

Raasay 1:

Brochel & North Raasay



Brochel Castle, perched on an outcrop of coarse clastic rock on the east coast of north Raasay, provided a stronghold for the MacLeod clan and most likely was built in the late 15th to early 16th Century. Its coastal location enabled a degree of control of Raasay and important sea routes in the Inner Hebrides and the Scottish Mainland to the east. The original courtyard castle, with four towers, was surrounded by a high curtain wall. It was inhabited until at least 1671 and only remnants of the NE tower remain. The castle in a more complete state is depicted in William Daniell's aquatint of 1819.

Aspects covered: Late Proterozoic ('Torrionian') strata of the Diabaig and Applecross formations; lithologies of the Lewisian Gneiss Complex; three outcrops of post-Torrionian (Triassic?) carbonate-cemented breccias.

Parts:

- (a) [Brochel](#) - [Loch an Uachdair](#) (- return [Brochel](#));
- (b) ([Brochel](#)) - [Tairbeart](#) - [Arnish](#) - [Torrán](#) - [Creag an Eòin](#) - [Eilean Fladday](#) - ([Creag an Eòin](#)) - [Beinn na h-Iolaire](#) (- return [Brochel](#)).

Distance: (a) 4km (c. 3 miles); (b) 10km (6 miles).

Time: (a) 4 hours; (b) 5 hours.

General comments: This excursion is split into two parts; (a) the area around [Brochel](#), predominantly involving

various subdivisions of the Late Proterozoic ('Torrionian') strata and outcrops of (Triassic?) breccias;

(b) the area north of [Loch an Uachdair](#) (a third outcrop of breccia), then north to [Tairbeart](#), [Arnish](#) and [Torrán](#), and onwards to [Eilean Fladday](#) and [Beinn na h-Iolaire](#), predominantly involving various lithologies of the Archaean Lewisian Gneiss Complex, plus subdivisions of the Torrionian strata. [Eilean Fladday](#) can only be accessed at low-tide and the excursion should be timed appropriately if to be included as part of the excursion. It is unlikely that both parts of the excursion can be properly undertaken in one day.

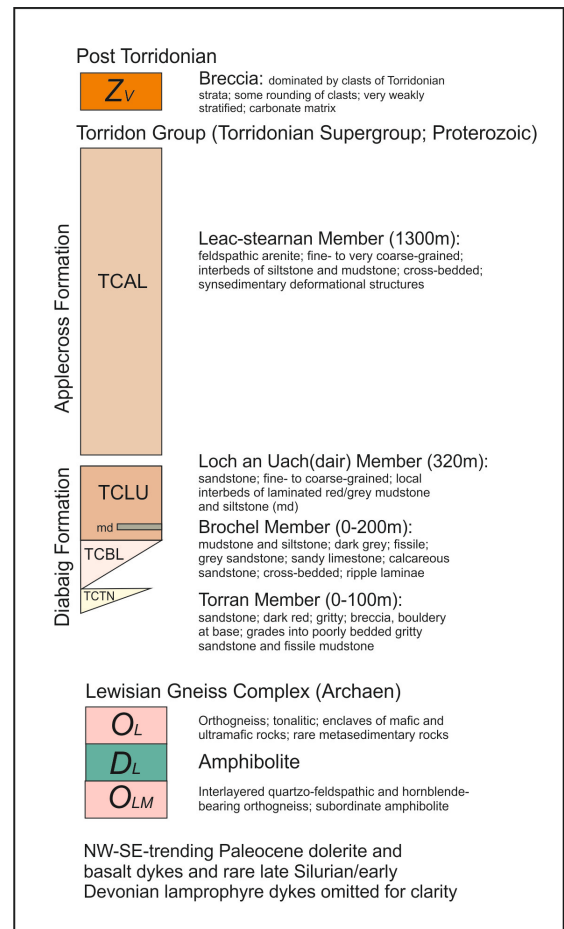
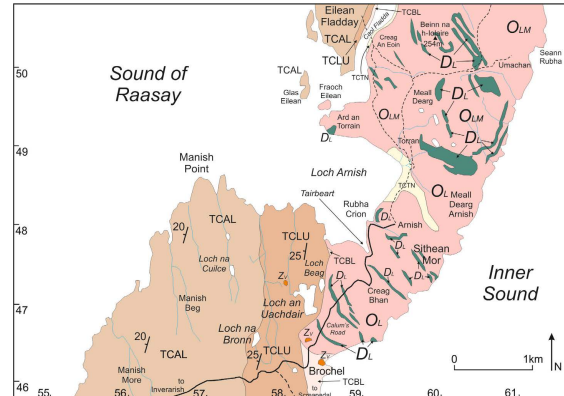


Figure Raasay 1.1: Simplified geological map and key of the North Raasay – Brochel area.

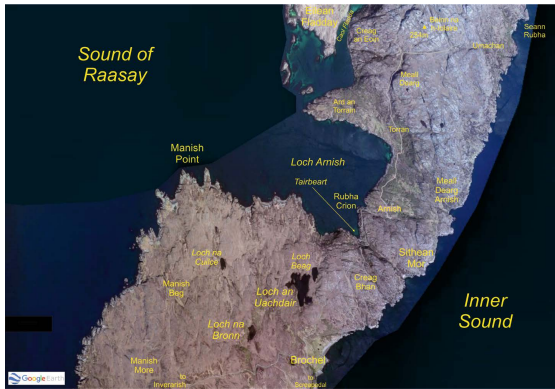


Figure Raasay 1.2: Annotated Google Earth® image of the North Raasay – Brochel area.

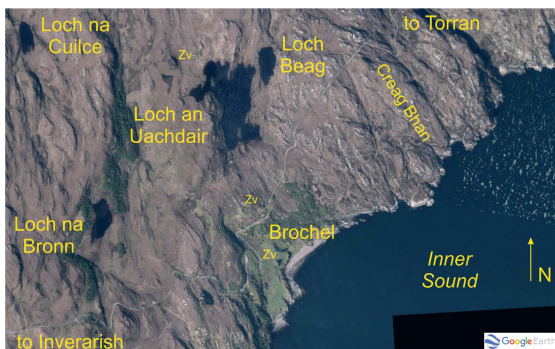


Figure Raasay 1.3: Annotated Google Earth® image of the Brochel area. Zv: breccia (Triassic?).

(a) Take the road north from [Inverarish](#) for 13km (8 miles) to [Brochel](#), where parking is available. [Brochel Castle](#) sits atop an outcrop of structureless breccia. Under no circumstances attempt to gain access to the crags: the ruins of the castle are a scheduled monument and unstable due to their poor state of repair.

Proceed from the road down to the base of the crags.

Locality 1 [\[NG 5846 4627\]:](#)

The subcircular outcrop of breccia below the castle measures c. 75m across and is surrounded by Late Proterozoic ('Torridonian') dark grey, fissile mudstones and siltstones of the Brochel Member (Diabaig Formation), which dip at c. 15° towards the west. The irregular contact of the breccia with the Brochel Member strata is exposed on the north side of the crags. The ruins of [Brochel Castle](#) sit atop the western part of the breccia outcrop and the southern margin is close to the High-Water line of the nearby coast, where the best exposures of the breccia can be examined. The centre of the breccia outcrop is poorly exposed within a depression. The breccia is essentially unstratified and dominated by angular to sub-rounded cobbles and boulders, the latter rarely up to 1m across, of rusty-brown, coarse-grained sandstone very similar to the strata of the Leac-stearnan Member of the Applecross Formation, which crops out c. 300m to the west. The breccia matrix is dominated by silt and mud grade material, with a pale, heterogeneously

distributed carbonate cement. Of significance, there are no clasts of material from the Lewisian Gneiss Complex, which is exposed a short distance to the north and forms most of North Raasay.



Figure Raasay 1.4: The Brochel breccia outcrop, with remnants of Brochel Castle, atop. View is towards the NE.

Return to the road and head c. 300m uphill, to the NW, to the obvious [crag of breccia](#).

Locality 2 [\[NG 5830 4653\]:](#)

This outcrop is perhaps the best exposed and most informative of the three breccia masses preserved in North Raasay. It, too, is oval, with a long axis (E-W) length of c. 70m. Here, the surrounding rocks are part of the Lewisian Gneiss Complex, with Torridonian strata of the Loch an Uach(-dair) Member of the Diabaig Formation unconformably overlying the basement gneiss c. 100m to the west. As with the Brochel breccia outcrop, the margin of this breccia mass is somewhat angular, apparently controlled by the jointed character of the basement gneisses. The clast population within this outcrop is somewhat different to that at Brochel and, although this breccia unconformably overlies the basement, gneiss too is absent.

At the western end of the breccia outcrop, obvious boulder- and cobble-dominated material grades westwards into coherent blocks of stratified shale and sandstone of the Brochel Member of the Diabaig Formation that crops out (i.e. is *in situ*; but is poorly exposed) in the low ground to the south. The dominant well-exposed eastern and southern part of the breccia outcrop is dominated by cobbles and less common boulders of medium- to fine-grained feldspathic sandstones identical to the strata of the Loch an Uach(-dair) Member. The matrix is, similarly, of silt and mud grade material, with a pale carbonate cement.

A gross stratification to the sequence is recognised, highlighted by the present-day weathering characteristics of the breccia, and clast lithology differences within the outcrop. The lowest and highest of the three obvious units within the outcrop are similar in character and comprise poorly sorted cobble and boulder conglomerate, with dominant clasts of medium- to fine-grained feldspathic sandstones (see above). Between these two units is a breccia dominated by angular slab-like fragments of grey shale of Brochel Member

character. The NW margin of the breccia outcrop is exposed where the middle unit, the breccia dominated by grey shale, is in contact with *in situ* granitic gneiss of the Lewisian Gneiss Complex and is dominated by large slabs of coherent grey shale.



Figure Raasay 1.5: The middle breccia outcrop, NW of Brochel. Note apparent dip of the strata towards the east. Boulders within the sequence can be identified from afar. View is towards the NW.



Figure Raasay 1.6: Detail of the middle breccia outcrop, NW of Brochel. Three informal units are recognised and comprise lower and upper units dominated by boulders and cobbles of medium- to fine-grained feldspathic sandstones, separated (in the recess) by a breccia dominated by angular slab-like fragments of grey shale of Brochel Member character. View is towards the NE. Pole c. 1m long.



Figure Raasay 1.7: Detail of the middle breccia outcrop, NW of Brochel. View is towards the NW. Pole c. 1m long.



Figure Raasay 1.8: Detail of the middle breccia outcrop, NW of Brochel. Three informal units are recognised and comprise lower and upper units dominated by boulders and cobbles of medium- to fine-grained feldspathic sandstones, separated (in the recess) by a breccia dominated by angular slab-like fragments of grey shale of Brochel Member character. View is towards the north. Pole c. 1m long.



Figure Raasay 1.9: The NW margin of the middle breccia outcrop comprising disrupted slabs of grey shale (Brochel Member) interbedded with breccia of the same material. At the top of the slope (to the left of the pole) is *in situ* gneiss. View is towards the NW. Pole c. 1m long.



Figure Raasay 1.10: The NW margin of the middle breccia outcrop, comprising disrupted slabs of grey shale (Brochel Member) interbedded with breccia of the same material. To the west (left) is *in situ* gneiss. View is towards the east. Pole c. 1m long.

Continue north over sparse exposures of the Lewisian Gneiss Complex for c. 200m towards [Loch an Uachdair](#). Here, the view towards the north illustrates the difference in character of the topography created by the gneisses and the unconformably overlying Torridonian sedimentary rocks. To the east of the loch, the glaciated gneiss has a hummocky appearance with abundant, dispersed exposures. The overlying strata of the Loch an Uach(-dair) Member of the Diabaig Formation, which dip to the west at c. 20°, give rise to small c. N-S -trending escarpments and dip slopes (towards the west).



Figure Raasay 1.11: View north across Loch an Uachdair, with very poorly exposed (Torridonian) strata of the Loch an Uach-dair Member of the Diabaig Formation around the loch. To the north and east is the outcrop of the underlying (basement) Lewisian Gneiss Complex, comprising abundant discrete exposures of granitic gneiss on the glaciated landscape. The disparity between the low altitude of the Lewisian-Torridonian unconformity along the east side of the loch (where the obvious change in level of rock exposure marks the unconformity) and the presence of gneiss forming the high ground of Beinn na h-Iolaire (in the distance) is due to a significant topography on the 'Lewisian landscape' at the time of Torridonian strata deposition.

Return to the road and, either on foot or by vehicle, continue NE on the road, to a [point due east of Loch Beag](#) (i.e. at the NE end of the obviously straight stretch of road).

The road NE from [Brochel](#) to [Arnish](#) is just under 3km (2 miles) in length and takes a very few minutes to drive. However, the journey will be very much more appreciated knowing how, when and by whom it was constructed.

This stretch of public road was not always so; it was constructed by hand by Calum MacLeod, a resident of Eilean Fladda(y). Between 1949 and 1952 he and his brother Charles constructed the track between [Torran](#) and [Eilean Fladday](#). After several failed petitions to have the public road extended north from [Brochel](#), Calum took the matter into his own hands and undertook the task over the decade 1964-74. Using a wheelbarrow, a shovel and a pick-axe, he constructed the 2 miles of road between [Brochel](#) and [Arnish](#). The only input from the local council responsible for public roads was to supply a

team of workers to blast out some of the road-cuts required to produce a feasible route for the road. The road was subsequently adopted as a public road and surfaced ('tarmaced' or 'black-topped') by the local council in 1982. Known as *Calum's Road*, there is a sign in Gaelic and English and a commemorative cairn at the [Brochel](#) end of the road. There is also a helpful road sign to warn drivers about potential hazards.



Figure Raasay 1.12: The beginning of Calum's Road (Rathad Chalum) at Brochel.

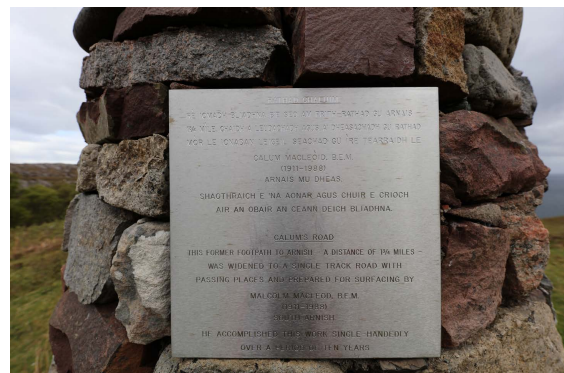


Figure Raasay 1.13: Cairn celebrating the achievement of Calum MacLeod's building of the road between Brochel and Ardnish in north Raasay.



Figure Raasay 1.14: Calum MacLeod, armed with pick-axe and wheelbarrow during the construction of the Brochel to Ardnish road.



Figure Raasay 1.15: Road sign on the Brochel to Ardnish road, warning of a potential hazard.

From the NE end of the obviously straight stretch of road at [\[NG 5889 4725\]](#), walk due west to the north end of [Loch Beag](#) over poorly exposed gneiss of the Lewisian Gneiss Complex. To the west, the unconformably-overlying (Torridonian) Loch an Uach(-dair) Member of the Diabaig Formation forms a series of N-S -trending ridges due to the westward dip of these strata. Many of the exposures of these sandstones and siltstones display spectacular examples of soft sediment deformation, whereby the laminae of the strata are highly distorted. Such features can be attributed to seismically-induced liquefaction.



Figure Raasay 1.16: Distorted laminae within Loch an Uach(-dair) Member feldspathic sandstones, immediately NW of Loch Beag. Pole c. 1m long.



Figure Raasay 1.16: Distorted laminae within Loch an Uach(-dair) Member feldspathic sandstones, immediately NW of Loch Beag. Pole c. 1m long.

Continue west, around the northern side of [Loch an Uachdair](#), to the obvious isolated mound of breccia at [\[NG 5802 4726\]](#).

Locality 3 [\[NG 5802 4726\]](#):

This outcrop is c. 20m across and is best exposed on the east side. As with the other two breccia outcrops, the dominant clast lithology of the boulders and cobbles is medium- to fine-grained feldspathic sandstone, identical to the strata of the Loch an Uach(-dair) Member, which, for this breccia outcrop, is the surrounding lithology unit. The surrounding *in situ* exposures of the Loch an Uach(-dair) Member include beds of coarse feldspathic sandstone and grey shale. As with the other two breccia outcrops, the matrix is silt and mud grade material, with a well-developed pale carbonate cement.



Figure Raasay 1.18: The unstratified breccia outcrop, NW of Loch an Uachdair. The surrounding Torridonian strata of the Loch an Uach(-dair) Member (Diabaig Formation) are exposed on the left (SE) and right (NW, in shade) side of the mound. In the distance is the escarpment of Paleocene basaltic lavas on the east side of Trotternish on Skye. View is towards the NW.



Figure Raasay 1.19: Detail of the near-vertical contact between the breccia (left) and the Loch an Uach(-dair) Member (Diabaig Formation) strata (right) on the NW side of the mound. Pole is c. 1m long and is located on the Loch an Uach(-dair) Member strata, close to the contact.



Figure Raasay 1.20: Detail of the breccia, with sub-rounded to sub-angular blocks (clast-supported) of feldspathic sandstone in a dominant carbonate cement, together with minor silt and mud grade material in the block matrix. Coin c. 24mm across.

Return eastwards to the road and continue NE towards Arnish.

(b) Before reaching the end of the road, if travelling by car, park in the area on the right-hand-side (east) of the road before the hairpin bend [[NG 5907 4748](#)]. Continue northwards on foot, with care, around the hairpin bend to the stretch of road with a large cutting on the right (east) side at [[NG 5912 4775](#)].

Locality 4 [[NG 5912 4775](#)]:

Here, excellent fresh exposures of the Lewisian Gneiss Complex, which forms the basement of much of NW Scotland, can be examined. As with all roadcuts, sensible care should be exercised.



Figure Raasay 1.21: General view of the Lewisian Gneiss Complex of north Raasay. The large roadcut on Calum's Road, north of the hairpin bends SE of the bay of Tairbeart, provides an excellent fresh exposure of granitic gneiss with thin layers of amphibolite. In the distance is Beinn na h-Iolaire (Hill of the Eagle).

The main lithology within this rock-face is granitic gneiss, with thin (decimetre scale) alternating layers or bands: dominant orange layers, with quartz and alkali feldspar; and subsidiary dark green layers, with amphibole, biotite and plagioclase. The other lithology within the rock-face is dark green amphibolite, dominated by amphibole,

biotite and plagioclase, forming layers (with minor amounts of granitic gneiss) up to 1m thick.

Folds within the outcrop indicate multiple deformation events, but are not easily correlated, even over short distances. Other evidence of deformation includes the formation of boudinage, whereby the more competent (or rigid) amphibolites have been deformed, producing sausage-shaped masses with lens-shaped profiles on planar rock faces.

These Raasay (and [Rona](#), to the north) outcrops of Archean gneiss are part of a southern region of retrogressed gneisses that form the basement to the Scottish continental crust. The original gneisses, preserved further north on the Scottish Mainland around [Scourie](#) and [Gruinard Bay](#), were formed at high pressure and temperature, the so-called granulite facies of metamorphism. A subsequent (later) metamorphic event produced the retrogressed, or modified, gneisses, formed at a lower pressure and temperature, the so-called amphibolite facies of metamorphism, such as those on Raasay and Rona.

The granitic gneisses are interpreted as having a magmatic origin, comprising large tonalite, trondhjemite and granodiorite plutonic intrusions. The amphibolites have a bulk composition similar to that of tholeiitic basalt and are interpreted as having been dykes emplaced during a later magmatic event.

The intricacy of the rocks in this road-cut indicates the complexity of their formation during some of the oldest recorded events in Scotland's geological history.



Figure Raasay 1.22: Basement gneiss, with dominant granitic gneiss comprising thin interleaved quartz-alkali feldspar and amphibole-biotite-plagioclase layers and discrete dark layers of amphibolite (amphibole-biotite-plagioclase). In the middle of this view is a boudinaged mass of amphibolite. Pole c. 1m long.



Figure Raasay 1.23: Basement gneiss with dominant granitic gneiss comprising thin interleaved quartz-alkali feldspar and amphibole-biotite-plagioclase layers, and discrete dark boudinaged layers of amphibolite (amphibole-biotite-plagioclase) (middle and centre top of view). In the middle of this view is a (disrupted) folded layer of granitic gneiss. Pole c. 1m long.



Figure Raasay 1.24: Basement gneiss with dominant granitic gneiss comprising thin interleaved quartz-alkali feldspar and amphibole-biotite-plagioclase layers, and discrete dark boudinaged layers of amphibolite (amphibole-biotite-plagioclase). Pole c. 1m long.

Continue to [Arnish](#) at the end of the public road [\[NG 59940 4800\]](#). Parking is available on the west side of the road. Take the signposted track towards [Torran](#) and [\(Eilean\) Fladday](#) through the wooded area, past two cottages at [Torran](#): behind the first and in front of the second. Where the track splits, take the left-hand fork.

Along this part of the path, the basal unit of Torridonian strata, the Torran Member, is exposed. It comprises dark red, coarse sandstones, locally a breccia or conglomerate, with fragments of gneiss derived from the (subjacent) basement Lewisian Gneiss Complex. These deposits most likely accumulated as fan deposits on the sides of palaeo-valleys.



Figure Raasay 1.25: Breccia/conglomerate of the Torran Member (Diabaig Formation), comprising sub-angular to sub-rounded clasts of granitic gneiss in a matrix of similar comminuted material. Coin c. 24mm across.

Continue northwards to where the tombolo (at [\[NG 5908 5039\]](#)) separating Raasay and [Eilean Fladday](#), comes into view.

Locality 5 [\[NG 5908 5039\]](#):

Path-side exposures of the Torran Member breccia/conglomerate occur close to the Raasay coast, whereas on the opposing coastline of [Eilean Fladday](#), Brochel Member laminated siltstones and fine-grained sandstones of lacustrine association are exposed at low tide. The overlying Loch an Uach(-dair) Member medium- to coarse-grained sandstones contain uncommon pebbles of granitic gneiss and accumulated in a complex fluvial channel system.



Figure Raasay 1.26: The tombolo between Raasay and Eilean Fladday. Adjacent to the coast-parallel path on Raasay in the middle foreground, breccia/conglomerate of the Torran Member crops out.



Figure Raasay 1.27: Breccia/conglomerate of the Torran Member (Diabaig Formation), comprising sub-angular to sub-rounded decimetre-size clasts of granitic gneiss in a matrix of similar comminuted material, adjacent to the coast-parallel path on Raasay, SE of the tombolo. Pole c. 1m long.



Figure Raasay 1.28: The east coast of Eilean Fladday, south of the tombolo. In the foreground, within the intertidal zone, are grey laminated estuarine siltstones of the Brochel Member, overlain by the orange cliff-forming Loch an Uach(-dair) Member medium- to coarse-grained fluvial sandstones.

Paleocene dolerite dykes of the NW-SE -trending dyke swarm occur within the Torridonian strata.



Figure Raasay 1.29: Near-vertical Paleocene dolerite dyke within Brochel Member strata on the east side of Eilean Fladday, adjacent to the tombolo. Note zig-zag path providing access to the higher ground to the left of the dyke. The path continues through the notch on the

skyline, left of a continuation of the dyke. View is towards the NW.



Figure Raasay 1.30: Lacustrine laminated (fissile) siltstones and shales of the Brochel Member. Pole c. 1m long.



Figure Raasay 1.31: Fluvial cross-stratified medium- to coarse-grained feldspathic sandstones of the Loch an Uach(-dair) Member, adjacent to the path where it passes through the notch beside the Paleocene dolerite dyke. Pole c. 1m long.



Figure Raasay 1.32: Detail of fluvial (cross-stratified) medium- to coarse-grained feldspathic sandstones of the Loch an Uach(-dair) Member, adjacent to the path where it passes through the notch beside the Paleocene dolerite dyke. Note uncommon small clasts of granitic gneiss. Coin c. 24mm across.

Return across the tombolo to Raasay and head south for a short distance to where a path (at [\[NG 5912 5019\]](#)) leads off, uphill, towards the east. Take this path, which flanks the south side of [Beinn na h-Iolair](#), over ground consisting of abundant (but isolated) exposures of granitic gneiss. Examination of the exposures north of the path reveals the variability and complexity of the gneiss, with folded granitic gneiss and amphibolite. Pegmatites are uncommon but can be identified relatively easily.



Figure Raasay 1.33: Typical complexly folded granitic gneiss on the southern slopes of Beinn na h-Iolair. Pole c. 1m long.



Figure Raasay 1.34: Typical complexly folded granitic gneiss on the southern slopes of Beinn na h-Iolair, with a tabular granitic pegmatite. Coin c. 24mm across.

Where the path splits, (at [\[NG 5969 4978\]](#)), the left-hand (north) fork leads north towards [Rona](#), whereas the right-hand (south) fork leads south to [Torran](#). Close to this junction in the path, there is a spectacular exposure of folded banded gneiss, with contrasting pale granitic and dark mafic (amphibolite) layers.



Figure Raasay 1.35: Exposure of folded, banded gneiss, with contrasting pale granitic and dark mafic (amphibolite) layers. Exposure is located near to the point where paths are signposted towards Rona, Torran and Fladda. Pole c. 1m long.

The path towards Rona ends at [Eilean Tigh](#), another tidal island linked to Raasay by a tombolo. It is a long path and is best left for another day. The route is solely over gneiss of the Lewisian Gneiss Complex, but provides rewarding views of North Raasay, and ultimately [Eilean Tigh](#) and [Rona](#).

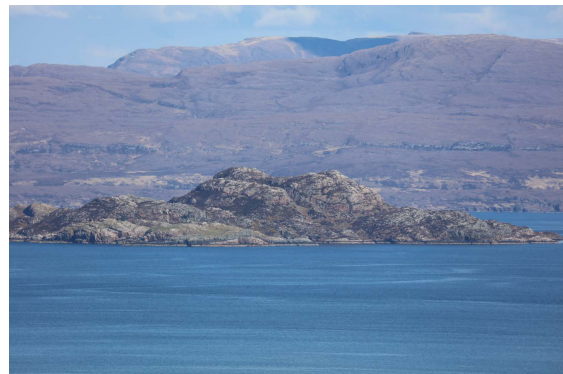


Figure Raasay 1.36: Eilean Tigh, composed of the Lewisian Gneiss Complex. View is towards the east from Trotternish (on Skye), with the northern part of the Applecross peninsula of the Scottish Mainland in the distance.

Head south and downhill along the path through lightly wooded ground to [Torran](#) and then on to [Arnish](#).

End of excursion.