

- (6) "Geology of the Ayrshire Coalfield, Area II," p. 9, *Mem. Geol. Surv.*  
 (7) GEIKIE, *Ancient Volcanoes*, i, 361.  
 (8) *Trans. Glasgow Geol. Society*, xiii, 240. Martin and Tyrrell on a puddle trench section at North Third.

For a complete Bibliography see :—

MACGREGOR, A. G. *Trans. Glasgow Geol. Soc.*, xviii, pt. ii, 324.

The Geological Survey Regional Handbook, *The Geology of the Midland Valley of Scotland*, gives references to publications that have appeared since the date of the above paper.

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## CORRESPONDENCE.

### SUBMARINE CANYONS.

SIR,—With reference to the article in your June number on the above subject, without wishing to belittle in any way a serious attempt to attack this problem, I think it should be pointed out that even if we concede (as the author seems to have proved) the possibility of submarine currents of some velocity, we have by no means surmounted all the difficulties.

The canyons in the American Continental Shelf are comparable in size with the Grand Canyon, for the erosion of which nearly the whole of the Tertiary seems to be demanded even using the two most powerful erosive agents, (a) alternations of heat and frost and (b) a ponderous armature to grind out the bed. If Daly's low sea-level ever occurred, its earliest date is Lower Pleistocene or, say, one sixth as much time as allowed for the erosion of the submarine canyons in the absence of (a) and, in place of (b) a presumably limited amount of broken material.

This second point has its importance, for the hypothesis would lead one to look for innumerable small canyons all along the Shelf instead of a few very large ones spaced at great distances.

Leaving aside submarine mountain masses, there are three classes of puzzling submarine features: canyons which align with great rivers, "deeps" which are fairly common in the neighbourhood of the British Isles and almost exclusively found in a narrow channel dividing two large bodies of water, and the canyons referred to above which plunge steeply through the edge of the Continental Shelf. Those who admit that the earth's crust can sink find no difficulty in accounting for the first class, explaining that the canyon was part of the river's valley when above water; they will also probably agree that where the "deeps" occur an isthmus once existed which was cut through when one body of water overflowed into the other at a lower level. As to the third class, in view of the small time allowance it seems likely that their formation was equally catastrophic.

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