CORRESPONDENCE

POTASSIUM-ARGON AGE STUDIES IN SCOTLAND

SIR,—In a recent paper (Miller, J. A., and P. E. Brown, *Geol. Mag.*, **102**, 106–134, 1965), reference is made to the results of several age determinations made on rocks from the Strathspey Complex and the surrounding matesediments, the Monadhliath Schists. The specimens for these determinations were collected by the writer during the course of fieldwork in Strathspey in 1960 and 1961. The conclusions drawn by Miller and Brown from the ages determined are at variance with the geological evidence.

In Table 2(*a*), p. 114 samples from localities 17 and 18 are referred to respectively as " Central Highland Granulites (Moine-Monadleath) " and " Central Highland Granulites, Moine-Monadleath schist ". The specimens from which these samples were derived were both collected from the Monadhliath Schists which according to Anderson (1956) are representative of the Pelitic and Quartzitic Transition Group at the top of the Moine. The Monadhliath Schists occur above the Central Highland Granulites and have been correlated by Anderson (1956) with the Lochaber Series of schists and quartzites which are most commonly regarded as Dalradian. The present writer is of the opinion that they are best regarded as Dalradian, the alternating sequence of pelitic and quartzitic rocks marking the onset of instability in depositional environment after the long stable period during which the Central Highland Granulites accumulated.

At locality 17 a specimen of lit-par-lit migmatite was collected, and at locality 18 a specimen of pelitic schist unaffected by migmatization was obtained. The ages determined showed no significant difference (see Miller and Brown, Table 2(*a*), p. 114).

It is important to establish the stratigraphic position of the Monadhliath Schists since they have undergone regional migmatization in this area. Thus, results obtained from them are pertinent to the statement in the paper that the late (F3) migmatites of the Moine are not of the same age as the main Dalradian migmatites in the Central Highlands (p. 120). Regional migmatization in Strathspey affects both the Monadhliath Schists and the Eilde Flags (Central Highland Granulites). If the Monadhliath Schists are Dalradian the age of migmatization is related to the geographical position in the orogene and not to the stratigraphic horizons affected and a whole sequence of ages of migmatization transitional between the two areas may be expected.

A metamorphic origin is suggested (p. 120) for the granitic rocks of the Strathspey Complex. Dates determined from these rocks are given in Table 2(*d*), p. 117 under the heading " Older Granitic Rocks from the Loch Laggan Area, Monadleath Mountains ". The samples 31–34 inclusive were all collected from the granite core of the Strathspey Complex (for descriptions see Anderson, 1947, pp. 105–6 ; 1956, pp. 21, 25). The recent investigation indicates that this granite core was intruded. There is a big swing in strike around the north-east margin of the granite, minor apophyses of the granite cross-cut and displace bands in the metasediments and migmatites. Intrusion brecciation of the Monadhliath Schists by some dykes and sills of granite has also been observed. In addition the lit-par-lit migmatites are distributed in a series of bands bearing no constant relationship to the granite margin. The intrusion of the granite is demonstrably post-tectonic since representatives of the minor folds produced by the latest deformation are present in the metasedimentary inclusions within the granite. A small amount of assimilation of pelitic migmatite has taken place, this being the origin of the sample from the specimen collected at locality 32 which is referred to as hybridized.

There is no reason to separate the Dalchully Granite (locality 72, Table 4, p. 123, Miller and Brown) from the remainder of the granitic rocks of the Strathspey Complex. Its geological relationships and petrology indicate that it is a minor apophysis of the main body. It is also possible that the Allt Crom Granite (locality 71, Table 4, p. 123, Miller and Brown) represents an intrusion

similar to the Strathspey Complex since it shows great similarities in field appearance and structural environment.

The core of the Strathspey Complex represents a Forceful Intrusion (Read, 1961), rather than an " Older Granite " (migmatite). Miller and Brown show that many Caledonian granites were emplaced about 400 million years ago. It is suggested that the older dates obtained from specimens from the core of the Strathspey Complex, 430–420 million years (Table 2(*d*), p. 117, Miller and Brown) indicate that granite intrusion commenced earlier at the level now exposed in Strathspey, possibly because it represents a level deeper in the tectogene.

REFERENCES

ANDERSON, J. C. G., 1947. The Kinlochlaggan Syncline. *Trans. geol. Soc. Glasg.*, **21**, 97–115.

—— 1956. The Moinian and Dalradian rocks between Glen Roy and the Monadhliath Mountains, Inverness-shire. *Trans. roy. Soc. Edinb.*, **63**, 15–36.

READ, H. H., 1961. Aspects of Caledonian Magmatism. *Lpool. Manchr. Geol. J.*, **2**, 653–683.

T. E. SMITH.

SUNDERLAND TECHNICAL COLLEGE.

26th August, 1965.

SILURO-DEVONIAN BOUNDARY

SIR,—In spite of Dr. Tarlo's flattering picture of a " courageous stand ", I must explain that my paper had nothing to do with the Ludlow Research Group. That most informal association of workers interested in the Silurian and Devonian has, to my knowledge, no creed which I may retract. My paper was intended to be an objective review of a problem which must be settled eventually by international agreement. Though I have discussed these matters with Dr. Tarlo, I had not seen the introduction to his Polish monograph before I submitted my paper to you. Having read it I am still not " convinced by the case " which he presents. Indeed I have long suspected that he views the Welsh Borderland through Old Red coloured spectacles. I still see there a marked change, both faunal and lithological, at the Ludlow Bone Bed and, not being a student of fossil vertebrates, I find the sharp change in the latter at the top of the Downtonian regrettably difficult to pin down.

As to the views of Dr. Jaeger, I can only say that I suspect his preference to be, like that of other Central and East European colleagues, for a boundary taken at the disappearance of the monograptids. However, after long discussions with him, I came to believe that he favoured a compromise at the base of the *Monograptus uniformis* Zone if a compromise were necessary.

I cannot see that a changed position for the Siluro–Devonian boundary will " facilitate direct correlations " between British and Central European strata. It is perhaps rather more the case that an increasingly accurate correlation, based upon all available kinds of evidence, permits the possibility of a reasoned and lasting decision upon a standard for the boundary.

In his letter, and at greater length in his monograph, Dr. Tarlo refers to the problem of naming Post-Ludlovian, Pre-Gedinnian strata. It should be remembered that no problem exists where the Ludlovian is followed directly by the Downtonian and none in Central Europe, where the Czech workers already have a complete stage terminology. The problem exists only in situations such as that of the Calcaire de Liévin, where there are Post-Ludlovian marine strata which are not of Bohemian (or Downtonian) facies. It is in these situations that Boucot has employed the term Skalian. In his monograph Dr. Tarlo objects to this on the grounds of the prior and different usage of the " étage de Skała " by Kozlowski. Whatever be the answer to this argument, I believe it would be even more confusing to employ Ludlovian for