

Farther east the fossiliferous beds of Dinas Brán appear to lie considerably above the *Leintwardinensis* Slates.

On comparison with other areas it is found that this succession is almost identical with that in the Long Mountain, in North Denbighshire, and in the Lake District. It is also inferred that the *Leintwardinensis* Slates represent the Leintwardine Flags of Herefordshire, and that the Dinas Brán beds correspond with a part of the Upper Ludlow.

3. "On some Points in the Geology of the Harlech Area." By the Rev. J. F. Blake, M.A., F.G.S.

In testing the conclusions arrived at in regard to the Llanberis and Penrhyn area by an examination of that of Harlech, two questions are raised concerning the latter:—(1) Can a succession be traced below the Purple Slates similar to that which the author has described as occurring in Caernarvonshire? and (2) Where is the most natural break in the series, and does it show an unconformity?

With reference to the first question, the author gives his reasons for concluding that, as far as the succession is seen in the Harlech area, it is similar to that of Caernarvonshire. A group of Purple Slates is described which so closely resemble the Llanberis and Penrhyn Slates, that he considers that he is justified in definitely correlating them with those slates. Below these are slaty greywackes, which, if not identical with those of Caernarvonshire, bear a greater resemblance to them than any other part of the series does. No older beds are seen. Above the Purple Slates are the Harlech Grits proper.

In discussing the second question, the author describes conglomeratic beds occurring some distance above the base of these Harlech Grits; but at Pont Llyn-y-Crom the junction between them and the underlying Purple Slates shows features recalling what is seen at Bronllywd. He discusses the possible existence of an unconformity at the base of these grits, and concludes that on the whole the phenomena point, though not very strongly, to an unconformity of no great importance.

The concluding part of the paper is occupied with a consideration of the question of classification of the Cambrian strata and those in juxtaposition with them.

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## CORRESPONDENCE.

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### SIR H. HOWORTH ON THE HOLDERNESS BOULDERS.

SIR,—The title and some of the paragraphs of Sir Henry Howorth's latest contribution have been penned under a singular misapprehension. I have written not a word "on the Scandinavian Ice-sheet," nor offered any opinion as to the mode of transport of those very damaging boulders. I have, indeed, my own views on these questions, but have kept them to myself with the modesty which your correspondent recommends. This reserve I propose to maintain, despite Sir Henry's somewhat inconsistent challenge

to me to enter the lists against "the best men" among Glacial geologists—meaning, as he rather quaintly explains, the men he quotes.

The sole statement of mine with which we are concerned is that certain boulders extracted by Mr. Lamplugh and myself from the Holderness Boulder-clays are of Norwegian origin. Extricating from Sir Henry's communication what is germane to this question, I note first that the ballast theory has taken a more definite shape. It may have occurred to the writer that there is no port on the Holderness coast, and that the number of vessels from Christiania cast away there is limited. For whatever reason, Sir Henry now carries us back to the age of the Vikings, who, it appears, ballasted their ships with little pieces of rhombenporphyr, and used small pebbles of laurvikite for anchors; and he, apparently, would have us believe that the stones now on the strand have lain there undisturbed for many centuries! To anyone who has watched the movement of this beach, which no artificial works have been able to hold, or who reflects that in the days of the Vikings the Holderness coast-line must certainly have been several miles to seaward of its present site, this idea will come with all the force of novelty.

But, besides the pirates from Viken, Sir Henry has two other strings to his bow. One is the idea that we have mistaken boulders driven into the face of the cliff by high tides for boulders belonging to the clay. Sir Henry is rather fertile in suggesting foolish blunders that somebody else may have made, and I do not see how he is to be convinced on this point except by personally examining the cliffs that he writes about, which is perhaps too much to expect from so busy an author. But, since he inquires whether boulders of the rocks in question have been found inland, I venture to remind him of such a find made at Cambridge by an observer in whose caution he has, I am sure, full confidence. It was recorded by me in your July Number, and still awaits Sir Henry's attention. In the northern counties, where so many thousands of boulders have been critically examined, there is no record of the types in question except from the eastern coast-line.

This last significant fact will afford exercise for Sir Henry's ingenuity with reference to his remaining alternative, viz. that these rock-types may occur *in situ* somewhere in Britain, apparently in Durham, the Cheviots, or the Lake District. Assuredly this suggestion cannot have been submitted to the writer's petrological adviser. Recalling that the disputed boulders, of at least four distinct types, have all been matched in one district of Norway, and that the British areas indicated, which are as thoroughly known as any part of this country, have yielded nothing remotely resembling any one of those types, we may fairly ask for some surer ground for this very original hypothesis than the exigencies of Sir Henry Howorth's glacial theories.

ST. JOHN'S COLLEGE, CAMBRIDGE.  
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ALFRED HARKER.