

NOTICES OF MEMOIRS.

I.—ON THE PARALLEL RIDGES OF GLACIAL DRIFT IN EASTERN MASSACHUSETTS. By PROFESSOR N. S. SHALER.

(Proc. Boston Society of Nat. Hist., vol. xiii., February, 1870.)

IN the immediate neighbourhood of Boston the unstratified Drift does not lie in anything like a continuous sheet, but is distributed in long and rather narrow ridges, which, with varying height, on account of long-continued denudation, may be traced for miles across the country. These ridges are particularly conspicuous in the islands of the harbour of Boston, where, although much worn by the action of tidal currents, the parallelism is quite apparent. They exhibit two sets of trends, the one being north-west and south-east, the other north-east and south-west; and a comparison of the sections, given at various points in the islands of the harbour, at Chelsea, Somerville, Cambridge, Brighton, South Boston and elsewhere, has shown that throughout this region the Drift is remarkably similar at the same height above the sea.

The Drift contains pebbles of various sizes, five-foot boulders, and fragments of every gradation down to coarse sand. The whole is imbedded in a fine mud, which so binds the materials together that, in the lower parts of the mass, where it has been subjected to considerable pressures, it has become a hard conglomerate. Nowhere is there any attempt at stratification.

In regard to the origin of these Drifts, Professor Shaler agrees with Agassiz in considering them as the materials which rested in and upon the glacial sheet at the close of its history, and which were dropped in the places they now occupy by the melting of the ice upon which they rested. As this Drift deposit must have originally been at least one hundred and fifty feet thick, it is difficult to conceive how such a mass of detritus as that in question could have ever been contained in a glacial stream, and the supposition is necessary that the mass of the Drift must have been rent from the floor of the glacier as it moved along.

But there is evidence, according to Professor Shaler, that the glacial sheet was at many points over half a mile in depth, and, therefore, this action may readily be conceded to it.

Moreover, in a section exposed at Cambridge, large masses of the clay slate, grooved and scratched by long working on the solid rock, were found in the Drift, at a height of several feet above the bed from which they had been torn.

It follows, as the author observes (if these conclusions be accepted), that this deposit of detrital matter must have covered, with something like uniformity, the whole of this part of the coast; and indeed the relation of the separate masses of Drift is irreconcilable with any other hypothesis—for they could not be the terminal or lateral moraines of a glacier.

The cause of the peculiar parallelism of the two series of ridges is difficult to arrive at; but it is known that the district around

Boston is affected by two lines of upheaval, each marked by dykes and by considerable dislocations of strata. With the direction of these disturbances the lines of Drift exactly correspond, and Professor Shaler concludes that these Drift-hills are only cappings of glacial detritus lying upon ridges of the more solid rock of the country; the solid pedestal having prevented the wearing action of the streams from affecting the detrital matter which rested upon them. He concludes with some remarks upon the Glacial period.

II.—THE MAMMALIA AND OTHER REMAINS FROM DRIFT DEPOSITS IN THE BATH BASIN.

By CHARLES MOORE, F.G.S.

[A Paper read before the "Bath Natural History and Antiquarian Field Club." 8vo. Bath, 1870.]

THE "Drift deposits" here described comprise the Alluvial beds and Post-Pliocene gravels, due to the action of fresh water, and which have been deposited in the valleys since the country assumed the general physical configuration which it now possesses. Although some of the derived materials have been brought from considerable distances, in general they have been washed down from the higher grounds, or from the sides of the valleys upon which the ancient streams operated, in much greater volume than those which now follow their courses.

The area to which Mr. Moore's remarks are applied comprises the low ground, west of Bath, and the valleys running immediately out of it to the east, namely, those of Box, and that extending by way of Limpley Stoke and Freshford to Bradford.

He treats first of the Historic Period, mentioning the discovery, at a spot twelve feet below the city of Bath, of two stone coffins, in which he obtained a small collection of fossils, which had been washed in. Mr. Moore shows that, subsequently to the Roman occupation, the area upon which Bath stands became a swamp, as remains of this period occur covered up by mud, vegetable remains, and drift wood, the deposit in some instances being almost converted into peat. Mixed with it are many mammalian remains. He explains, by means of well-sections, the characters and thicknesses of the different deposits of Historic, Pre-Historic, and Post-Pliocene times, which are met with in the vicinity of Bath.

Under the term "Mammal Drift" are included all the gravel deposits of the district. In it are found remains of *Elephas primigenius*, *E. antiquus*, *Rhinoceros tichorhinus*, *Ovibos moschatus*, Wild Boar, Horse, Reindeer, and *Bos primigenius*. No traces of Man have as yet been determined.

Mr. Moore gives lists of the land and freshwater mollusca, and other remains from the different drifts, and he also records the species of derived fossils which he has met with in them. Concluding with some theoretical remarks, he expresses his opinion that evidences of glacial action occur in the deep and long-continued furrows in the stiff Liassic clays on which the Mammal Drift now lies.

H. B. W.