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# Lochailort

[NM 770 820]

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## Introduction

One of the most accessible and informative sections across the Sgurr Beag Thrust is exposed at Lochailort, about 35 km west of Fort William. The Sgurr Beag Thrust forms the boundary between the Morar Group and the Glenfinnan Group and is the most significant tectonic dislocation within the Moine succession. The thrust is a southerly continuation of the structure first recognized at Kinloch Hourn, approximately 30 km to the NNE (see Kinloch Hourn GCR site report, this chapter); near Lochailort, it is folded by a major synform–antiform pair (Figure 8.21). Good exposure allows examination of the contrasting nature of the two sequences on either side of the thrust, and the development of characteristic platy fabrics along the junction and in its footwall, which illustrate its tectonic nature. This boundary is of fundamental importance in understanding the orogenic history of the Moine and the early geological history of the Scottish Highlands. The geology of the Lochailort area has been described in detail in the regional studies of Powell (1964, 1966, 1974), Powell *et al.* (1981) and Baird (1982). The Lochailort GCR site is complementary to the Fassfern to Lochailort Road Cuttings GCR site that describes the structural and stratigraphical succession immediately to the east.

## Description

The Sgurr Beag Thrust (here locally termed the 'Lochailort Thrust') is exposed in a prominent NNE–SSW-trending elongate glaciated hillock, approximately 300 m in length, called 'Tom na Faing', on the floor of the small valley of Glenshian at the head of Loch Ailort (Figure 8.22)a. Tom na Faing is a roche moutonnee, with ice-smoothed striated surfaces on its gentle northern side and a steep, ice-plucked SSW side, indicating a down-valley south-westerly direction of ice movement.

The hillock is composed dominantly of gneissose pelite, part of the Lochailort Petite Formation, which is the lowermost unit of the Glenfinnan Group succession ((Figure 8.3); Johnstone *et al.*, 1969; Holdsworth *et al.*, 1994). Here it is a very coarsely foliated and migmatitic pelite and semipelite, with abundant garnet. Subordinate psammitic interbeds are present, and both the foliation and lithological layering trend NNE. The gneissose pelite and semipelite contain abundant concordant lenticular quartz and quartz-feldspar veins, typically a few centimetres thick and up to 40 cm long. Larger concordant pegmatitic veins, composed of quartz-plagioclase-muscovite with garnet-rich margins and biotite selvages, and rare large east–west cross-cutting quartz veins are also present.

Rocks of the Morar Group are exposed on the south-west flank of Tom na Faing. Strongly attenuated, planar psammite units of the Upper Morar Psammite, several tens of centimetres thick are folded into F3 folds with steep SW-plunging axes. The contact between the Glenfinnan Group gneissose pelitic rocks to the east and the Morar Group psammites to the west is exposed along the south-western side of Tom na Faing, and is particularly clear at the southern end of the hillock (Figure 8.22)b. Here, the pelitic rocks change their character over several metres, with the coarse-grained leucosomes becoming attenuated and reduced to the texture of a medium-grained streaky gneissose pelite. On the west side of the boundary, the layered psammites are highly strained, with attenuated siliceous units producing a distinctive 'tram-lined' appearance over several metres. At the boundary, individual psammite units have a thickness of only a few centimetres. Despite the clear macroscopic evidence for high strain, there is little obvious grain-size reduction or mylonitization, and the pelitic lithologies retain their gneissose texture.

Close to the contact, both lithologies contain tight to isoclinal minor F2 folds whose axes plunge steeply to the south-west and whose axial planes trend sub-parallel to bedding, and to the Sgurr Beag Thrust. The F2 structures fold the gneissose foliation, psammitic ribs, and the quartz-feldspar segregations. In the pelitic units the F2 folds have an intense axial-planar fabric that is a result of recrystallization to a finer grain-size and boudinage and flattening of the quartz and

quartz-feldspar pegmatite veins and pods.

On Tom na Faing F3 folds of the S1/S2 foliation, the bedding, and the quartzfeldspathic segregations are also well exposed. The folding varies from large tight folds several metres across, to abundant smaller, open, neutrally vergent folds, which re-align the overall gneissose layering to strike north-west (Powell, 1974). Like the F2 folds, F3 axes again plunge steeply to the south-west. A prominent S3 mica schistosity is locally well developed in the pelitic units, although in parts only a strong crenulation cleavage is seen. Persistent, thin, NE-trending quartz-feldspar veins are commonly developed, axial planar to the F3 folds, a feature characteristic of F3 folding elsewhere. The larger-scale Glenshian Synform and Loch Eilt Antiform that refold the Sgurr Beag Thrust on a regional scale are F3 structures.

## Interpretation

The stratigraphy and structure of the Lochailort area was originally described by Powell (1964, 1966) as a continuous stratigraphical sequence from west to east, repeated by a series of roughly N–S-trending folds of various generations. To the east of the boundary between the Upper Morar Psammite Formation (Ardnish Psammitic Group of Powell, 1964) and the Lochailort Pelite Formation, the rocks were described as deformed and gneissose, lacking the well-preserved sedimentary structures of the rocks to the west. However, the junction between the two units was inferred to be a sedimentary transition.

The identification of the Sgurr Beag Thrust to the north (see Kinloch Hourn GCR site report, this chapter, and Tanner, 1971) as a major tectonic discontinuity separating lower-grade Morar Group rocks to the west from higher-grade Glenfinnan Group rocks to the east, was followed by its extrapolation southwards to Loch Eilt and Lochailort. Powell (1974) then recognized that the western outcrop of the Lochailort Pelite occurred as an F3 infold (the Glenshian Synform) of Glenfinnan Group rocks bounded on either side by the Sgurr Beag Thrust. The underlying Upper Morar Psammite Formation and succession to the west were assigned to the Morar Group.

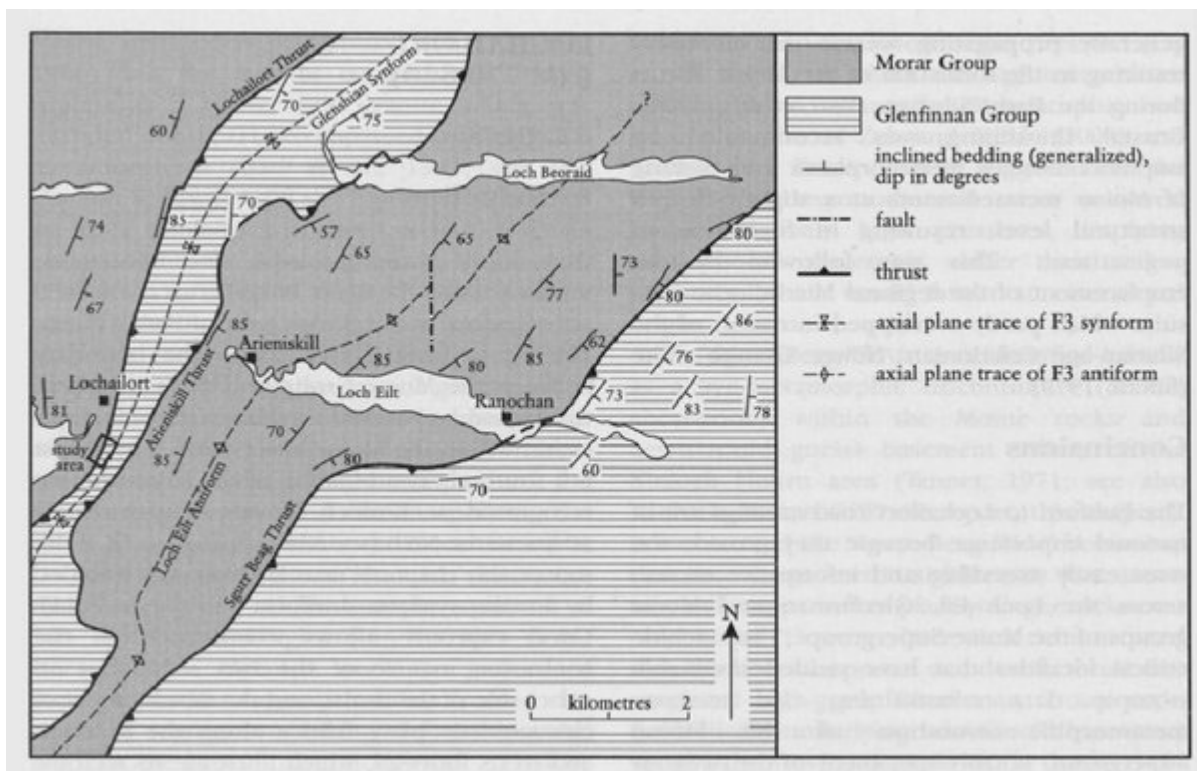
The absence of tectonic slices of Lewisianoid gneisses left some doubt as to the presence of a major discontinuity at this junction. However, Powell *et al.* (1981) documented the metamorphic assemblages across this boundary, notably those in calc-silicate rocks, and showed that it juxtaposes rocks of differing metamorphic grade. Rathbone and Harris (1979) provided further evidence for the presence of a shear zone at Lochailort. They demonstrated the increased intensity of strain within the Upper Morar Psammite Formation over several hundred metres immediately to the north-west of the thrust. The strain is extremely high close to the boundary. The lack of grain-size reduction or mylonitization in the shear zone suggests that the Sgurr Beag Thrust was active at sufficiently high temperatures and pressures to enable ductile deformation and recrystallization and recovery processes to occur, probably contemporaneous with regional amphibolite-facies metamorphism. The lack of high-strain micro-fabrics in the Sgurr Beag Thrust has also been noted at Kinloch Hourn (Tanner, 1971).

The age of the Sgurr Beag Thrust and associated D2 structures is still controversial, but it appears that the thrust was active during the Knoydartian and reactivated later in the Caledonian Orogeny (Tanner and Evans, 2003; see also 'Introduction', this chapter).

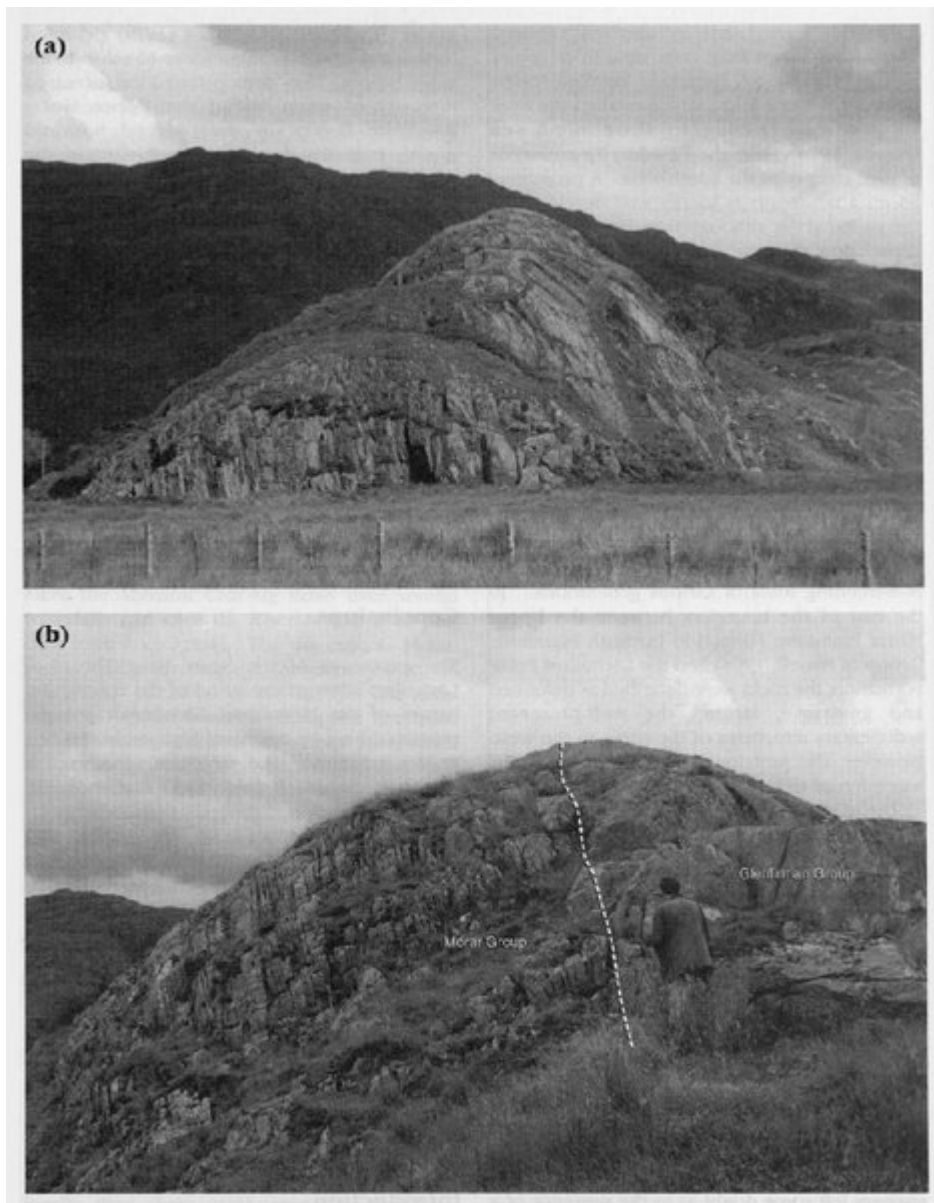
## Conclusions

The exposures of the Sgurr Beag Thrust at Lochailort allow examination of the contrasting nature of the Morar and Glenfinnan groups, separated here by a zone of high strain focused at the junction. The structure represents a major tectonic break and metamorphic discontinuity, yet it is generally concordant with the regional structure and stratigraphy, and shows no evidence of major grain reduction and mylonitization. These features are indicative of ductile deformation occurring during a metamorphic event at relatively high temperature and deep crustal levels. The site is of national importance and remains suitable for teaching and research purposes.

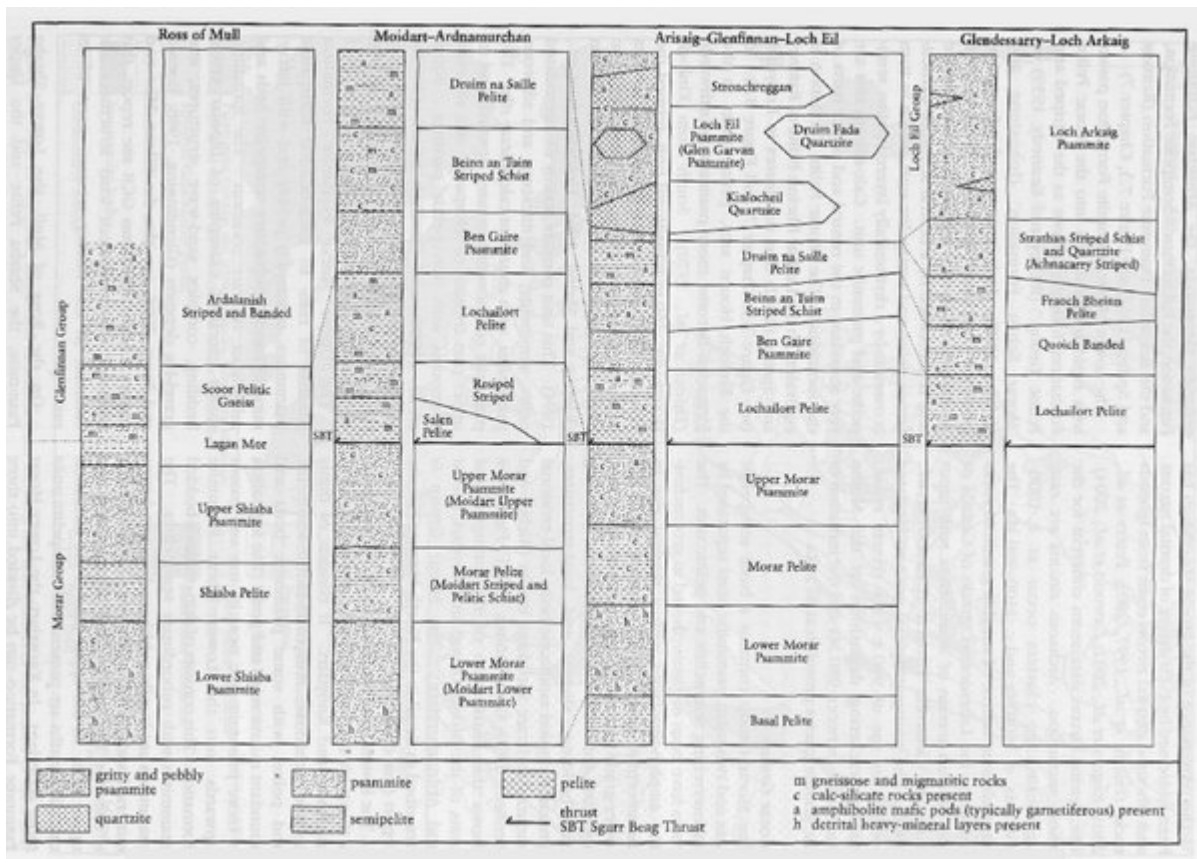
## [References](#)



(Figure 8.21) Map of Lochailort-Loch Eilt area showing the regional structure. Note that the Lochailort, Arieniskill and Sgurr Beag thrusts are one and the same dislocation. After Baird (1982).



(Figure 8.22) (a) General view of the Sgurr Beag Slide at Tom na Faing looking towards the north-east. The low flaggy rocks on the left are the layered psammities of the Morar Group to the west, whilst the higher more-massive ground on the right are the pelitic gneisses of the Glenfinnan Group to the east. (b) Closer view of the Sgurr Beag Slide, again with flaggy banded psammities of the Morar Group to the west, and pelitic gneisses of the Glenfinnan Group to the east. The figure is standing immediately to the right of the contact. (Photos: E.K. Hyslop.)



(Figure 8.3) Tectonostratigraphy of the Moine succession within the Moine (South) area, showing the main formations.