

similar climate, and many of the marginal lacustrine sediments are similar to those now being deposited along the Trucial coast of Abu Dhabi.

With clouds gathering and a cool wind blowing off the sea, the fieldtrip came to an end.

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## Why is flint found in Islay?

by Isabel Buckingham

In 1979 an archaeological dig at a Bronze Age site on the island of Islay unexpectedly found a flint assemblage from a location where flint had been worked. As Ireland is the nearest land, they assumed that was where the flint and possibly the people had come from. Over the years a mix of random chance, observant crofters and deliberate searches has revealed more sites and information well summarised in ScARF South Hebrides Mesolithic Project.

While there was some contact with Ireland there are stylistic differences in the microliths and it is now known that the Mesolithic was found not only on the west and east coast of Scotland but inland in the Tweed valley, Aberdeenshire and to Orkney and Shetland. In Scotland stones are used locally and apart from an occasional high status object they are worked and used where found.

In Islay the sites are only in the Rinns on or near the west coast. Some sites show recurrent use and charcoal

has given dates of 7250  $\pm$  45 BP, 7930  $\pm$  59 BP. These sites are near where flint is found in *diamictons* a convenient word that avoids stating whether this is till, or ice drop deposit. These deposits are only found on the Rinns which is part of the puzzle. High level glacial deposits to a height of <60m OD have yielded dates by Thermoluminescence of 53.9ka BP to 41.4 ka BP while those lower at Kilcairn gave >150ka BP. These flint and chalk erratics are totally absent from the more recent fluvo glacial deposits to the east on the Rinns or the low area joining Loch Indaal and Loch Gruinard which only became land about 2ka BP.

These are four possibilities:

Chalk exists in N Ireland but is largely covered by extensive Tertiary Basalt flows. It is only exposed along the coast. Did people transport this to Islay? That was the earlier assumption but the sea is stormy with strong tidal currents and the stylistic differences and other evidence make this unlikely.

Could chalk with flint have been plucked from N Ireland and moved north? Conventional thinking has the Irish and Scottish ice sheets joining and flowing to the edge of the continental shelf. The Donegal-Barra fan is interpreted as debris flowing from the ice. As the distinctive Ailsa Craig granite is found in the South West of England it is assumed the flow was southwards. However there is one possibility that this may have happened once.

Some chalk is still found in a tiny area of Skye. All striations show an east to west movement. Doubtless there were several cycles of erosion and deposition. Flint gravels are found near Buchan, and SW of Peterhead on hill tops up to 100m above sea level. They were worked in the Mesolithic, and suggest a widespread now remover Cretaceous cover.

Further east? Chalk fragments in a volcanic vent in Arran are well attested. There is the large Loch Gruinard fault on the east side of the Rinns which is a branch of the Glen More fault. It may be a half graben. There is a down throw to the east. Could Cretaceous rocks be found in the bed of Loch Indaal?



Fig. 1: Kilchairan storm beach

Attempts are boring have not yet given an answer, as 30m of estuarine mud overlies clay, but it is easy to see how glacial erosion would differentially remove a soft rock.

I searched and found water worn flint on Kilchiaran storm beach NR202601 (fig. 1). The island Heritage Centre at Port Charlotte has a large smooth lump of chalk with an embedded flint. Softer debris is pushed into the surface.

#### Present Situation:

I went with an open mind and two guides. I am familiar with the Uists but had not been to Islay before. The coast is a high energy environment and the present coast line seems to date from about 2,000BP when land was created between the Rinns and the remainder of the island. The date is from bore holes in the flat bog south of Loch Gruinard. There are strong tidal currents of <8 knots in the Sound of Islay and these flows create a standing wave off the Mull of Oa and the west entrance to Loch Indaal. There is a westward extending spit developed at the entrance to Loch Gruinard which is driven by tidal currents.

All west, north-west, and south facing beaches have well marked stone cobble storm beaches which are active and expanding. There are well developed and dynamic sand dune systems with some seaward erosion and active creation of fore dunes. There are blowouts and the creation of machair inland. These effectively hide what is beneath except along stream courses or where slippage has happened. Sphagnum Peat growth is active in the lowlands inland from Loch Gruinard, around Loch Gorm and blanket bog is found inland.

At a casual glance at the scenery shows all the features of moulding by ice and a further confusing mix of fluvo glacial features. Unravelling this is a work in progress, and I resorted to first principles.

The amount of crustal depression resulting from ice sheet loading is a function of ice thickness and the different density between ice and rock, which is normally about 1/3. Normally the amount of depression is highest in the centre of the ice sheet where it is thickest. The marginal depression extends to 150-180kms beyond the margin of the ice sheet depending on the plasticity of the rocks. Islay is an area of much faulted old rock and evidence is found at different heights in different locations.

Tectonically stable parts of the world, such as Bermuda are used to study sea level fluctuations and these show that sea level has only been higher by 2m in an interglacial 200kaBP and in the last interglacial at 5-6m. U-Th dates of fossil coral show that sea level was 121 +/- 5m lower during the last glacial maximum, rising to 60m about 10,000BP. The late glacial sea level rise was interrupted by two major freshwater pulses at 14,000 BP and 11,000BP giving the Lake Windermere Interstadial and Loch Lomond Interstadial when ice reformed during these Heinrich events.

The oldest lowest diamictons on the west side of the Rinns is up to 62mOD with the chalk and flint only in



Fig. 2: Icedrop deposit matrix sand not clay silt



Fig. 3: Ice striated mudstone.

the lower layers exposed at Kilchiaran NR204601. The gravel and sand beds had no visible orientation and occasional coarse sand lens. There seemed no fine material. I had no disagreement with an explanation that this was deposited in the sea below melting ice. (fig. 2) I managed to find water worn flint by searching the storm beach. Higher up in the same valley marked striations in Colonsay metamudstone were clear showing the east-west direction of ice movement (fig. 3).

Much of the deglaciation of west and central Islay seems to have occurred when sea level was at 22mOD. There is one marked east- west esker just north of Sutherland farm NR250655. Expensive outwash sands and gravels are exposed east of Saligo NR 213664 (fig. 4) and at NR231673 (fig. 5) where they have been worked. The sand martin burrows mark the sand lens. No flints are found. Studies in the area between Loch Gruinart and





Fig. 4: Fluvo glacial outwash 27m above sea level.



Fig. 7: NW dip in quarry behind Cnoc Iolaircan



Fig. 5: Finer outwash about 300m east of previous



Fig. 8: Contorted beds with ice wedge and sand martin

Loch Indaal show that apart from one previous brief interlude the Rinns only became joined to the rest of Islay about 2,000BP.

Peat has developed over estuarine mud. There is a very strange arcuate moraine just inland at the head of Loch Indaal. It has an undulating top <29m at Cnoc Iolaircan NR287635 (figs. 6, 7 & 8) which has conveniently been quarried for sand and gravel. The beds dip to the north west and are well bedded, with varied cobbles and very fine sand. The interpretation is deltaic forests. The lowest part is highly contorted, with sand martins using the silt parts. Could this have been affected by permafrost? The edge is overturned. Was there a tongue of ice in what is now Loch Indaal, or a large mass of ice pushed by a storm? Was this a “dead ice” feature? As no flint is found there either, the suggestion of Irish ice

seems less likely. *Hint in Google Earth use the previous date facility to see clearly.*

On the very unsatisfactory grounds that others theories are discounted, that only leaves the as yet unproven source of chalk as the now eroded deposits further east, possibly down faulted in Loch Indaal.

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Fig. 6: from Cnoc Iolaircan looking east along ridge

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