record significantly reduces the thickness of strata of uncertain age in terms of the graptolite zones at the Wenlock–Ludlow Series boundary in the type area for the Wenlock Series. But being outside the type area (Ludlow) of the Lower Elton Beds, no unequivocal conclusion can be drawn from this new record regarding the graptolite zone to which these Beds should be assigned. However, taken in conjunction with the earlier records, it significantly increases the probability that the base of the Ludlow Series in its type area as defined at Pitch Coppice by Holland *et al.* (1963, p. 139 and fig. 11) lies at the lower limit of the *nilssoni* Zone.

References

Cocks, L. R. M., Holland, C. H., Rickards, R. B. & Strachan, I. 1971. A correlation of Silurian rocks in the British Isles. *Q. Jl geol. Soc. Lond.* **127**, 103–36.

Holland, C. H., Lawson, J. D. & Walmsley, V. G. 1963. The Silurian rocks of the Ludlow district, Shropshire. *Bull. Br. Mus. nat. Hist.* (Geol.) **8**, 93–171.

Holland, C. H., Rickards, R. B. & Warren, P. T. 1969. The Wenlock graptolites of the Ludlow district, Shropshire, and their stratigraphical significance. *Palaeontology* **12**, 663–83, pl. 130.

Lawson, J. D. 1971. Some problems and principles in the classification of the Silurian System. *Mém. Bur. Rech. géol. min.* **73**, 301–8.

Warren, P. T. 1971. The sequence and correlation of graptolite faunas from the Wenlock–Ludlow rocks of North Wales. *Mém. Bur. Rech. géol. min.* **73**, 451–60.

White, D. E. 1969. *In: A. Rep. Inst. Geol. Sci.* (*GB*) for 1968, 96.

Palaeontology Department
Institute of Geological Sciences
Exhibition Road
London SW7 2DE
9th April 1974

DENNIS E. WHITE

Ardnamurchan, Centre 1

SIR – The recent letter by Green & Wright (1974) reiterates their misgivings about the geological history of Ardnamurchan, in particular that the Ben Hiant vent is early yet topographically low compared with the high elevation of the later gabbroic plutonic centres. This geological relationship is, however, not unusual; an analogy exists in Skye between the Kilchrist vent south of Broadford and the Cuillen plutonic centre.

They ask (p. 164) where are the intervening faults which give this contrast in elevation? The answer lies partly in the numerous cone-sheets each of which lies along an inclined fracture with down-throw outwards from the centre, and partly in the fact, evidenced by the intrusive Ben Hiant dolerite, that only some of the lower horizons of the pyroclastic beds filling the crater are preserved. In addition, any postulated cauldron subsidence within the vent merely enhances the above topographic contrast, and there is some evidence for this (Richey & Thomas, 1930, p. 124). It has been shown (Le Bas, 1971) that cone-sheets are capable of raising the country rocks constituting the inner conical portions relative to their surroundings. In Ardnamurchan the central area has been raised by about a hundred times as many cone-sheets as has Ben Hiant and thus, contrary to Green & Wright's interpretation (p. 163, l. 13), Ben Hiant has been relatively lowered by the cone-sheets in comparison with the country rocks in which the

main plutonic centres were emplaced. The effect of intrusions of the central gabbros (interpreted as floored layered complexes) would have caused only further uplift of the roofing country rocks. It is thus not surprising that the Ben Hiant vent, which lies just on the edge of all this uplift, is relatively low and early.

Looking forward, the question now arises: what proportions of the elevation of such a volcano as Mauna Loa or Etna might be due to a similar mechanism of uplift? The answer would help to solve some of the problems of lunar and martian volcanic structures.

References

Green, J. & Wright, J. B. 1974. Ardnamurchan, Centre 1 – new radiometric evidence. *Geol. Mag.* **111**, 163–4.

Le Bas, M. J. 1971. Cone-sheets as a mechanism of uplift. *Geol. Mag.* **108**, 373–6.

Richey, J. E. & Thomas, H. H. 1930. The geology of Ardnamurchan, north-west Mull, and Coll. *Mem. geol. Surv. Scotland.*

Department of Geology
University of Leicester
England, LE1 7RH
26th April 1974.

M. J. LE BAS

The petrology of the Warsak alkaline granites, Pakistan, and their relationship to other alkaline rocks of the region: Corrigendum

SIR, – It is regretted that some of the trace-element data in Kempe (1973) are in error. The following corrected data should be substituted in Table 3, p. 394:

	3	4	5	6	7	8	9	10
Sr	< 20	n.d.	72	n.d.	317	n.d.	—	n.d.
Ba	645	550	425	555	1595	405	—	245
Rb	144	118	56	110	105	180	—	205

n.d.: not detected

Reference

Kempe, D. R. C. 1973. The petrology of the Warsak alkaline rocks, Pakistan, and their relationship to other alkaline rocks of the region. *Geol. Mag.* **110**, 385–404.

D. R. C. KEMPE

Department of Mineralogy
British Museum (Natural History)
London SW7 5BD
1st May 1974