Table 1. TECTONIC EVENTS IN NORTHERN UGANDA

Southern West Nile	Northern West Nile	Aswa Zone	East-central Karamoja
<div> <div> <div>Relationship not known</div> <div>→</div> <div>MADIAN</div> </div> <div> <div>←</div> <div>CHUAN</div> </div> </div>			
Folds trending NW No associated mylonites	Folds trending NNW – NW Mylonites trending approx. E–W	Folds trending NW Mylonites trending NW	
<div> <div> <div>MIRIAN</div> <div>Overthrust folds with NE–ENE axes</div> </div> <div> <div>←</div> <div>WATIAN</div> </div> </div>			
Mylonites in 'Refoliation Zones' of the 'foreland' area, trending ENE	No evidence for mylonites in 'foreland' areas	(Note resemblance between southern W.N. 'Refoliation Zones' and Aswa Zone)	Karasuk Group Flaggy Moroto Granulites Mylonites in 'foreland' area
			? MOZAMBIQUIAN 400–650 m. yr.
ARUAN Folds trending N or NNE		Northerly trending gneisses cut by the Aswa Zone	Central Karamoja gneiss tectonism ?
WATIAN Folds trending E–W		Present as reworked granulites	Charnockite Group tectonism ? DODOMAN

to any of these tectonisms. It seems likely, however, that the Mirian, as expressed by the flaggy refoliated gneisses throughout the district and by the 'Refoliation Zones' in the south, was the dominant tectonism which imposed a Mozambiquian age on Aruan and Watian rocks. This correlation is perhaps supported by the strong tectono-metamorphic resemblance between the Mirian and the 'Mozambiquian' rocks in Karamoja. It is suggested that the Mirian may represent an early phase of the Mozambiquian and that the Chuan is a later phase, the age range of the Mozambiquian (c. 400–650 m. yr.) being enough to span both events (see Table 1).

If these suggestions are correct the 'pervasive event' invoked by geochronologists for the ubiquitous Mozambiquian ages in the African Basement acquires an identity as far as northern Uganda is concerned in the form of the Mirian and Chuan orogenies. The presence of granites in the Aswa Zone part of the Chuan lends support to this supposition.

As a result of these studies several considerations arise:

(1) The 'West Nile orogenic belt' is not a valid entity as it consists of four tectonic elements, the Watian, Aruan, Mirian and Chuan. Its status on the revised tectonic map should be reconsidered.

(2) The Chuan orogenic belt, which was omitted from the 1958 tectonic map and which crosses the West Nile belt, should be re-instated. If it is not sufficiently known from ground mapping it is now possible to delineate its extent by photogeological means.

(3) The Mozambiquian orogeny pervaded irregularly the 'foreland' of the northern Uganda Basement and is probably equivalent in age to the Chuan and Mirian tectonisms. This 'foreland' to the Mozambiquian, which is made up of congealed earlier orogenic belts, was thus fragmented by the Mozambiquian movements.

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¹ Holmes, A., The Sequence of Pre-Cambrian Orogenic Belts in South and Central Africa, *Eighteenth Intern. Geol. Cong.*, 1948, Pt. XIV, 254 (1951).

² de la Vallée Poussin, J., *Mem. Inst. Geol. Univ. Louvain*, 8 (2), 135 (1935).

³ Combe, A. D., *Ann. Rep. Geol. Surv. Uganda*, 5 (1946).

⁴ Cahen, L., *Geologie du Congo Belge* (Valland-Cermanne, Liege, 1954).

⁵ Esquisse Structurale Provisoire de l'Afrique au 10,000,000. *Cong. Geol. Intern., Assoc. des Services Geol. Afric.* (Paris, 1958).

⁶ Hepworth, J. V., *Report No. 10, Geol. Surv. Uganda* (1964).

⁷ Hepworth, J. V., *Twenty-second Intern. Geol. Cong.*, 1964 (in the press).

⁸ Macdonald, R., thesis, Univ. London (1963).

⁹ Macdonald, R., *Report No. 5 Geol. Surv. Uganda* (1961).

¹⁰ Snelling, N. J., *Overseas Geological Surveys Report for 1960–61*, 33 (1961).

Recrystallization of Mica in Crenulated Schists

DR. NICHOLSON, in his recent communication¹, quite rightly states that in strain-slipped phyllites micaceous minerals commonly concentrate on alternate limbs of crenulations. This observation has been made by Clough² and repeated by King and Rast³. In my more recent paper⁴ I was essentially concerned with the mechanics of growth of isolated matrix mica flakes under conditions involving annealing recrystallization, and not with the mechanism of chemical transport involved in chemical differentiation, which will be attempted elsewhere. My point, however, that in mimetic recrystallization mica flakes grow so as to become stain-free is amply illustrated by Dr. Nicholson's photographs. In particular his Fig. 2 shows clearly the completely stain-free mica flakes at the closures of microfolds. My other point that at a subsequent stage of recrystallization mica flakes grow parallel to axial planes of folds is again shown by Dr. Nicholson's Fig. 1. At no stage in my discussion did I claim that abundant new mica grows along the axial plane, but I did point out mica flakes growing parallel to axial planes. As my Fig. 4d shows, these micas, like Dr. Nicholson's Fig. 1, grow on the limbs of microfolds.

I have no objection to the explanation of quartz migrating from one site in the strain-slipped fabric to another, and I think his is an idea worth stating.

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¹ Nicholson, R., *Nature*, 209, 68 (1966).

² Clough, C. T., in *Geology of Conval, Mem. Geol. Surv. Scotland*, 9 (1897).

³ King, B. C., and Rast, N., *Geol. Mag.*, 93, 191 (1956).

⁴ Rast, N., in *Controls of Metamorphism*, edit. by Pitcher and Flinn, 89 (1965).

DR. RAST's letter is best answered by using his own text¹ which proceeds as follows. "Thus the first stage of [annealing] recrystallization . . . is . . . the regeneration of mica with approximate . . . orientation of the micas involved in the flexure. This regeneration . . . involves a nucleation step. It is an elementary assumption that where flexure of first generation micas is most intense the second generation mica will nucleate more rapidly [than elsewhere]. Assuming . . . initial post-nucleation growth is [the] most rapid, it is likely that the points of maximum flexure will be the positions of maximum growth of phylloblastic minerals thus producing the phenomenon of metamorphic differentiation (Fig. 4b). . . ." (My square brackets and italics.)

Thus Dr. Rast's text suggests this differentiation is a product of annealing recrystallization while I argued in my communication², largely on petrographic grounds, that it is produced during deformation. Since that