

trouble us with such multitudes of these low things? We poor amateurs seem to be so many Pharaohs—to be afflicted in all our quarters with protozoan creatures enough for all four of Egypt's animated plagues!—R. EX.

MR. CROLL'S HYPOTHESIS OF THE FORMATION OF THE YORKSHIRE BOULDER-CLAY.

Sir,—I submit that Mr. Croll's hypothesis of the formation of the Yorkshire Boulder-clay by a sheet of land-ice, without any intervention of the sea, is at once negatived by the abundant beds of sand and gravel intercalated in it, in one of which occur shells perfect, unrolled, and sometimes double; and that his explanation of the absence of chalk from the purple clay by one arm of his ice-sheet having passed north of, and so escaped, the Wold is equally negatived by the fact of this clay overlying and passing gradually down (through clay with more and more chalk) into the chalky clay along the Holderness coast, viz., at Dimlington cliff, and at the cliff south of Mappleton; for besides this gradual transition, these places could not by any possibility be reached from the direction of Shap without the chalk being crossed.

From the way in which Mr. Croll uses the quotation from a paper of mine as to the origin of the chalk in Boulder-clay, the reader might suppose that, like Mr. Croll, I regarded such Boulder-clay as a deposit of land-ice without intervention of the sea; and I am anxious not to be misunderstood in this respect: for though I regard the material making up the chalky clay, and indeed most of that making up all glacial clay, as the *product* of land glaciation, yet the evidence seems to me unanswerable that such clay, wholly unstratified as it is, has been deposited under the sea; and that moreover to all appearance as tranquilly as many sedimentary deposits.

Were your pages less engrossed with Glacial topics, I should like to discuss with Mr. Croll the evidence bearing upon this subject, as well as upon the hypothesis of an ice-sheet 2,000 feet and more in thickness, which he and Mr. Jamieson insist has passed, regardless of hill and vale, over the higher mountains of Scotland, such as Schiehallion, and the filling up of the North Sea with ice; but until opportunity offers, I must content myself with demurring to all these propositions.

I may mention that Mr. Rome thinks that the Shap blocks are confined to the upper part of the purple clay, and that he ascertained the exact spot (about 15 feet from the top of the cliff) near Saltburn whence one of these boulders had come. Supposing this to be confirmed, it would show that the glacial period had nearly terminated when these erratics came over; and the period arrived when the glacier ice having been lifted out of the straths and valleys, the mountain regions had become an archipelago filled with ice-floes, to the agency of which (and not to that of bergs) both Prof. Harkness and myself refer the transport of the blocks in question—the period, in fact, to which I would refer all the glacial accumulations of the Scottish highlands.

SEARLES V. WOOD, JUN.