

THE BRIDLINGTON CRAG,

SIR,—In your Number for December, 1881 (p. 538), Mr. Lamplugh, introducing what he had to say about Bridlington and Dimlington by quoting from the first part of my memoir, "On the newer Pliocene period in England," my assertion that the Bridlington shells lived where they occur, adds that this is "very doubtful."

What I endeavoured in that memoir to show was, that at the time when, at the beginning of the great submergence, the land-ice found its way to the sea, while that was as yet confined to the east side of England, and the Crag shells, *Nucula Cobboldiæ* and *Tellina obliqua*, had not become extinct, the basement clay of Holderness was its moraine, the ice which formed it being so much of that enveloping the wold as issued through the Humber; that as this ice began to retreat before increasing submergence (to advance afterwards during emergence, while forming the chalky clay, in a direction which, in consequence of the altered inclination of England, was quite different to that of its retreat, so that it avoided Holderness), it uncovered this moraine, whereupon the Bridlington and Dimlington mollusca established themselves upon it, becoming imbedded in the thin beds of mud and sand which were then thrown down on it, and which, perhaps, became some of them buried in the moraine by slight alternations in advance or retreat of the contiguous ice as it was (on the whole) retiring; that afterwards, during the emergence, and when the ice giving rise to the moraine of the chalky clay was pushing in its altered direction, and invading East Anglia and the East Midland Counties, a stream of ice from the North of Yorkshire (reinforced by the land-ice which crossed the Pennine at Stainmore and brought the Shap blocks found in the purple clay of East Yorkshire) came southwards down the east side of Yorkshire, and gave rise by its moraine to the purple clay; and that in doing so it passed over this early moraine which had been deserted by the ice during the progress of the submergence, breaking up and twisting up into the old moraine the thin beds containing the remains of the mollusca which had established themselves upon it. Not only did it do this, but it carried off part of the older moraine and incorporated this into its own, the lower part of this, in which chalk is plentiful, being largely made up of the older moraine reconstructed, and sheets of the old moraine thus carried off are at Dimlington and near the site of the Talbot Inn to be seen alternating with sheets of the newer moraine in the lower part of the latter.

So far from what Mr. Lamplugh had to show invalidating my assertion that the shells lived where they occur, his descriptions appear to me in the fullest way, as far as they go, to confirm not only this assertion, but the whole process which I have traced.

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SEARLES V. WOOD.

ERRATA IN THE FEBRUARY NUMBER, 1882.

- p. 94, line 10 from bottom, for "Upper White Lias," read "Upper Lias."
 p. 96, for "Transactions of the Bath Literary and Philosophical Association," read "Proceedings of the Bath Natural History and Antiquarian Field Club."