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CORRESPONDENCE

SOME PROBLEMS OF GEOMORPHOLOGY AND CONTINENTAL RELATIONSHIP IN BRITISH GUIANA

Sir,—I am unable to accept Dr. Junner's strictures on the accuracy of my remarks about the geology of West Africa published in the January-February number of the *Geological Magazine*, for the following reasons :—

1. *Kawere Group.*—It is clear that Dr. Junner restricts this name to the basal sediments of the Tarkwaian system. In the paper by W. J. Hughes and myself (1) based on field work in 1925–7, the term " Kawere " group or facies was referred specifically to the volcanic series of lavas, pyroclastic and perhaps spilitic rocks which were named after the Kawere valley where they occur, and which intervene between the upper normal sedimentation of the Birrimian series, and the basal beds and normal sedimentation of the Tarkwaian series. Indeed, the final proof of the latters' unconformity with the Birrimians was provided by these writers (*pace* the late Sir A. E. Kitson) (1, discussion, p. 178), although he did not altogether approve of their use of the name Kawere. However, I do not think we should have used this name, if at that time the Gold Coast Geological Survey had adopted it exclusively for the basal Tarkwaian sediments. Even so, it does not appear that

Dr. Junner's sweeping statement " the Kawere group does not contain any volcanic agglomerates " was entirely supported by Whitelaw (2) who refers to volcanic activity accompanying the Kawere group.

Dr. Junner's later work (3) has come into my hands since my Guiana paper appeared, and I can detect in the former no material discrepancy between his account of the Gold Coast succession and that outlined by Bishopp and Hughes (1), except on this point of nomenclature. In our 1930 paper it was expressly stated (author's reply to discussion) that *Tarkwaian rocks were not included among the volcanic rocks of our " Kawere facies "*, which Dr. Junner properly assigns to the Upper Birrimian. Hence the comparison which I have made with the sequence of similar types in British Guiana.

2. *Trend Lines.*—According to Dr. Junner's map (3, plate 2), the trend lines appear to have, in the average, more northing than north-east. Thirty-three degrees would be a better approximation than either N.E. or N.N.E. While in Sierra Leone there is a change of trend to north and north-west, it does not appear that a north-easterly strike can be entirely excluded.

3. *Voltaian Escarpment.*—(*a*) Nowhere have I suggested that the present scarp-line is to be identified with a fault. I do suggest, however, that it may have retreated under erosion back from an original coastal fracture (cf. du Toit, (4), pp. 256–7).

(*b*) Distances : Dr. Junner, avoiding mention of the relationship of the scarp with coastal trends, says it is 50–150 miles (80–240 km.) from the coast. Kitson (5) gives it as 40–220 miles (64–352 km.).

A glance at the map (3) shows the scarp-line running north-westerly—may one suggest west-north-westerly—at about 303°, almost at right angles to the older tectonic lines. But the coast-line has two significant directions : one nearly parallel to the scarp, and the other approaching it at a high angle. In the first case the distance normal to the scarp-line between, say, near Mpraeso and the coast at Cape Three Points is about 254 km., increasing to about 312 km. measured from the inflexion of the scarp-line near Wenchi to the coast west of Half Assini.

Thus, the meaning of my expression " the escarpment set back some 300 km. from the coast " seems clear enough in the light of du Toit's criteria, irrespective of the scarp's closer relation to a different coastal trend south-east of Koforidua.

4. *Gorceixite.*—I must express my regret to Dr. Junner for the *lapsus calami* in my reference to his discovery, which would

no doubt have been corrected, if access to the literature had not been interrupted. It is of considerable interest to note from the Report of the Imperial Institute for 1940, that a similar mineral has recently been discovered in British Guiana by the Geological Survey.

5. *Coast-line and Coastal Faulting.*—Dr. Junner's letter does not mention his own references to coastal faulting in the work he has cited (3, p. 34), while Kitson (5) makes emphatic statements as to the considerable fracturing and downfaulting of blocks at the coastal margin. If these views are inaccurate or misleading, is Dr. Junner now able to state definitely that coastal faulting is not appreciably developed?

For comparison purposes age-determinations by the helium and radioactive methods for the principal rock-types in West Africa and Guiana would be welcome; while in the latter country a more detailed study of the flat-lying Kaieteurian beds with their large associated intrusive gabbros and dolerites has long been desirable. Dr. Junner's warning as regards correlation of unfossiliferous sediments and igneous rocks over great distances seems out of place here, since we are trying to test an hypothesis that at one time the rocks of West Africa and Guiana were, after all, not very far apart. The question is, if joined, how well would they correlate; the tentative answer at present seems to be, not at all badly.

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14 Hume Street,
Dublin.
29th March, 1941.

(1) A contribution to the geology of the manganese ore-deposits in the Gold Coast Colony and in Ashanti. (With discussion and author's reply.) D. W. Bishopp and W. J. Hughes, *Trans. Inst. Mining Met.*, 1929–1930.
(2) *Gold Coast Geological Survey, Memoir No. 1*, 1929.
(3) *Gold Coast Geological Survey, Bulletin No. 11*, 1940.
(4) *Our Wandering Continents*, Oliver and Boyd, 1937.
(5) *Gold Coast Geological Survey, Bulletin No. 1*, 1925.