It seems that turbulence in the ambient flow changes the process of entrainment into the separated regions, increasing the pressure within them and bringing the shear layers closer to the body. At angles of incidence which are not too small this causes earlier reattachment.

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Possible Dextral Movement on the Minch Fault

IN deducing dextral movement on the Minch Fault, Garson and Plant¹ have used the apparent similarity between the rock types on South Harris and those on Coll and Tiree. Recent work on Coll² and Tiree³ shows that the Lewisian metasediments there are no more similar to those of South Harris than metasediments occurring in many other localities throughout the Outer Hebrides⁴ and on the Scottish mainland, whereas the distinctive rocks of the metamorphosed igneous complex on South Harris are absent from Coll and Tiree. The strike of the metasediments in east Tiree as drawn by Garson and Plant on their map is in part 90° divergent from that measured in the field. Continuation of strike over distance proposed is, at best, unreliable in such a complexly deformed area.

Where the Minch Fault forms a distinct bathymetric feature along the line indicated by Garson and Plant it coincides with what is known to be a normal fault down-throwing sediments to the east of the Outer Hebrides⁵⁻⁷. Regarding the suggested displacement of sedimentary basins E and C on the Shetland-Hebridean shelf, it can be seen on the maps of Bott and Watts^{5,6} that the Minch Fault would need to bend sharply twice through at least 35° to run between the two basins. The use of the apparent displacement of what are thought to be Mesozoic basins to calculate Palaeozoic fault movements must be regarded as suspect.

Dearnley first proposed the existence of a transcurrent fault in the Minch, with sinistral movement, in 1962 (ref. 8) on the basis of matching the relative distribution of Scourian and Laxfordian type rocks with that of the mainland of Scotland. More detailed investigations of the Outer Hebrides⁹ have shown that the distribution of these rocks is considerably more complex than originally thought and weakened the case for a large transcurrent in the Minch. Garson and Plant have not presented any evidence of substance to prove the existence of the fault or that it has moved dextrally, and the hypothesis must remain speculative. Large faults are known on the Shetland-Hebridean shelf, but these are normal faults probably related to the initial rifting of the Atlantic and the subsequent development of the continental shelf¹⁰.

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Reply

WE agree that there is a general similarity between Lewisian metasediments and those in other localities throughout the Outer Hebrides and on the Scottish mainland. But the similarity between the South Harris, Coll-Tiree and Iona metasediments is remarkable, and rock-types such as graphitic gneisses, diopside-rich calc-silicate rocks, phlogopite marbles and potash-rich rocks match very closely. Although the complete South Harris metagabbro-anorthosite-tonalite complex is absent on Coll and Tiree, this is negative evidence, and it is significant that anorthosite occurs on Iona.

It was not possible on the scale of our Fig. 3 (ref. 1) to give more than a mean strike for the Coll-Tiree metasediments, but we suggest that local divergences can be explained in many cases as later superimposed structural features. Our hypothesis is that the distinctive limestones and associated metasediments on South Harris, Coll-Tiree and Iona form marker horizons, albeit distorted by later events, which were finally displaced by dextral movement.

We do not agree that a sharp bend is required to make the Minch Fault pass between possible sedimentary basins E and C; the splay of the Great Glen Fault through the Shetland Islands curves by an equal amount.

Finally, we suggest that normal faulting on the Minch Fault in no way precludes transcurrent movement, for there is also strong evidence of late down-throw to the south-east of the comparable Great Glen Fault.

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