
Excursion 12 Sithean Sluaigh

Key details

Author	C. D. Gribble
Theme	The thermal aureole seen around the basic igneous plug at Sithean Sluaigh represents an excellent and very rare example of progressive metamorphism of pelitic country rocks to extreme temperatures (called pyrometamorphism). Primarily of specialist interest.
Features	High temperature mineral assemblages in pelitic rocks; gabbroic plug with marginal dolerite.
Maps	O.S. 1: 50 000 Sheet 56 Inveraray and Loch Lomond B.G.S. 1: 63 360 Sheet 37 Inveraray 1: 50 000 Sheet 37 E Lochgoilhead
Terrain	The going is steep and rough, with the gabbro plug presenting an area of exposed rock right at the summit of Sithean Sluaigh. Sithean Sluaigh is about 100 km (60 miles) by road from Glasgow. To get there, take the A82 Loch Lomond road to Tarbet, and then the A83 past the Rest and Be Thankful (where there is a magnificent southerly view). Near Loch Fyne, take the A815 south along the eastern shore of the loch to the village of Strachur where the A886 is encountered. From the crossroads, continue along the A886 for 7.25 km (4.5 miles) until reaching the end of a forestry plantation on the north side of the road (about 2 km beyond the junction with the B8000). The walking distance from here is about 5 km (3 miles).
Distance	
Time	This trip takes a full day from Glasgow including the time spent driving there and back.
Access	Parking spaces can be found at the side of the road, just beyond the forestry plantation mentioned above.

Sithean Sluaigh is the more northerly of two summits, the southerly one (about 1 km away) being Cruach nan Capull. Sithean Sluaigh is 435 m in height and the ascent should be made along the edge of the forestry plantation from about grid reference [NS 060 965]. Climb to the NE for about one kilometre and then swing round to the north and head towards the summit of Sithean Sluaigh, some 1.5 km distant. As the climb is steep take it slowly, and, once above the level of the plantation, pause frequently to admire the views of Loch Fyne.

The Gaelic word Sithean (pronounced shee–hen) means 'a fairy hill': Sluaigh (sloo–ah) means 'of the multitude' or 'people'.

Introduction

The geology of the area was first described by Gunn et al. (1897) as being underlain by Dalradian country rocks; in particular by phyllites (of the Garnetiferous Mica Schist Group described by Hill 1905) which vary in composition from psammitic rocks to pelitic rocks, and which contain quartz, albitic feldspar, muscovite and chlorite, and with occasional garnet, biotite and other accessory minerals also present.

The gabbro plug at the summit of Sithean Sluaigh is oval in plan with its long axis trending NW to SE; it is about 180 m by 90 m in size (Figure 12.1). The plug is very well exposed, and the geological variations can be seen with ease. However, the aureole rocks are not well exposed and the best plan is to try to locate the positions of the samples shown on (Figure 12.1) which were given to the Hunterian Museum, since in situ exposures of rock occur at these points. The numbered locations below are shown on the map (Figure 12.1). Note that these rocks are often fine grained and their mineralogy is difficult to identify with certainty in the field, even with a hand lens.

Locality 1

The centre of the intrusion is gabbro containing basic plagioclase feldspar, augite, olivine and iron ores, with zeolites occasionally present.

Locality 2

The plug has a fine grained margin of dolerite exhibiting good ophi tic texture which can be seen by the naked eye. This dolerite is exposed in places as a low, broken ledge of rock surrounding the main mass of gabbro.

Locality 3

A finer grained dolerite occurs on the north edge of the plug (Figure 12.1), forming an outer 'skin' to the marginal dolerite. All the dolerites have a mineralogy similar to that of the main gabbro.

Locality 4

A coarse grained rock (called a pegmatite by Smith 1965) occurs between the gabbro and the marginal dolerite on the west side of the intrusion. It is not marked on (Figure 12.1) as it is discontinuous, but this coarse material is easily identified.

Since an extensive scree is present, the exact limit of the thermal aureole is difficult to ascertain, but is estimated to be about 9 m wide. At this distance the country rocks are baked and hardened.

Locality 5

At the northern edge of the intrusion a narrow ledge of toughened phyllites occurs (Figure 12.1). This ledge may originally have been continuous around the plug but is now seen only in a few isolated exposures which are not precisely identified on the Figure

Locality 6

On the SW side of the plug, a gully in the scree exposes country rocks (R6543) about 5 m from the contact, and the rocks here contain cordierite and dark green spinel. The mineralogical changes which occur in these rocks depend to a large extent on the type of rock involved, with pelitic rocks showing the greatest changes. Further breakdown of the original minerals in the country rocks can be observed as the contact is approached. At about 1.5 m from the contact, the dark hornfelses contain spinel, cordierite and orthopyroxene, with occasional sanidine present. The grain size here is small and the rock is dark grey or black in colour, and also has a high specific gravity. Nearer the contact the grain size increases and spinel, sanidine and orthopyroxene occur as constituents.

Locality 7

On the SE side of the plug (Figure 12.1), spinel, green corundum (emery), and mullite may occur (Smith 1965), and a specimen from this locality (R6545), a few centimetres from the contact, is entirely composed of dark green spinel set in

a matrix of plagioclase.

Note that many of the minerals described above are dark coloured and fine grained, and are difficult to distinguish in the hand specimen. However they are rare minerals and many of them (spinel, orthopyroxene, etc.) are particularly beautiful when viewed in thin section, under the microscope.

Geological history

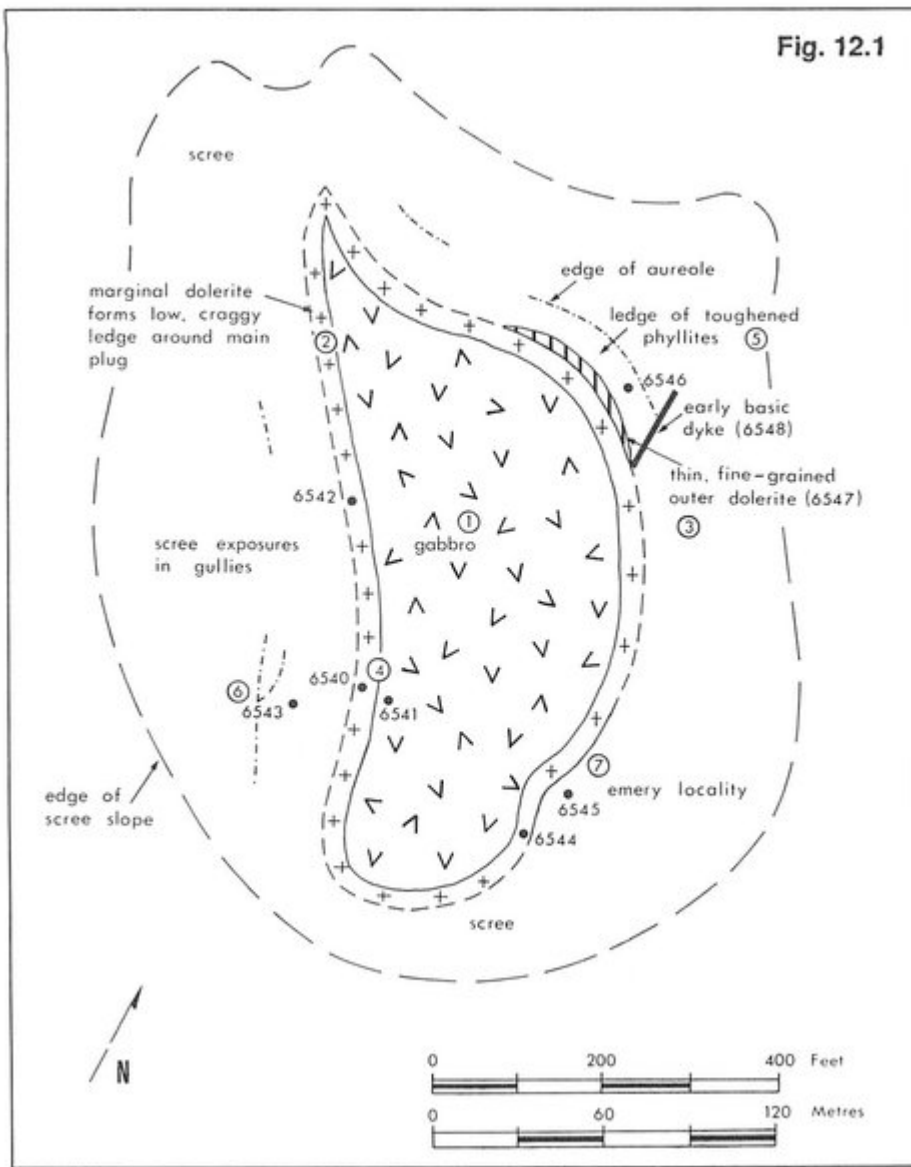
The basic igneous plug of Sithean Sluaigh was emplaced into a volcanic vent during Tertiary times; temperatures of about 900 °C were produced in the aureole. When temperatures as high as this occur, affecting pelitic rocks, the rocks start to melt with the production of a low temperature liquid (rather like a granitic liquid). When this liquid forms, any unmelted fractions remain as high temperature residua rich in alumina, magnesia and iron, and low in silica and alkalis. The major minerals formed from such material will include spinel, corundum and cordierite.

Many of the contact rocks seen at Sithean Sluaigh represent these high temperature unmelted residua which remained after the Dalradian country rocks were subjected to the high temperatures in the aureole. The low temperature (or granitic) liquid, which must have been formed when the rocks were first melted, is not seen; and this low temperature liquid was possibly added to the gabbroic magma, which is unlikely since it has a normal gabbro composition, or, more probably, was removed elsewhere. This type of hypothesis has been used to explain other rock associations of a similar nature (Evans 1964; Gribble 1968). Smith (1969) gives a very good account of the mineralogy and geochemistry of the plug and its thermal aureole.

References

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Fig. 12.1



(Figure 12.1) Geological map of Sithean Sluaigh (adapted from Smith 1965) Numbers (e.g. 6543) refer to specimens in the Hunterian Museum.