currents it is more than a little difficult to decide what is to be regarded as " depositional " and what " post-depositional " in the way of small-scale structures, even with the one graded bed if this is complex, but, in the Victorian examples of salt-dome type mudstone injections, the beds (Silurian) are not strongly graded, but rather sharply defined alternating sandstone and mudstone. It was for this reason that the flame structures in them were regarded as post-depositional. Many examples in the Victorian Ordovician rocks, which are predominantly graded beds, are however to be ascribed to penecontemporaneous differential flow, as they are not related in any way to underlying ripples and there is widespread evidence for post-depositional flow of a few inches in the sandstones.

E. SHERBON HILLS.

UNIVERSITY OF MELBOURNE.
24th February, 1958.

SIR,—We regret having overlooked Professor Hills' important contribution to the subject of load-cast structures, but are glad that we have, however tardily, reached conclusions in certain respects similar to his own.

It is true that flame structures are perhaps best developed in purely argillaceous sediments, but it is the case, at least in the Southern Uplands, that the deformed bed may be of silt or even fine-grained greywacke. The formation of transverse ripple marks is thus not excluded though as we point out in our paper (p. 487) load-casts developed from them appear to be rare. In the example given by Professor Hills of flames developing in mudstone above transverse ripples, the original irregularities in the clay would reflect the transverse ripples and the structures may still be termed T-ripple load-casts.

The main aim of our paper, however, was to point out that given sufficient density contrast, any surface irregularity may be exaggerated to produce a load-cast : transverse ripple-mark is one of these irregularities, but grooves and flutes appear to be more important.

Differential flowage may produce flow-casts which are similar to load-casts, but so long as some of the original structure is retained the two forms can be recognized. In the rocks of the Southern Uplands we believe load-casting to be the dominant process but a general evaluation of their relative importance is an interesting task for the future.

G. KELLING.
E. K. WALTON.

GRANT INSTITUTE OF GEOLOGY,
WEST MAINS ROAD,
EDINBURGH 9.
10th March, 1958.

IGNEOUS ROCKS AT GOREI, SHILEMADU RANGE, BRITISH SOMALILAND

SIR,—May I add a postscript to Dr. J. E. Mason's interesting account (*Geol. Mag.* xciv, p. 498) ?

Leckie's preliminary report on the geology of the Protectorate published in 1905 (1) seems to have been written whilst he was still in that country but presumably before he had seen the Gorei (8° 58′ N., 47° 48′ E.) exposure of which he makes no mention.

I have found no later published account by him, and the brief description of the geology of the country given in the Military Report on Somaliland, 1907 (2), does not refer to Gorei. But of the three attached maps, the two topographical sheets mark both Gorei and the Shilemadu Range, and the

geological map, " supplied by Mr. R. G. Edwards Leckie " and dated July, 1906, shows the whole Shilemadu Range as an isolated exposure of Archaean.

There appears to be no further record before I visited Gorei for an hour on 22nd March, 1930, and again, for a little longer, with Mr. J. A. Hunt, on 10th April, 1930. My field notes show that I felt undecided as to whether or not the igneous rocks were intruded into the Nubian Sandstone (Cretaceous), though the overlying Auradu Limestone (Lower Eocene, or possibly Palaeocene at base) was unaffected. My sketch shows conglomerate overlying the lower part of the igneous outcrop, and suggests that the Nubian overlay weathered igneous.

In the general description of the geology of the country (1933, p. 35) (3) the rocks were included in the Basement Complex assigned to the Archaean, since neither Mr. Hunt nor I had found evidence of any comparable igneous rocks of later age in the region. Specimens had by then been described, of both the crystalline rocks and the porphyry dykes, by Dr. Alfred Harker (1933, Appendix I, p. 43) and not by myself as implied by Dr. Mason.

My reference in 1952 (4) (p. 59) was made without a further visit and was influenced, so far as the dykes were concerned, by supposed analogy with Blanford's Cretaceous Trap Series, examples of which I had by then seen.

The nearest exposure of undoubted Basement Complex is found at Habarjeh, 100 miles N.W. of Gorei. The nearest Trap Series basalt is exposed in hand-dug wells at Warder, about 200 miles S.W.; and quartz tuffs, apparently of the same series, interbedded with the uppermost Nubian Sandstone, extend from near Warder to the N. and W., so far as Gududi (8° 49′ N., 45° 00′ E.) in the Protectorate, and to the Harar Digit and Awareh (8° 16′ N., 44° 09′ E.) districts in Ethiopian territory (1952, Ill. 2, whose scale is 1 : 500,000 and not as stated).

As the result of Dr. Mason's paper I am content to accept his tentative view that all the igneous rocks of the Gorei exposure form part of the Basement Complex, a view that I should have thought his work makes firmer than he claims. Mr. Hunt tells me that, while he never managed to revisit Gorei, he also feels able to agree with Dr. Mason's findings.

Mr. Hunt's and my specimens are, it is believed, preserved in the Department of Mineralogy and Petrology at Cambridge.

W. A. Macfadyen.

REFERENCES

(1) Leckie, R. G. E., in A. Knox, 1905. *Notes on the Geology of the Continent of Africa*, pp. 97–100. H.M.S.O. (War Office).
(2) War Office, 1907. *Military Report on Somaliland*, i. General Staff, War Office.
(3) Macfadyen, W. A., 1933. *The Geology of British Somaliland.* Crown Agents.
(4) —— 1952. *Water Supply and Geology of parts of British Somaliland.* Crown Agents.

Hope's Grove,
Tenterden, Kent.

26th February, 1958.