"PRE-KARROO STRATIGRAPHY OF TANGANYIKA"

SIR,—Mr. Stockley's paper (*Geol. Mag.*, lxxx, pp. 161–170) on the above subject is of great interest, and is a marked step forward towards the understanding of the correlation of East African rocks. We particularly welcome and support the distinction between the Basement System of regionally metamorphosed rocks and the totally different, weakly metamorphosed volcanic and sedimentary rocks which Mr. Stockley includes in his Nyanzian and Kavirondian Systems.

Some points of detail in the correlations seem to us, however, to need amplification or modification in the light of the evidence from the Kavirondo district of Kenya. The writers are more particularly acquainted with the geology of Southern Kavirondo (R. M. S.) and North and Central Kavirondo (W. P.).

(1) *Nyanzian System.*—In Central Kavirondo the predominant volcanic rocks are intermediate in character. In South Kavirondo andesitic lavas and tuffs form a considerable part of the succession. The diversity of volcanic types is thus rather greater than is implied by Mr. Stockley's mention of only acid and basic types.

The statement (p. 166) that in the Nyanzian System "sediments (excepting pyroclastics) are relatively rare, if they exist at all" does not apply to Central and Southern Kavirondo. In the Sakwa and Kadimo areas of western Central Kavirondo greywackés and conglomerates are intercalated in the volcanic sequence, while in the Migori gold belt of South Kavirondo blue-grey and sometimes graphitic shales, greywackés and conglomerates form a large part of the Nyanzian. Recent work (as yet unpublished) shows that the sequence in that area is :—

3. Slaty and andesitic group. Tuffaceous, silty, and ferruginous slates ; banded ironstones ; andesitic volcanic rocks ; and shales.

2. Greywacké group. Greywackés, gritty andesitic tuffs, conglomerates, and banded ironstone.

1. Basal volcanic group. Metabasalts, pillow lavas, and banded ironstone.

The inclusion in the Nyanzian System of the Kuria Volcanic Series (dacites and dacitic porphyries) of the Musoma district is not supported by the evidence from the Migori gold belt just across the Tanganyika-Kenya border. There, an extensive area is occupied by a series of andesitic and dacitic rocks, which are so closely similar to the Kuria volcanics both in the field and under the microscope that the correlation of the two series seems certain. A large part of these rocks is probably intrusive, but lavas and tuffs of similar composition occur among them. The whole suite is intimately associated with typical Kavirondian boulder conglomerates, which occur at the base, in the middle and on top of the andesitic suite, and contain boulders derived from it. The vulcanicity and the accumulation of boulder deposits were in part contemporaneous, and some of the boulder beds consist largely of rounded blocks of the andesitic rocks. The whole andesite-conglomerate complex rests unconformably on the Nyanzian rocks. It appears therefore that the Kuria Volcanic Series belongs to the Kavirondian System and not to the Nyanzian.

(2) *Kavirondian System.*—Mapping in South Kavirondo fully confirms Mr. Stockley's conclusion that there is a major unconformity between the

rocks of his Kavirondian and Nyanzian Systems, and thus reinforces his arguments in favour of separating the two systems instead of treating them as subdivisions of a single system.

The facies of the Kavirondian rocks in South Kavirondo is similar to that in the Musoma area, with boulder conglomerates as the dominant rocks.

In North and Central Kavirondo, however, argillaceous types make up a large part of this system. Coarser sediments predominate locally, as one would expect, but not on the whole. In this connection it seems erroneous to accept as typical the succession given on pp. 162 and 168. In areas (mapped between 1938 and 1941, but not yet published) adjacent to that where this succession was established, I (W. P.) have been able to trace no such general sequence, and it is of interest to note that A. D. Combe, who first mapped the "type" area, arrived at the following succession (*Geol. Survey of Uganda, Ann. Rep. for 1927*, 1928, p. 16).

3. Shales and phyllites with interbedded argillaceous sandstones.

2. Felspathic sandstones, quartzites and grits, grading into arkoses, and associated with conglomerates.

1. Shales and phyllites with interbedded argillaceous sandstones.

A similar sequence was established by Salée in Ruanda for his Urundi System which he correlates w th the Karagwe-Ankolean (A. Salée, *Mém. de l'Inst. Géol. de l'Université de Louvain*, V, ii, 1928, pp. 55 and 118).

(3) *Correlation of the Muva-Ankolean.*—Although we are not familiar with the Muva-Ankolean rocks of the type areas, whereas Mr. Stockley is, we are reluctant to accept his conclusion that the Muva-Ankolean rocks are so different in lithology from those of the Nyanzian and Kavirondian Systems that they must belong to yet another and younger system. It seems that in North and Central Kavirondo there is evidence of a significant change of facies towards that characteristic of the Muva-Ankolean, both in the Nyanzian and Kavirondian Systems. In the Nyanzian System of the Samia Hills banded ironstones occur in close association with a typical Nyanzian volcanic suite. Not far to the west in the adjacent area of Uganda similar banded ironstones, very probably of the same group, are associated with argillaceous sediments. If, as has been suggested, the ferruginous material in these banded ironstones were derived from the weathering of basic volcanic rocks, it would not be surprising to find that banded ironstones were absent from the Muva-Ankolean rocks of the type area far from the volcanic region.

Again, as has been pointed out above, the Kavirondian rocks in North and Central Kavirondo also show a change towards an argillaceous facies. We therefore consider that the stratigraphical position of the Muva-Ankolean rocks suggested by Mr. Stockley is not supported by evidence from Kavirondo.

Finally, we think it should be emphasized that the successions given by Mr. Stockley in his chronological table should be regarded as indicative of the general nature of the lithology rather than as type successions of wide application.

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