

they are of Old Red Sandstone age. It is the object of the author to show the correctness of the latter supposition, and he brings forward evidence to prove that the red rocks rest unconformably upon the Lower Palæozoic rocks, or are faulted against them, and that the breccias of the red rocks contain fragments of the Lower Palæozoic rocks, and also of intrusive rocks which break through the latter. The red rocks also resemble deposits which are known to be of Old Red Sandstone age.

The Old Red Sandstone rocks of the district form an irregular and incomplete elliptical ring around a denuded plateau of older rocks. The incompleteness is due to the concealment of the southern part of the ring beneath the sea; but if the southern part of this ring be as irregular as the northern portion, faulted patches of the Old Red Sandstone rocks may well come in among the older rocks of the cliffs in the positions where the beds which are discussed in this paper occur.

3. "On the Depth of the Source of Lava." By J. Logan Lobley, Esq., F.G.S.

The author contends that lava cannot have been brought to the surface from a depth of 30 miles, as fissures which would serve as conduits could not exist at that depth, and, moreover, the lava would be consolidated before it reached the surface, owing to contact with cool rock for a considerable period. He argues that the pressure of the overlying rocks would cause the rocks even at a depth of 10 miles to be practically plastic, as shown by M. Tresca's experiments, and that no continuous fissure could occur in such rocks. Estimates of the volumes of ascending lava-columns were given, with a diagram comparing them with a 30-mile thickness of rocks.

CORRESPONDENCE.

THE HIGH-LEVEL SHELLY CLAYS AND MR. MELLARD READE.¹

SIR,—My "writings on the subject" are not so "numerous" by a long way as those of Mr. Mellard Reade, but I had hoped that they were at least tolerably clear as far as they went. I find, however, that my friend Mr. Reade has "completely misunderstood their tenour." He thinks I have made "strenuous endeavours to prove that high-level shelly beds do not exist." This would indeed be a waste of time on my part, in all cases where they were ordinarily well attested. No; freely admitting them in all such cases, the point of interest with me has been—How were they formed or deposited? Are they *in situ*, and do they indicate former levels of the sea? Mr. Reade seems to hold as a matter of course that they are and do; and he even suggests that if such shelly clays are found in one place, say at 1000 feet, it becomes "futile" and a "waste of time" to question whether a different bed (from all description) is found in another place at 500 feet! On the contrary, I hold that as some of these clays are known to

¹ GEOL. MAG., March, 1897.

have been transported, more of them than we imagine may be so; that therefore they do not necessarily indicate former levels of the sea; and that every case is to be judged of by its own evidence.

As regards Chapelhall, I certainly pointed out the slender evidence on which it rested, it being, so far as I know, quite exceptional in this respect; but I may say, on behalf of all the Committee, that it was a disappointment to them that the shelly clay was not found; for it was hoped that a careful examination of it would throw light on its origin and mode of formation. This would have been much more satisfactory to them than finding it at all.

But Mr. Mellard Reade makes a far more important mistake than any regarding the purport of my poor papers. Referring to the suggestion that the Ayrshire beds have been laid down by a Frith of Clyde glacier, he says—"I can only point out that the hypothetical course of such a glacier does not correspond with that of any map I have yet seen which professes to give the lines of glacial flow in Scotland." Now, this is a point which should be easily settled. I suppose that the two best, most recent, and most authoritative maps of the ice-flow in Scotland are those by the Messrs. Geikie—Sir Archibald's sketch-map in his "Scenery of Scotland," 2nd edition, p. 248; and Professor James Geikie's of the British Isles in his "Great Ice Age," 3rd edition, p. 69. Both of these maps distinctly show the lines of ice-flow extending from the mountainous region around the heads of Loch Lomond, Loch Long, etc., across the opening of the Frith of Clyde, over the low grounds of Renfrewshire and Ayrshire, and curving out to sea in the neighbourhood of Ayr, as the West Highland ice came into contact with the ice from the Southern Uplands. And Sir Archibald Geikie expressly says, referring to the striations along the estuary of the Clyde—"These markings prove that the mass of ice moved southward from Loch Lomond, crossed the Clyde, passed over the hills of Renfrewshire, and crept down into the heart of Ayrshire, where it united with the ice that was streaming northward from the Southern Uplands" ("Scenery of Scotland," 2nd edition, p. 246). Professor James Geikie also notices the trend of the ice-markings in the lower reaches of the Clyde in similar terms ("Great Ice Age," 3rd edition, pp. 69, 70).

Now, will Mr. Mellard Reade kindly say what maps he has seen, "professing to give the lines of glacial flow in Scotland," which show them differently from the above? We may then come to understand how he does not appear to have seen Messrs. Geikie's maps, nor I those to which he refers.

GLASGOW, *March 8, 1897.*

DUGALD BELL.

CYCADEOIDEA GIGANTEA, SEWARD: AN OMISSION.

SIR,—May I make use of your Magazine for the purpose of pointing out an unfortunate omission in a recent paper on a new Cycadean stem from Portland. In the last number of the Quarterly Journal of the Geological Society I gave a description of the