod *Trichosphaerium* affording an example of the exogamous conjugation of biflagellate isogametes, while the heliozoan *Actinosphaerium* practises endogamy.

Referring to the pelagic foraminifer *Globigerina* (p. 61), the author says that after death the tests sink to the bottom of the sea to form the "Globerina ooze" (*sic*), "at depths where the carbonic acid under pressure is not adequate to dissolve the more solid calcareous matter." On the following page we read:—"Some Foraminifera live on the sea bottom



FIG. 1.—*Cerianthus membranaceus* in its tube. Colour pink, with tentacles annulated pink and brown. About 35 cm. in length. From "The Cambridge Natural History," vol. i.

even at the greatest depths, and of course their shell is not composed of calcareous matter." There is nothing to indicate to the reader why this is more obvious than any of the other plain statements in the book.

The last three chapters of Dr. Hartog's treatise deal with the Sporozoa, the Flagellata, the Ciliata, and the Suctoria. As an illustration of the rapid strides of recent years, he notes that seven years ago no single species of Sporozoa was known in its complete life-cycle. It would have been better to have used the general expression "body-cavity" instead of "cœlom" on p. 105. Cœlom and hæmocœl are both body-cavities, just as clothes props and thorough-breds are both horses!

The importance of investigations into the life-