North Skye 4:

The Loch Cuithir Diatomite deposits

Diatomite (diatomaceous earth, or 'kieselguhr') is the remains of diatoms, single-celled aquatic algae composed of silica that can accumulate in fresh-water loch (lake) sediments. If no other material is deposited, very pure deposits can form. It is green when wet and white when dry and processed. Diatomite can absorb up to three times its weight of water. Consequently, after processing, it has a wide variety of commercial applications: a stabiliser for explosives; filters; very mild abrasives; insecticides; thermal barriers; and various agricultural products. On Skye, diatomite was discovered at a few locations in north Skye in 1886 and exploited by the Skye Diatomite Company from 1899. Production finally ceased in 1960.

Discoveries of diatomite on Trotternish were made at Digg, Sartle and Kilmuir, with the most extensive being at Loch Cuithir, below Flasvein on the inland lava escarpment. The deposits accumulated on Quaternary glacial moraines during the Holocene Epoch, during a period of relative higher temperatures; however, the presence of overlying peat, which has formed during subsequent less mild and wetter conditions, suggests that diatomite is no longer accumulating.

All that is left of this industry that employed up to 50 people are remnants of the narrow gauge (2 foot/60cm) tramway that ran parallel to the Lealt River, and derelict brick buildings at Loch Cuithir and at Inver Tote on the coastline, from where the processed diatomite was shipped out. Peat was cut during the winter months to facilitate the kiln drying process.

Locally known as *caile* (Gaelic, chalk), the diatomite was dried on wire nets at Loch Cuithir and then transported, initially on horseback, but subsequently via a gravity-driven tramway, first by manpower and later using a stream locomotive. Once transported to Inver Tote, the diatomite was kiln dried, ground and calcined (to remove carbonate and any organic material). It is estimated that *c.* 2000 tons of diatomite were extracted.

The Loch Cuithir diatomite is very pure, with over 96% silica (SiO_2) and little or no interlayered silt or mud. The absorptive value of the material is over 3.56 (a good diatomite would have an absorptive value greater than 4.0).

An article in *The Scotsman* newspaper, published in 1887, describes the construction of the extraction and processing infrastructure. It also describes how the loch was drained via the formation of a 300m long cutting, 4m wide and 4m deep.

The diatomite formed a layer just 0.5m below the surface, extending to a depth of *c.* 8m, and was cut using a peat spade into blocks and hand-barrowed to the drying sheds.

One account of the activity was recorded by Dr J. A. MacCulloch, Rector of Saint Columba's in Portree. His report was prepared from observations made on one of the boats that collected the diatomite:

'A drying and grinding factory has been erected at the water's edge; great sheds stand on the upper slopes at a precarious angle; while a miniature railway, a continuation of one which runs inland to the diatomite beds, connects the edge of the cliff with the landing-stage and factory far below. When we arrived the work-people were all at the loch and there was scarce a sign of life round this lonely bay. But presently a long train of men and women began to zigzag down the path on the face of the slope and transformed this solitude into humming activity. They must get the cargo embarked while the tide served. Each one carried a bag of diatomite from the grinding-house to the boat slip, till the coble was piled up with sacks. Then it made a slow journey to the steamer, where the sacks were transferred to the hold. Meanwhile a second coble was a-filling, and so all day long, for there were hundreds and hundreds of sacks to be removed, the work went steadily on.'

Production was significant during the First World War and intermittent thereafter. Production finally ceased in 1960. A feasibility studied at the end of the 1960s concluded that a restart to extraction was uneconomic.

Stornoway Gazette (05 03 2008) – In the Trotternish area of Skye, taking the Staffin road out of Portree, travellers will pass the Storr Rock, and then after continuing a further five miles or so, arrive at a lay-by near a gorge with a sign pointing off to the left, indicating the small community of Lealt. There is a lot more to this area than first meets the eye, and it's all down to a substance called Diatomite and even a brush with German espionage. Known to the locals as 'Caile' (Gaelic for chalk), Diatomite is a clay-like floury grey substance, found in certain freshwater lochs and suppling many minerals used in the production of numerous products, ranging from beverages, sugars and cosmetics to chemicals, industrial oils and paint. Trotternish was home to two mining areas – one in Digg, Staffin, and the other at Loch Cuithir in Lealt. Although little is known of the Digg mine, where production ended sometime after the First World War, it is the history of the Loch Cuithir mine which is of interest.

Work began at Cuithir in 1899 and finally ceased over six decades later in 1960. Over the years, the mine saw periods of inactivity, but when up and running operations made use of the large industrial works at the area – a large factory building, a railway with embankment cuttings, and a rolling stock traversing three miles of landscape, including an aerial ropeway. The light railway was used to transport the Loch Cuithir Diatomite to the shores at Invertote for a final drying and grinding, and a large building containing a furnace, grinding machine and storage space was constructed there for this purpose. Such modernised business works were quite remarkable for this part of the world at the time. In those days there was no road between Staffin and Portree, so a puffer boat would anchor in the bay at Lealt, and local skiffs were used to transport the finished Diatomite from shore to boat, ready for shipping to the mainland. There were around 40 to 50 people steadily employed at Lealt, yet on days that the boat came in this total rose to as many as 80 workers. Perhaps one of the most intriguing aspects of the mine's history comes from the ownership of the drying factory at Invertote by Germans. Although closed during the period of the Great War, surprisingly the now enemy foreign residents were allowed to stay on. Shortly afterwards a rumour began to circulate that the area was haunted and that the ghost of a recent tragic death at the Lealt falls had appeared at the factory. As the local story goes, (the rumour was actually started by the Germans) with the intent of keeping locals away. It turned out that the resident Germans were spies and that, almost unbelievable to the community, the area was being used as a German base with submarines surfacing in the sea bay! Moving on, the year 1950 saw the next development in the mining of Diatomite from Loch Cuithir. As the loch was one and a half miles up the moor, through peat bogs and rivers, the Department of Agriculture and Fisheries for Scotland (DAFS) decided that a road should be built, with the intention of extracting the Diatomite by digger, and then taking it to the Lealt road end above Invertote. The road took around a year and a half to build, during which the mine was put out of operation. Yet, when production started again, the new method of extraction did not reach the high standard of quality which was achieved when extracted manually by spades. The mechanical extraction resulted in the Diatomite being less pure, and full of unwanted dirt. Drying the substance is, in fact, the problem of the process, for it is obvious that in a damp climate like Skye, the diatomite does not lose its moisture quickly. The problems which began after the construction of the 1950s road were further highlighted and compounded six years later. A new factory was built at Uig (the site where the Cal Mac offices are now situated), far from the mining site at Loch Cuithir, and it may be said that this move was the ruining of the entire Diatomite industry upon Skye. As Diatomite was no longer dried at Invertote it now had to be transported by road, wet, for the much-needed drying process to Uig, 23 miles away. A vehicle may have left Loch Cuithir carrying five tonnes of Diatomite, yet only producing one tonne of the finished product after drying had taken place – a finished product which was also not as pure as it ought to be for the specialised work it had to do in various products. A lot of money was wasted on travelling, and within the factory itself, inefficiency was also present, with machinery often breaking down due to the damp state of the Diatomite. Outside the factory, the scenic communities of Trotternish also began to suffer. When the factory was working, it poured out a fine white dust which covered every house in the area. Grass became chalky in colour and after dry spells in the weather, the road-sides from Staffin to Uig would turn white with Diatomite – Uig was constantly under a cloud of dust. With complaints of insubstantial profits and bad management, the factory was finally closed to production for the last time in 1960. Yet, although the Diatomite mining industry on Skye came to an abrupt ending, it was still regarded by many locals as a blessing at the time. Following from World War One, the industrial works provided employment for many returning men who could not find work elsewhere in the island. And at peak production, around 1955/56, 50 to 60 men were paid good wages to work at the factory.

Aspects covered: a Quaternary age diatomite deposit; landslipped material; Paleocene plateau lavas.

Route: Lealt - Loch Cuithir (- return Lealt).

Distance: 10 kilometres on rough road (return journey from Lealt to Loch Cuithir), plus 1km on foot.

Time: 2-3 hours (if Loch Cuithir is accessed by vehicle, or 7 hours if accessed on foot).

General comments: The workings of this deposit are still visible, although, unfortunately, the remaining, unextracted diatomite is under several metres of water in Loch Cuithir. This excursion has more of an industrial heritage content and is only suitable for vehicular parties if they decide to access the loch via the rough (but partially metalled) road/track. Remnants of the processing plant are located on the north side of the Lealt River (Abhainn an Lethuillt) where it flows into the Sound of Raasay at Inver Tote. Access to the coast is by a steep but good path from the east side of the public road.

The Lealt turn-off is located 18km (11 miles) north of Portree and 11km (7 miles) south of Staffin on the main (A855/A835) coastal road of north Skye.

Parking is available on the seaward side of the (A855/A835) road north of the Lealt River. Follow the minor road signposted Lealt, west (inland), through the settlement of Lealt, for 5km (3 miles) to the east side of Loch Cuithir. Beyond Lealt, the poor quality track/road was built in 1950 specifically to transport the diatomite to the public road and thence to Uig. It is suitable for vehicles if care is exercised, which should be assessed at the time. Caution is advised in the vicinity of the loch - it is deep, and the surrounding area is, in places, marshy.

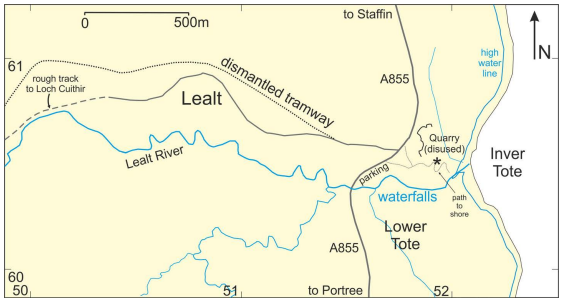
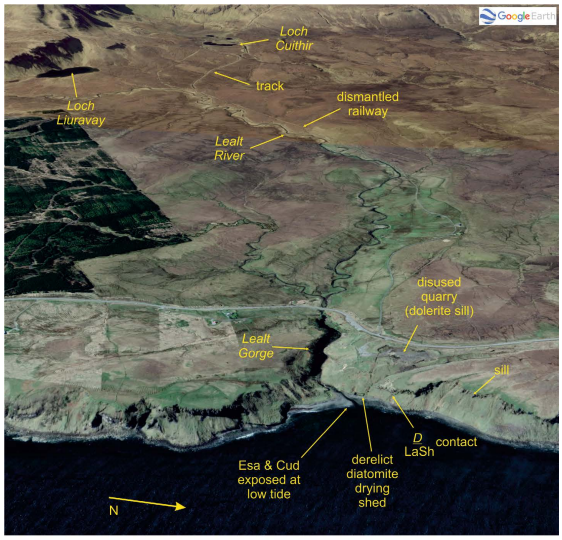


Figure North Skye 4.1: Location map for Loch Cuithir - Lealt - Inver Tote area.

En route, remnants of the narrow gauge (2 foot/60cm) tramway, constructed to transport the diatomite to the coast, can be observed close to the rough track.



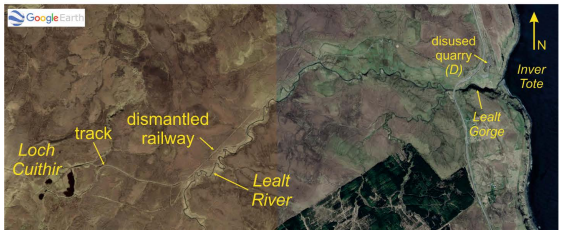


Figure North Skye 4.2: Annotated Google Earth® images of the Loch Cuithir – Inver Tote area. Cud: Cullaidh Shale Formation; Esa: Elgol Sandstone Formation; LaSh: Lealt Shale Formation.

Figure North Skye 4.3: Trace of tramway between Loch Cuithir and Inver Tote.

Figure North Skye 4.4: Remains of extraction plant at Loch Cuithir.

Figure North Skye 4.5: Loch Cuithir, viewed towards the west.

Locality 1 [NG 4759 5962]:

Loch Cuithir is located upon landslipped material, which overlies Jurassic strata blanketed by peat and morainic glacial deposits containing boulders, gravel and sand. Peat formation post-dates the accumulation of the diatomite in the loch.

Only parts of these diatomite workings remain. Some of the brick buildings, together with the line of the tramway used to transport the diatomite to the coast, are still obvious. The diatomite occurred as a 3–6m thick layer below a less than 1m thick covering of peat. The loch had an original area of 60 hectares (24 acres) and was drained

in order to extract the diatomite. Ditches, around the perimeter of the loch, were excavated and the water was drained through a man-made outlet at the northern end of the loch, thus allowing removal of the peat and extraction of the diatomite. East of the drainage outlet are spoil-heaps, mostly of plateau lava boulders, presumably removed from the workings during excavation.

This locality also provides a spectacular view of the Paleocene plateau lavas of the Beinn Edra Formation. These lavas crop out on the Flasvein - Creag a' Lain - Sgurr a' Mhadaidh Ruaidh escarpment and dip at a shallow angle towards the west.

Return to the main road.

Locality 2 [NG 5161 6041]:

From the roadside parking area, it is a short walk to the river viewpoint, which provides excellent access to see the two dramatic waterfalls and gorge of the Lealt River. The total drop in elevation is *c.* 90m. The top of the waterfall is at the contact of the Middle Jurassic strata with an overlying Paleocene dolerite sill and a similar dolerite sill forms the lower half of the fall.

The Middle Jurassic Lealt Shale Formation of the Great Estuarine Group has its type-locality in a section of the Lealt River, specifically from the (new) road bridge, downstream to the top of the dolerite sill that is responsible for the main waterfall. The sequence is dominated by shales and thin limestones (some of both shelly) and a stromatolite bed. These strata are not easily accessed here, and similar sequences are available elsewhere that can be safely investigated in detail (for example **Strath 5**).

Figure North Skye 4.6: Viewing platform on the north side of the Lealt River, east of the A855 road.

Figure North Skye 4.7: The main waterfall on the River Lealt, east of the A855 road, with a sequence of interbedded Lealt Shale Formation shales and limestones, above and below which are dolerite sills.

Figure North Skye 4.8: Detail of the main waterfall on the River Lealt, east of the A855 road, with a sequence of interbedded Lealt Shale Formation shales and limestones, above and below which are dolerite sills.

Locality 3 [NG 5189 6048]:

The coastal viewpoint offers an excellent panorama of the Sound of Raasay and the island of Rona (Ronaigh) at the northern end of Raasay. There is a useful information board at the viewpoint.

Figure North Skye 4.9: Information board at the Lealt River coastal viewpoint.

Follow the path that zig-zags down to the coast at Inver Tote, on the north side of the Lealt River.

Figure North Skye 4.10: Remains of diatomite processing plant at Inver Tote. The brick structure with chimney was a kiln used to calcine (heat treat, driving off CO_2) the diatomite and the stone building beyond was a drying shed.

Figure North Skye 4.11: Remains of diatomite processing plant at Inver Tote. The brick structure with chimney was a kiln used to calcine (heat treat, driving off CO_2) the diatomite and the stone building beyond was a drying shed.

Return to parking area.

End of excursion.