Nor is Dr. Pulfrey in happier case when he refers to the " private report ". So little private indeed was that document that it was especially written for publication, together with a map. But when all was ready we learnt that Sir Albert Kitson was coming out to Kenya, and as we did not wish to appear to rush in under the nose of the consultant, the report was withheld from the printer but its contents were made available to those interested. Actually, the main facts of that report had already appeared in the Annual Reports of this office previously referred to (GEOLOGICAL MAGAZINE, July, 1936, p. 331). To my certain knowledge the so-called private report was made use of by Sir Albert Kitson, and several other geologists.[1] It was in no way confidential.

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THE BALLARD DOWN FAULT.

SIR,—May I appeal to Mr. Brydone to give me the credit for a genuine desire to discover the truth, and not to " score off " him, to " blunt his points ", or to strike an " attitude " ? If I have poached on his preserves in Dorset it was done in innocent unawareness that he was working on tectonics.

I cannot leave his first paragraph uncorrected. I " asserted " nothing new in 1936, with regard to the relative ages of the chalk above and below the Ballard Down Fault that had not already been asserted by Strahan in 1898, and I modified Strahan's assertion by calling attention to the subsequent work of Rowe. After sifting Strahan's statements, and still clearly referring to them, my words were : " The actual observations or facts that we are justified in setting down . . . appear to me to be limited to the following " (GEOL. MAG., 1936, 59). It seems that this could hardly be called an assertion (still less a new one) by anyone who did not desire to misrepresent my views. Those views, for what they are worth, are stated in GEOL. MAG., 1937, 86.

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STRENGTH OF THE EARTH'S CRUST.

SIR,—A paper recently read before the Geological Society of London dealt with marine platforms which occur in Cornwall, Wales, and Scotland at heights above present sea-level up to 1,000 feet ; and in the discussion the question of the whole country rising as a unit was mentioned. Even if it is eventually established

[1] Murray-Hughes, R., " Notes on the Geological Succession, Tectonics and Economic Geology of the Western Half of Kenya Colony," *Report No. 3, Mining and Geological Dept., Kenya Colony*, 1933.

that there are platforms of marine origin over a wide area at concordant heights, it should be realized that a very large block of crust could not act like this by reason of sufficient strength of its own.

Some imagine that such a block of crust could behave in a manner similar to a floating raft, in that if one pushed down a corner, the opposite corner will rise ; but there is an evident example of weakness in Scandinavia. Everyone who has studied the evidence of former sea-levels here, from Sederholm onwards, is agreed that the crust is recovering from isostatic depression, and a rough estimate of the force that is restoring the *status quo* can be made. It is only necessary to assume a figure for the amount of recovery still to be effected ; some are of opinion that the fjords have already recovered —though the floor of the Gulf of Bothnia is still rising—but if we assume, in order to get an outside estimate, that they have not recovered and that the deeper inner parts were not entirely carved out by glacial overdeepening in the confined space, then taking Hardanger Fjord as 980 feet deep and Sogne as 2,800, an estimate of 2,000 feet for further recovery at the middle of the depression is not unreasonable.

Taking the country affected as 500 miles across, the slope from each side towards the middle averages only about 1 in 600. The force tending to restore this to the horizontal must be very small.

If we assume that 2,000 feet of crust of specific gravity 2 is depressed into supporting magma of specific gravity 3, the upthrust is equal to the difference, that is 2,000 feet of specific gravity 1. A column of water one inch square and 2,000 feet high weighs approximately 870 pounds, so that on these figures the force tending to restore equilibrium is less than half a ton per square inch at the middle, and of course still less towards the periphery.

Those familiar with the region would probably say that 2,000 feet is a gross overestimate, but might concede half this ; which gives a figure of much less than a quarter of a ton per square inch. Yet the massive crust is responding to such a feeble force in a supine manner, the Palaeozoic floor equally with the heavily-injected strata folded on to its edge.

It would seem that the crust here (and this is a fair sample of the whole) yields to a feeble but long-imposed force in a manner which answers—up to a point—to the definition of viscosity ; so that, if a block of crust shows a marine platform equidistant from sea-level throughout its length, we may take it that the block is being supported equally at every point.

The same figures tell us that, conversely, if for any reason the serenity of the supporting magma should be disturbed, the crust—unable to support its own weight for long—would reproduce at the surface every disturbance. We may yet have to think of it as a very flexible raft riding on a not-too-quiet sea.

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19th April, 1937.