

CORRESPONDENCE**GLACIAL DRIFTS**

SIR,—Shorn of its dire warnings and elaborate metaphors, the only new points Mr. Carruthers' letter contains arise out of his visit to Bilston. He appears to attach most importance to his observation that there is a layer of boulder clay a short distance below what he regards as the top of the sand. I have since re-examined this part of the section carefully and have concluded firstly that this apparent interbedding is very limited in extent and secondly that what is really present is a lenticular sandy layer within the boulder clay. It is true that near the top of the sand there are layers of clay free from stones or containing at most a few pebbles, but these are of a type frequently associated with fluvio-glacial deposits and readily distinguishable from true boulder clay.

It was one of my regrets that at the time of our joint visit, owing to the state of the face, I was unable to show Mr. Carruthers a good example of a boulder clay-filled fissure. I assume the example he describes was seen on a subsequent visit. The clean-cut sides he claims are certainly not characteristic. As pointed out in my original paper, and confirmed by an excellent fissure recently exposed, the sides show disturbance of the bedding such as would be produced by sand slipping downwards into the opening. However produced, it is surely a strange type of faulting envisaged by Mr. Carruthers, which throws a higher bed into a lower without leaving any trace of disturbance in the former.

Mr. Carruthers attempts to explain the absence of weathered material in the fissure as due to the thickness of boulder clay at Roslin. This feature can hardly be invoked at Loanhead, where, as mentioned in my original note, the boulder clay is generally about 2 feet thick. Where it passes evenly over a fissure it may be as thin as 1 foot and could not, on Mr. Carruthers' hypothesis, even have provided enough material to fill a 6-foot deep opening. It should be added that the structures noted by Mr. Carruthers near the base of the section are simply those characteristic of slump-bedding.

The remainder of Mr. Carruthers' letter is merely an assumption of the truth and widespread application of his own views. The proof, or disproof, of the latter, and particularly their extension to Scotland, obviously depend upon critical and careful examination of as many sections as are available throughout a wide area. Whatever proportion of truth Mr. Carruthers' theories may ultimately be found to contain, they have served a useful purpose in stimulating interest in such a task. Unfortunately more pressing duties do not at present permit of its realization. In the meantime, while preserving an open mind about Mr. Carruthers' conclusions regarding his own area, I can only decline to accept his all too hasty assurances that these can be extended to the Midland Valley of Scotland.

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