

of the different bases is fully considered, and to which I have drawn attention in my paper.

I do not for a moment pretend to have reached the end of my studies of this interesting complex of rocks, and shall await with much interest the appearance of the promised paper. As to my 'shear-planes' (not 'shear-zones'), it is just *because they have nothing to do with the 'schist-making' processes*, that they afford such strong *negative* evidence (while they record the action of dynamic forces on a grand scale) against the notion of the schist-manufacture having been wrought generally in *solid* crystalline masses. The general principles of my work are sufficiently before the world for those who care to know them to do so.

WELLINGTON COLLEGE, BERKS, 16th Dec., 1892.

A. IRVING.

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GLACIAL GEOLOGY.

SIR,—I quite agree with Mr. R. M. Deeley in your last number, when he writes that he has "read with much interest the papers by Mr. Mellard Reade and Mr. Percy Kendall in your July and November issues. On the one hand we have the submergence theory proved up to the hilt, and on the other, the glacier theory sustained with equal show of reason. Does it strike the combatants that they may both be right and both be wrong?"

It is difficult to conceive a Glacial Period without the usual phenomena appertaining to both land and coast ice. Why should we, therefore, restrict ourselves to either the one agency or the other, when there must have been marine and land moraine drifts contemporaneously forming. The Gloppa deposit at Oswestry described by Mr. Nicholson in the Q.J.G.S. Vol. xlviii. p. 86 may be taken as a typical marine drift with its glaciated lake district erratics and Boreal Fauna of recent shells, occurring from 1070 to 1120 feet above O. D., yet twelve miles to the north-west of the Gloppa in the upper valley of the Dee from the neighbourhood of Corwen to Bala Lake, which is only 540 feet above O. D.—the drift is entirely local and does not contain any fragments of recent marine shells, though 500 feet below the Gloppa deposit.

The plain interpretation of this—to my mind—is that ice filled the upper valley of the Dee and the surrounding country to a higher level than that to which the marine drift of the Gloppa obtained. The Gloppa deposit like the other deposits of high level marine drift as Moeh Tryfean, Macclesfield, and Halkyw (Flintshire), are situated upon the outskirts of the mountainous areas to which they belong. This, I think, would suggest that such mountainous areas were covered with a thickness of ice in their central portions, which excluded the high level marine drift from the interior mountains and valleys.

WILLIAM SHONE.

UFTON PARK, CHESTER, Dec. 16th, 1892.