

## **SHETLAND GEOLOGY, TWO SNIPPETS**

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The whole of the Shetland Islands are a geopark which has been financed by the Shetland Amenity Trust which handles the hydrocarbon royalties and which has set up the superb web site at [www.shetlandamenity.org/geopark-shetland](http://www.shetlandamenity.org/geopark-shetland)

They produce many excellent geology guides and trails, on line and on paper and publish a good and inexpensive paper geology map obtainable at Lerwick museum.

### **Eshaness**

I had a guide for the Eshaness volcanics which certainly aided not only understanding but navigation. The Eshaness peninsula is in the north west of Mainland, the main island. The volcanic rocks were laid down 393-383million years ago in Devonian times and must be the most superb example of vulcanism in UK (Fig 1). There is car parking and an information board at the lighthouse and one of the vents is just seaward of that. The vent breccia has weathered to give loose debris on the bare surface and parts of the vent wall and the cooled remains of earlier eruptions are clearly visible. The strong winds preclude vegetation. This is a very high energy coastline with stacks off shore and the andesite cliffs weather into angular shapes with blowholes and geos. The adjacent



**Fig 1, Eshaness Cliff Volcanics**

Calders Geo clearly shows the layers of lava flows and pillow lava in the cliffs.

The path heads north keeping in land with the coast only occasionally visible. Storms throw rocks over the cliff top and strip off the vegetation. As the Grind o da Navir is approached the rocks are paler, red and pink, and what looks like a stone storm beach ridge is visible, but this is on top of the cliffs. Indeed that is what you see as blocks of ignimbrite have been tossed and churned round by the sea which enters by the *grind*, a gateway, with higher rock on each side. The whole structure resembles a bowl with rather angular stepped sides. This pyroclastic deposit has elongated particles of pumice from the original flow. The landform I could not explain until it was suggested that this was a Bronze Age quarry. On the return path to the car by a different route we passed the Hols o Scradda which is a partially collapsed sea cave into which a small stream runs. That stream in the past had powered three Norse mills, simple water mills which use a vertical fall to turn a wheel directly. I have seen a restored one in working order in Lewis. The remains of the Broch of Houllard are made of ignimbrite which must have been quarried over a mile away. This was probably constructed about 200BC. This is definitely only a fair weather trip and route and I am indebted to Allen Fraser who took us round, explained clearly and answered my questions.

### **Unst**

Unst was a must. There on the most northerly island, is found the most northerly hotel, brewery, distillery and inhabited dwelling in U.K. The Heritage Centre has an excellent museum and 1:25,000 geology map specially produced by BGS to thank the islanders for letting them go everywhere for 50 years. I bought the guide to the ophiolite and went next door to the Tea Room to dip into it. This island has all the essentials.

When the Iapetus Ocean was closing about 420 million years ago a section of the ocean crust was caught and thrust on top of the North American crust. This ophiolite forms the east side of Unst, but was folded then eroded so this is one of the best locations to see these details. With limited time and some bird watching to fit in; 60,000 gannets are quite something, I concentrated on one small area within walking distance of Baltasound where we stayed. I wanted to stand on the

Moho.

Hagdale is composed of dunite, formed in the lowest part of a magma chamber. It is mostly olivine but with streaks of chromite. Quarrying chromite was important in Cl 9th and the horse drawn crushing circle is restored and explains the process although the quarry is now mostly infilled (Fig 2). The descent to the shore is wet. To the north the two craggy hillocks are the Heogs which are made of harzburgite, soft olivine and harder orthopyroxene. If I could trace the boundary between these two rocks I would have found the Moho. I had a guide, map and compass. I followed the directions, took careful bearings, tried again, and compared the picture in the guide of the junction. We'd found it, but with weathering both were the same colour and the mixing no longer showed clearly.



**Fig 2, Horse Mill, Mavis Grind**

Immediately above the old chromite quarry is found the Keen of Hamar. This is a National Nature Reserve and S.S.S.I. (Fig 3)

<http://www.nature-shetland.co.uk/snh/hamar.htm>

The north facing slope comprises small stones and few low plants. There is active patterned ground on the serpentine debris and a few specialised flowering plants including the endemic Edmondston's chickweed. The cattle corridor has more normal hillside vegetation and seaward there is a sparse covering of soil, whether loess or till was unclear. Why was this site un-vegetated? Had it been cleared in a search for chromite? Do the heavy metals poison the plants, or is there a shortage of other nutrients? Ironically there is a shortage of water. While there is ongoing research this remains a puzzle. In the second week of May very few of the sparse plants were ready to

flower.

We took our car on the boat for Aberdeen. I booked all accommodation the day the ferry bookings opened. Large parties need to book a year in advance. With only one cloudy day during our stay we were fortunate and split our time between geology, birdwatching, archaeology and walking. Information is excellent and easy to find. Roads are excellent and ferries subsidised. You cannot miss the oil industry. I cannot recommend a visit to Shetland highly enough.



**Fig 3, Mavis Grind**