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## 6. 'Ledmorite' (melanite nepheline-microsyenite)

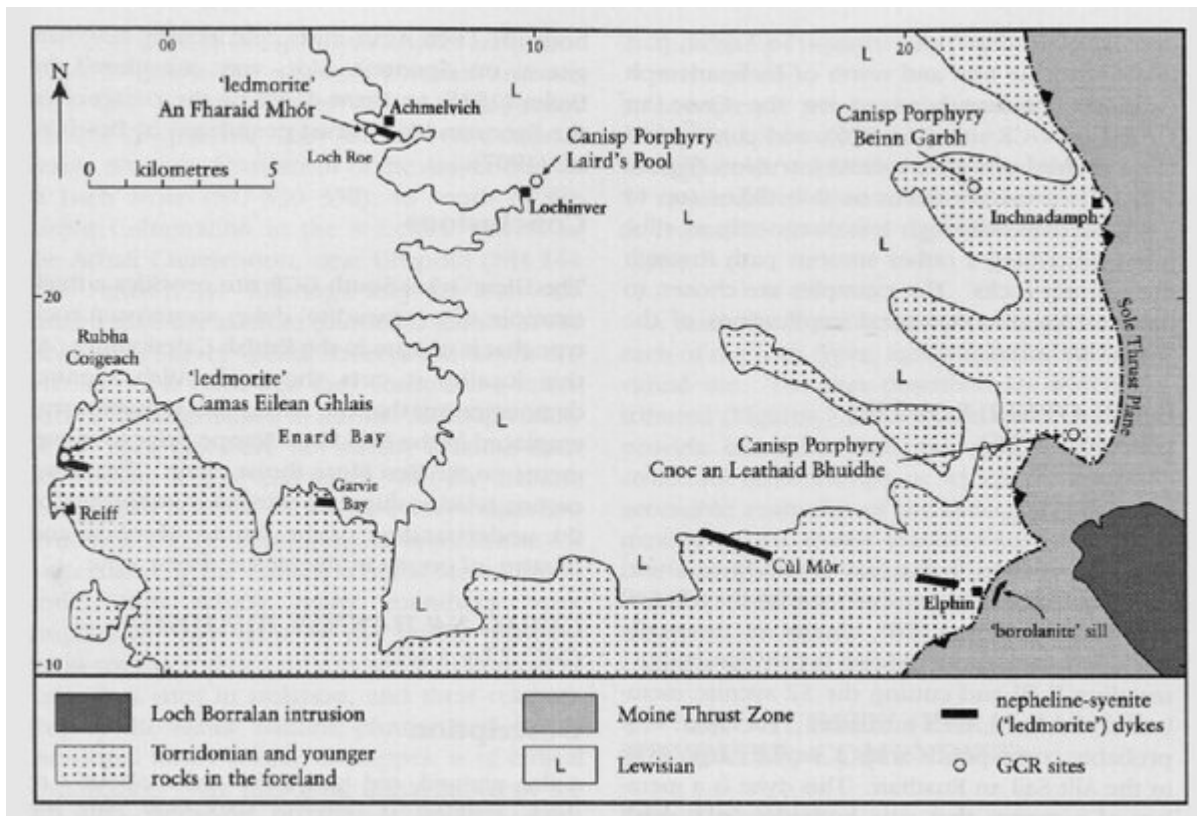
### Introduction

A dyke of silica-undersaturated syenite was recorded by Horne and Teall (1892) cutting Torridonian sandstones 28 km to the west of the Sole Thrust at Camas Eilean Ghlais (Figure 7.13) near Rubha Coigeach, NW of Achiltibuie. They pointed out its similarity to the rock type 'borolanite' that they had recently discovered and named in Assynt. A second example of a silica-undersaturated dyke, from near Achmelvich (Figure 7.13), was found in the Survey's collections by Sabine (1952). He suggested that the affinities of both rocks were with the 'led-morites' because they lacked the pseudoleucite spots that characterize 'borolanite'. The two dykes are similar in mineralogy, although the example from Coigach is coarser grained and more altered. They are largely composed of an aggregate of orthoclase and nepheline (altered to natrolite) enclosing euhedral crystals of melanite garnet, prisms of aegirine and rare deep-brown biotite. Thomsonite occurs in interstitial clusters.

These dykes are extremely important, in both a historical and a modern context. Both extend well to the west of the thrust belt and, as Sabine (1953) pointed out, are far from any extensive exposures of limestone that might have been involved in the assimilation reactions central to the 'Daly–Shand' hypothesis. The nearest Durness Group carbonate rocks would have been well above the level of the dykes if carried to the west by the thrusts. Although one might argue that the dykes were emplaced laterally from the Loch Borralan magma chamber, Sabine's arguments contributed to the eventual abandonment of the limestone assimilation hypothesis. In a modern context, the dykes show that the source of this, the most alkaline magmatism in the British Isles, lies in the high-grade Lewisian gneisses of the Foreland or in the mantle beneath.

The dykes also have structural implications. Both strike towards the Loch Borralan intrusion in its present position in the thrust zone. Although horizontal movement of the Borralan mass of a few kilometres on the Sole Thrust cannot be ruled out, it certainly seems unlikely that a large displacement has occurred. The timing of major late movements on the Sole Thrust is a contentious issue, because Elliott and Johnson (1980) and Coward (1985), on the basis of detailed mapping, suggested that the Borralan intrusion has been considerably displaced by late movements on this thrust. Coward calculated a minimum displacement of 30 km. Halliday *et al.* (1987), however, accept the evidence provided by the 'ledmorite' dykes, and consider that the main movements on the Sole Thrust must have pre-dated the emplacement of the Loch Borralan complex.

### [References](#)



(Figure 7.13) Map of western Assynt showing distribution of nepheline-syenite ('ledmorite') dykes in the Foreland and their relationship to the Loch Borralan nepheline-syenites in the Moine thrust zone. GCR sites exemplifying the 'ledmorite' dykes and the Canisp Porphyry are also shown. The full extent of the Canisp Porphyry around Beinn Garbh is shown on Figure 7.15.