CORRESPONDENCE

LOWER ORDOVICIAN TRILOBITES

SIR,—Since the March–April number of this Magazine was issued my attention has been drawn to a recent paper by F. Rasetti in the *American Journal of Science* (vol. 243, January, 1945) on the genera *Loganopeltis* and *Loganopeltoides* with a description and figure (p. 40, pl. 1, fig. 7) of the pygidium of his new species *Loganopeltis depressa* from the Lower Ordovician of Quebec. It seems to be almost identical with the specimen from the Shangort beds of Tourmakeady which was referred with considerable doubt to the genus *Cybelopsis* (*Geol. Mag.*, 82, 1945, p. 60), so that the generic reference may be altered to *Loganopeltis* with confidence.

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15th May, 1945.

ON THE NORMAL FAULTING OF RIFT VALLEY STRUCTURES

SIRS,—In his recent very interesting paper on the above subject (*Geol. Mag.*, lxxxii, 1945, 37–44) Mr. H. G. Busk urges, rightly I believe, that normal faulting has played a greater part in rift tectonics than is often conceded. There are, however, certain of his statements on which I should like to comment.

On p. 42 he states that the rift valley movements were initiated on a broad peneplain ; this peneplain is held to be of vast extent, and to include the great peneplain of the Northern Frontier District of Kenya.

While it is true that a great peneplain, usually referred to as the Miocene peneplain or the main peneplain, did extend over that part of Africa occupied by the Rift Zone, insufficient allowance has been made for the very large number of residuals and peneplain remnants that rest upon its surface in many areas. These remnants sometimes give rise to strong relief, and they are in places bounded by scarps eroded along ancient faults ; such scarps (fault-line scarps) have sometimes been confused with Rift Valley fault-scarps. In the southern Rift zone at least there occur fault-line troughs, such as the Luangwa Valley, that have the form of the Rift Valleys, but long antedate them. Before progress can be made in the formulation of Rift theories based on scarps and plateaux, it is first necessary clearly to distinguish the true Rift scarps from the numerous other scarps of different age and origin.

The nature of a very large number of the Rift faults does not appear to be essentially different from that of the pre-Rift (post-Karroo) faults, which have always been accepted as normal faults, apart from some rare local disturbances.

Mr. Busk regards the great peneplain of the Northern Frontier District of Kenya as part of the main peneplain ; it belongs, however, to a much younger cycle, which is separated from the main peneplain by scarps, up to 1,000 feet in height, that are usually erosion scarps, but sometimes possibly fault-line scarps. The main peneplain is represented by the southern Abyssinia plateau and the Uganda (Karamoja) peneplain.

Instead of an era of immobility followed by gentle movements, as described by Mr. Busk, I suggest that the features of the Rift Zone are due very largely to prolonged but intermittent continental uplift and consequent erosion, interrupted by two main periods of faulting—the post-Karroo and the Rift.

Great isolated mountains such as Ruwenzori and certain lesser heights are to be regarded in part, I suggest, as the cores of great residuals due to this long-continued uplift, and bounded locally by ancient faults.

Finally, in the north-eastern part of the Northern Frontier District, Mr. Busk has referred to certain isolated hills as horsts that rose above the Jurassic sea, and he quotes them as evidence for Jurassic block-faulting in this area. These views are based on the assumption that the red sandstone hills in question are older than the surrounding Jurassic limestones ; but actually the red sandstones (Marahan Sandstones) succeed the limestones by way of a well-defined transitional zone of alternating limestones and sandstones, as is clearly displayed in excellent sections along the westward-facing scarps. There may be faulting in the area, but the topography is due essentially to normal dip and strike structures in gently-folded sediments and to the presence of high, steep-sided outliers of the resistant Marahan Sandstones resting on the limestones.

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7th May, 1945.

A JURASSIC OUTCROP IN THE JORDAN VALLEY

SIRS,—In your issue of March–April, M. Avnimelech described an interesting discovery of Jurassic rocks from a new locality in the Jordan Valley, but I should like to register disagreement with the deductions which he draws therefrom. He suggests that the incompleteness of the Upper Jurassic succession in the Yabbok area may be due to movements in Callovian times forming a local domal uplift, whereas I would prefer a more regional explanation. A short distance further south marine Triassic beds are present in Wadi Hesban and Wadi Ayun Musa [1] but, in this locality, only continental " Nubian " sandstone occupies the interval between Triassic and Cenomanian. Further south again along the eastern shore of the Dead Sea south of Wadi Zerka Ma'in there are no marine intercalations in the Nubian Sandstone between Cambrian and Cenomanian.

My explanation of these facts is that the shore lines of the Triassic, Jurassic, and, perhaps, Lower Cretaceous seas had a direction approximately parallel to the present Palestine coast and they crossed obliquely what is now the Jordan Valley at, or in the neighbourhood of, the northern end of the Dead Sea. These lines mark the limit of the marine transgressions of these periods and further east-south-eastward continental conditions prevailed over an immense range of time. In 1931 I suggested,[2]

[1] Cox, L. R., " Further Notes on the Trans-Jordan Trias," *Annals and Mag. of Nat. Hist.*, Ser. **10**, vol. x, 93–113, 1932.

[2] Lees, G. M., " Salt. Some Depositional and Deformational Problems," *Journ. Inst. Pet. Tech.*, 1931, ix, p. 267.