

Residential Excursion to The NORTH WEST HIGHLANDS

Leader: Dr Iain Allison

Report by *M. Donnelly*

Participants: 14

Friday 7/9/12

We drove north in small groups (bumping into each other at various coffee stops on the way!) and arrived in late afternoon at the well-appointed Rhiconich Hotel sitting at the head of Loch Inchar. After a 'refreshment' and an excellent meal, our leader gave us an outline of the geology and the plan for the weekend.

Saturday 8/9/12 Tarbet

On a very damp and misty morning we set off in cars, south on the A838 and then A894, and turned northwest on a minor road to Tarbet where we parked above the pier. We were greeted enthusiastically by a 'local' – a friendly black and white collie, who, encouraged by the 'doggie treats' that one on our group just happened to have in her pocket, joined us as we set off across the field behind the Shorehouse Restaurant and climbed to a rocky knoll on the north side of the bay (NC 162490). Here we found mafic and felsic gneisses with bands of rusty-weathering, medium to coarse-grained garnet-biotite-plagioclase-quartz schist – so-called 'brown schists' which are interpreted as metasediments. These lie to the south of the Laxford Shear Zone and so are in the Assynt 'Terrane' or 'Block'. Originally of granulite facies they were retrogressed to amphibolite during the Laxfordian event, and are associated with large meta-mafic bodies in the southeast. They are cut by, and are therefore older than, the Scourie dykes; their foliation dips steeply to the southwest and they are strongly lineated. There were also occasional outcrops of foliated pink-weathering rock with quartz, K-feldspar and biotite – these may be fragments of a deformed granite sheet within the metasediments.

The weather was gradually improving, and we continued (up and down!) to the northeast and a second gully (NC 162492) where the metasedimentary gneisses are separated from the quartzofeldspathic gneisses of the Assynt Block. The latter have a strong steeply dipping foliation and an intense lineation, thought to be of Inverian age; Laxfordian deformation is concentrated in discrete shear zones.

Then we came upon a stunning outcrop – amphibole-rich gneisses cut by thin pink-weathering, medium-grained, strongly foliated granitoid sheets with elongated ribbons of quartz. Both gneisses and granitoid sheets are folded into tight upright folds that are axial planar to the main Inverian foliation. One of our party observed that the front face of the cliff had obviously collapsed to reveal the relatively fresh surface within – we all took a pace back!! A photo of this face appears in the Guide.....we started referring to it as 'Figure 87'!! (NC164492)



The collie had by now disappeared – presumably satisfied that he had seen us safely off his territory, he had headed back home. We resumed our way towards the northeast – up small hills and down into small glens, struggling through the knee-high heather. We made a particularly arduous climb, which was not eased by our leader's later confession that it was a mistake – we had not *had* to climb the hill, we could have contoured around instead! But it was worth all our efforts for, reaching the last ridge on the summit, there spread below us was the land of crags and lochans, with Cnoc Gorm (the blue hill) across the valley. To the northeast beyond the open water of Loch Laxford, the mainland lay in the distance, beneath a rich blue sky dotted with clouds – it was simply awe-inspiring. We made our way down (again!) and across to Cnoc Gorm – so named because of its dark amphibolitic rocks (NC 168499) which are composed of a coarse-grained, dark grey-weathering, garnet bearing metagabbro.

The hill is part of a huge belt of Archaean meta-mafic bodies, locally associated with metasedimentary rocks and extending along the southern side of the Laxford Shear Zone. Cnoc Gorm typically contains abundant dark areas with red garnet crystals up to 5 cm across, commonly surrounded by albitic rims which formed during decompression. The rocks are of Badcallian granulite facies, some retrogressed to amphibolite, and are penetrated by several thin tonalite sheets.

There are a number of narrow curving shear zones of Laxfordian deformation. We spent some time examining the outcrops and taking photos.

Then we were off again, with more ups and downs, across tightly folded gneisses cut by scattered pegmatitic granite sheets, and a Scourie dyke which cut the folds thus showing the latter to be Inverian. We arrived at Rubha Ruadh (Red Point), an enormous exposure of coarse-grained, foliated, pink Laxfordian granite about 1 km wide, and settled down for lunch. It was by now a beautiful day and from our high vantage point the panorama was spectacular. After lunch we spent some time looking for blue-green alkali amphibole and grass-green aegirine-augite within the granite before heading off for the next locality. After a few minutes our leader asked us if there was any difference between these rocks and those we had just left – but we had all been too busy talking to notice. Personally, I thought ‘What rocks?’ as it seemed to me that we were on a grassy slope. But then, there were *indeed* small outcrops and, yes, they *were* different!!

It transpired that we had just crossed what some authors consider to be the boundary between the Assynt and Rhiconich ‘Blocks’ or ‘Terranes’, a *very* significant boundary!!



After several photos we continued along and down this shear zone and some few hundred yards later we stopped and looked back. From this viewpoint the boundary was much more obvious

We continued over and through the heathery knolls towards the southwest until we came to the coast at Poll an Turrabain and a huge black cliff face of gigantic columnar jointing. After a 'viewing' pause, we walked round to the other side of it..... what a dyke



.....The TARBET DYKE

It is simply enormous and really impressive!! (NC 161495). We settled down to take it all in before more detailed examination. This is a composite dyke of the Scourie suite, comprising felsic, mafic and 'normal' dolerite, and xenoliths of the 'country' gneisses with which it has a discordant contact. It contains variable Laxfordian deformation, and also areas which retain the igneous texture.



Sitting on the Tarbet Dyke

Finally, we again set off up *another* big slope from the coast and made our way back towards the cars, having had a most satisfying and exciting day.



The Scourie Dyke
which is the gap in the hill, the shore, and the notch in the distance!!

Report by: *Ben Browne*
Sunday 9/9/2012

This second day of our excursion was devoted to Excursion 12 of The North West Highland Guide reorganised so as to reduce the driving and marginally increase the walking. Sites were visited either side of Scourie Bay all within the Lewisian of the Assynt terrane including classic Scourie dykes.

Parking just short of the pier at the head of Scourie Bay (NC155449) we followed a vegetated path northward to the left of a stone barn, through a gate and along to the left of a well made stone wall then west along a drain to First Inlet (Locality 12.3, NC15204524). Here a layered mafic-ultramafic body trending NE/SW forms a distinct ridge in the middle of the inlet. A magnet on a string showed attraction to the rock indicating a high content of magnetite. Loose boulders contained garnets with aureoles of retrogression from the original granulite facies of these rocks. There was not time enough to examine the southern side of this inlet in detail where a pyroxene+quartz+magnetite rock is interpreted as an ironstone of sedimentary origin.

Walking north then north-west to NC15134554 we obtained a view along a major Scourie dyke trending at 300° to form first the bay of Poll Eòrna (Locality 12.4) then a notch in the headland 500m further WNW. The dyke forms much of the exposed rocky shore of the bay and revealed a complex pattern of deformation, and garnets predominantly in the margins

A short walk uphill to the ENE brought us to a rocky outcrop at NC15064605 to the NE of a lochan where we were lead to expect shear zones in metasediments with small blades of kyanite but the guide refers to these as “having been described” and the map therein shows the metasediments to the SE of the lochan, so this deserves a second look, for certainly we found no such features.

Returning to the cars we drove the short distance to the cemetery car park (NC148447) on the south-west side of the bay. Passing to the right of the cemetery we reached the headland of Meallan

an Tiodhlacaidh (Locality 12.1) of layered granulite facies gneiss. Boudins of hornblende could be seen in various stages of break-up during their presumed derivation from a larger mafic-ultramafic body. Further west are two distinct relatively undeformed Scourie dykes with a trend of 310°. The first and thinner of the two is 1m thick and 50m north of the larger which is 55m thick. The former shows garnets mainly in the margins. The latter forms a gully and is very accessible and much studied. Variable Laxfordian retrogression is described as decreasing towards the centre.

Following the faint shore path westwards then crossing the headland we came to Locality 12.2 at NC14374469. Here a small hill is composed of big pods of pyroxene-olivine ultrabasic rock with garnet porphyroblasts some over 5cm in diameter and with decompression coronas. Boulders of this decompression symplectite lay in the bay below. These rocks have been used to constrain a pressure-temperature pathway for the evolution of these rocks.

On the south side of the bay at NC14234420 the sea has made a three dimensional dissection of a spectacular pegmatite with a graphitic texture and of a complex geometry. It is said that a Scourie dyke can be found to cut the pegmatite indicating the latter to be of Inverian age but the geometry was too complex for me to be convinced of this. This also deserves a second look

Starting south on our walk back to the car park we passed in the right hand wall of a gully at NC14254428 a beautifully developed ductile shear zone.

References:

Dr Allison's Excursion Notes

Eds. Kathryn M. Goodenough & Maarten Krabbendam, *A Geological Excursion Guide to the North-West Highlands of Scotland*, Excursion 13. BGS, 2011.