

though of course this might happen. I do not think it had so done in this case.

T. G. BONNEY.

SIR,—To the many explanations offered on Lithodomous Perforations, may I be allowed space to say, that in searching for *facts* in Geology in the Furness district, I met with a bed of slate-coloured clay on the sea-shore, about half way between high and low water. This clay was much bored, and the holes contained *live* Pholades, and apparently at work. Suppose in time this clay becomes embedded and changed into rock, and afterwards by some convulsion of nature is thrown to the surface, may it not be possible for the action of the atmosphere, rains, etc., to not only destroy the remains of the original makers of the holes, but alter the appearance of them, and the holes become useful winter homes for land snails.

I have seen the rocks at Ormeshead and other places in Wales, and more than 20 times those on Birkrigg, but after careful examination, cannot see how the explanations hitherto given fully account for the borings.

SAMUEL SALT.

ULVERSTON, 10th January, 1870.

TERRACES ON INLAND SLOPES.

SIR,—I am glad to see, from the reply of Mr. Mackintosh in your last number, that he no longer ventures to “assert” the marine origin of these terraces, though he still “believes” that the greater number of them are “Sea-worn.” I will, however, suggest to him that even such a modified “opinion,” considering the importance of the theory which it involves as to the very recent emergence of this whole island from beneath the sea, requires an array of facts in its support of which his book does not afford a single specimen.

One word upon my “descent of silt theory,” which Mr. Mackintosh still cannot, in any case it seems, admit; but which I look upon as possessing a real interest to geologists who are speculating on the causes which have modelled the existing surfaces, as showing how large an amount of change the atmospheric forces, coupled with that of gravitation, can produce within a very limited time.

It is clear that Mr. Mackintosh will not yet comprehend that the wash of rain on a plough-disturbed surface *must*, and *does*, carry down by degrees a large amount of silt, or disintegrated soil, to some lower level, where the force of the current sustains a check, and the solid matters are deposited. If he will only look at a recently ploughed slope, after a heavy rain-storm, he will see this process exemplified in an unmistakable manner. He speaks of “ridges artificially formed as boundaries between fields,” as “distinct from the terraces under consideration.” Of course they are so, if he refers to banks of earth raised high above the ground on *both* sides, such as are common in Devonshire and some other counties. The “terraces under consideration” are uniformly flat, or nearly so, on the upper side, and rest on a steep bank fronting the lower side.

And these, whether there still exists a force to check the further descent of silt, or that this has been removed, or *never existed there at all*, are, I venture to maintain, the result of the process I have described. And of this even Mr. Mackintosh, I think, will convince himself, if he will only cut through a few of them, and fairly examine their composition.

Of course I must not be understood as denying that many banks in valleys have been formed on either side of a running stream by its erosion, whether during floods, or when the stream ran at a higher level than at present. It is the "marine" origin of the terraces in question, to be seen scoring the flanks of our Chalk and Oolite hills, often up to their summits, which I have controverted. And although Mr. Mackintosh has now withdrawn the phrase "raised sea-beaches," as applicable to them, and substitutes those of "raised coast-lines, tidal terraces, or current-marks" (p. 26 *supra*), I do not think he thereby mends his position in any degree.

G. POULETT-SCROPE.

GLACIAL EPOCH IN NEW ZEALAND.

SIR,—I observe that several writers who discuss the debatable land between Geology and Physical Geography assume that in the Southern Hemisphere signs are found of a Cold Period, analogous to the Glacial Period of the North, and any difference of opinion on the subject is only as to whether the extreme cold affected both hemispheres at the same time, or alternately. I am aware that descriptions of this Glacial Epoch, and the formations by which it was supposed to be recognized in New Zealand, was given by Dr. Haast, prior to 1864; but towards the close of that year he completely changed his views on this most vital point in New Zealand Geology, and adopted the explanation of the former extension of the Glaciers in the New Zealand Alps, which was first suggested by myself in 1863.

Those who are interested in this subject will find the more modern view fully stated in the English translation of Hochstetter's work, the essential points being given in my own words (Hochstetter's New Zealand, 1867, p. 505). As the author does not give this important passage as a quotation, reference may be made to the Journal of the Royal Geographical Society, 1864, p. 103; while at page 92 of the same volume of the Journal, the opposite hypothesis of the submergence of the island and contemporaneous ice-cap during a Glacial period, is clearly stated by Haast.

This latter theory is quite irreconcilable with the observed facts, and the former extension of the glacier is sufficiently accounted for by the gradual reduction of the surface area exposed above the perpetual snow-line: firstly, by its erosion into valleys, ridges, and peaks; and secondly, by its gradual subsidence—a subsidence which has operated for the most part continuously—though interrupted by irregular and local elevations. Some of these have occurred since the arrival of colonists, even to the extent of nine feet. But beyond fifteen to twenty-five feet above the present sea level, no marine