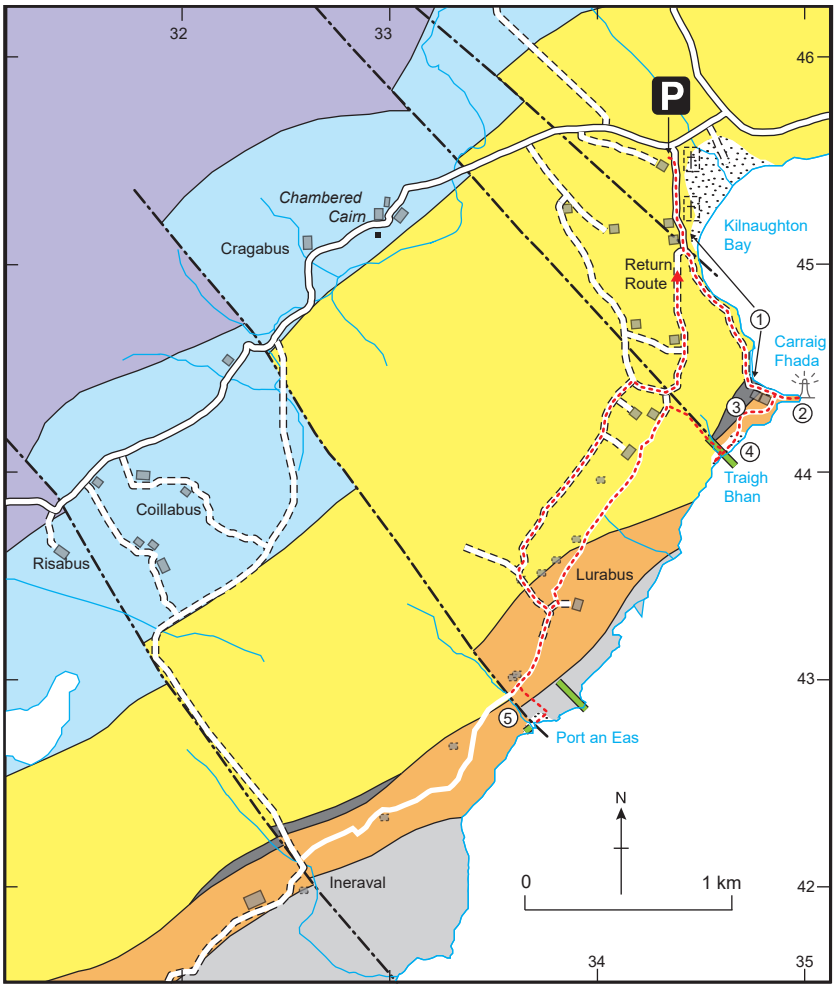

Fig. W9.1 Geological map of the area around Kilnaughton Bay after British Geological Survey (1997), showing the localities described in Excursion 9.

Excursion 9: Kilnaughton Bay

This excursion features beaches, easy coastal paths and a dramatic waterfall in the SE part of the Oa as well as the Scarba Conglomerate and the Jura Quartzite.

Grade: **1**. Increased to **1+** if including Port an Eas (Locality 5).

Terrain: Vehicle tracks, easy paths and sandy beaches. Localities 1 and 2 are suitable for those with limited mobility.

Duration: To the waterfall and back is about 3 hours.

Facilities: None on the walk but facilities nearby in Port Ellen.

Access: No restrictions.

Dogs: No particular issues.

Distance: 9 km (5.6 miles).

Start: Park at the new cemetery [NR 3436 4553] at Kilnaughton.

Notes: There is an option for a few cars to park nearer the lighthouse, about 1 km south of the cemetery.

A popular shorter option is to use this car park and visit Localities 1 to 4, without going to Port an Eas. This reduces the total distance to 1.5 km (1 mile).

The main geological features to be seen on this walk are some uncommon metamorphic rocks and minerals, a deep water submarine fan deposit. Plus some Paleocene-age dykes and sills and Ice Age raised cliffs.

This walk is an 'out-and-back' walk to the Port an Eas waterfall via the 'Singing Sands'. There is a shorter option (see 'Notes' above), and there is also a longer return option from the waterfall via Ineraval, Coillabus and the chambered cairn at Cragabus (see Fig. W9.1 opposite).

From the new cemetery car park, head S along the road. The first locality extends S for 700 m along the road and shoreline starting at the first houses at the beach just after the old cemetery.

Locality 1 [NR 3443 4511 to 3471 4445]

Kilnaughton Bay.

The raised cliff line and the rocks on the foreshore consist of the Jura Quartzite, which is a light-coloured, well bedded ***quartzite.*** *This is one of the most recognisable formations in the Dalradian of SW Scotland; it forms the Paps of Jura to the NE and most of the high ground of N and E Islay and the southern half of the Oa peninsula. Its total thickness in the Oa is estimated to be about 1500 m, which is considerably less than the 3000+ m estimated in N Islay and the 5000+ m in Jura. The section here is at the top*

Fig. W9.2 View of Locality 1 looking S towards Carraig Fhada. The rocks containing the kyanite are at the base of the raised cliff exposure where it meets the road just before the large gate post.

of the succession and here it has some pebbly beds and numerous partings of ***metamudstone*** *and* ***metasiltstone****. Many of the beds also have* ***cross-bedding*** *indicating that it was deposited by fast-flowing water currents, probably in a tidally-dominated delta system. The rocks are consistently dipping to the SE at around 40° and the traverse along the track views successively younger rocks.*

Many of the quartzite beds have shiny top surfaces; these were once clay minerals forming thin mudstone interbeds and they have been ***metamorphosed*** *during the* ***Caledonian Orogeny*** *some 470 Ma into flakes of* ***white mica*** *which give some of these beds a planar* ***foliation****.*

At a small promontory on the right of the roadside, at [NR 3470 4452], an unusual mineral called ***kyanite*** *can be found (Fig. W9.2). It occurs on the micaceous* ***cleavage*** *planes and consists of randomly orientated brown rosettes and blades about 1 cm long (Fig. W9.3). Kyanite is usually a blue*

Fig. W9.3 Rosettes and blades of kyanite (now replaced by micas) near the top of the Jura Quartzite, Locality 1.

Fig. W9.4 Laminated metamudstones lying above the Jura Quartzite in an old slate quarry. Bedding is about 45° SE and the cleavage is approximately parallel to this, resulting in a rock that can easily split, Locality 1.

colour, but here it has been replaced (pseudomorphed) by brown mica-type minerals. Kyanite is an alumino-silicate mineral and usually only occurs in much higher grade metamorphic rocks but it appears here because the original mudstone interbeds must have originally been unusually aluminium-rich. It is the only known locality of kyanite in this grade of metamorphic rock in the British Isles. This occurrence, along with the presence (and absence) of other metamorphic minerals, has been used to calculate a peak metamorphic temperature of about 430°C and it is one of the critical localities for establishing the grade of metamorphism in the Dalradian [Note: there has been some recent vandalism of this site and the kyanite crystals are now not so easy to see].

About 50 m after the kyanite exposure there is a small quarry (Fig. W9.4), earmarked for building. It exposes about 60 m of light-grey ***laminated*** *metamudstone; the bedding direction is picked out by thin bands of coarser material and it dips SE at about 50°. The rock has a closely spaced planar foliation and thus it can be split quite thinly, making it useful as roofing slate. This slate bed lies directly on top of the Jura Quartzite, and it crops out sporadically all the way from the Oa to NE Jura. It is thought to have been deposited in somewhat deeper water than the Quartzite and it indicates that water depths had increased and sand supply had ceased.*

The raised cliffs and small sea stacks are a glacial feature formed during the 'Younger Dryas' period some 12,500 years ago when sea level was relatively constant and significant freeze-thaw weathering of the rocks took place. Pebble beaches were subsequently deposited on the eroded, wave-cut platforms below the cliffs and preserved as a result of crustal rebound following ice removal.

Walk along the road past the new houses and the farm and then take the concrete path to the lighthouse.

Locality 2 [NR 3490 4435]

Carraig Fhada.

Above the slate is a thick sequence of well-bedded pebbly ***conglomerates*** *with some* ***sandstones*** *and* ***mudstones*** *which are exposed in the foreshore from the end of the previous locality to the lighthouse. The beds are up to 1 m thick with sharp erosional bases. Many beds show a gradual grain-size reduction upwards, known as* ***fining-up****. This distinctive sequence is known as the Scarba Conglomerate; its outcrop stretches from here on the Oa, across SE Islay, along the eastern coast of Jura and north up to Scarba.*

The pebbly beds are high-density ***turbidites*** *deposited by decelerating flows in deep water at the base of a slope. This change in depositional environment indicates tectonic instability and rapid subsidence probably caused by large* ***faults*** *which were active as the basin extended and developed.*

The basal sections of the beds are dominated by pebbles of quartzite (Fig. W9.5) and they contain clay minerals which have been metamorphosed to white mica resulting in a spaced cleavage being developed (Fig. W9.6). There are also some small-scale folds. The pebbles are flattened and stretched in a consistent direction, indicating the strain that developed as the rocks of Islay were folded in the Caledonian Orogeny. Some beds contain dark ***graphite*** *which could be the metamorphosed remnants of hydrocarbons.*

From the lighthouse go back to the farm and take the path heading uphill at its left hand side. This leads over the headland to Traigh Bhan. As the path descends to the bay there are some boulders in the grass (Fig. W9.7).

Fig. W9.5 Pebbly bed of Scarba Conglomerate at Locality 2 showing fining-up from pebbles to sand.

Fig. W9.6 Scarba Conglomerate with spaced cleavage and flattened clasts, Locality 2.

Fig. W9.7 Piles of rounded boulders, which is a remnant of a late-glacial storm beach now about 18 m above the current sea level, Locality 3.

Fig. W9.8 View from Locality 3 looking SW towards Traigh Bhan.

Locality 3 [NR 3471 4426]

Top of the headland between Carraig Fhada and Traigh Bhan.

The piles of rounded boulders are remnants of a raised storm beach preserved on the headland at a height of some 18 m above present day sea level. This is at a similar level to other beach fragments on Islay and probably marks a temporary high stand of the sea near the end of the main deglaciation about 15,000 years ago.

From the headland follow the narrow path through a gate and down to the beach (Fig. W9.8). Its popular name of the 'Singing Sands' comes from the squeaky noise that the sand makes when walked on when the moisture content is right.

Locality 4 [NR 3466 4414] to [NR 3452 4401]

Traigh Bhan.

The rocks at the middle and NE end of the beach are the same Scarba Conglomerate Formation as seen at the lighthouse. Mapping of this part of the Dalradian across Islay and Jura suggests that the main background sedimentation of deep water muds was periodically interrupted by sandy and gravelly turbidites which built small submarine fans.

A major NW-SE trending fault of presumed Mesozoic age cuts across the Oa to this bay and erosion along it is responsible for the formation of the bay. The rocks at the far SW end of the beach are the Jura Quartzite on the SW side of the fault. A Paleocene-age (c. 60 Ma) dolerite dyke can also be seen in front of the quartzite exposure, where it is intruded up the fault zone (Fig. W9.9). All the metasedimentary rocks seen so far are dipping SE, which is

Fig. W9.9 Jura Quartzite at the SW-end of the beach at Traigh Bhan, Locality 3. The dark rocks in the foreground are a Paleocene-age dolerite dyke.

Fig. W9.10 View SW over Port an Eas. Steeply dipping Scarba Conglomerate forms the cliffs around the western end of the bay.

the same as most rocks in SE Islay and Jura. They are interpreted as being on the SE limb of the major fold feature known as Islay Anticline which dominates the geological structure of Islay.

To continue to Port an Eas go to the small burn near the centre of the bay and follow it upstream on its eastern side along a narrow path for 25 m. Cross the burn by a plank bridge and then follow the path NW for about 300 m uphill through the grass and bracken slopes to a vehicle track. Turn left here and follow the track SW for 150 m past a house, from where an old path heads in the same direction. It passes by a new house after 200 m then crosses fields for 600 m or to the cleared settlement of Lurabus. Carry on past the old buildings to reach the main access road to the new houses some 100 m to the south. Keep heading SSE on old tracks for a further 500 m past two ruined houses to reach the top of the waterfall at Port an Eas (Fig. W9.10).

To get down to the beach walk 50 m back along the path to the ruined house and then head S towards the sea across rough grass (with traces of paths) aiming for the east side of the bay where a faint zig-zag path works its way down through the steep grassy slopes to the bay.

Locality 5 [NR 3366 4283] to [NR 3359 4278]

Port an Eas.

Just before the zig-zag track reaches the beach area it passes some rock exposures on the left. These are laminated metamudstones assigned to the Port Ellen Phyllite Formation. This sequence directly overlies the Scarba Conglomerate and is a shallow water deposit indicating that the deep water basin formed during Scarba Conglomerate times had filled up with sediment.

Fig. W9.11 Foliated and folded metamudstones of the Port Ellen Formation intruded by a thin dolerite dyke, Locality 5.

Fig. W9.12 Dolerite sill (of Paleocene-age) intruding SE-dipping Scarba Conglomerate, Locality 5.

There are many small folds and faults (Fig. W9.11) and the sequence is cut by a thin Paleocene-age dyke.

The rock outcrops on the far side and at the waterfall itself are the steeply dipping Scarba Conglomerate, similar to the previous localities. The rocks near the centre of the bay are also the Scarba Conglomerate but it is intruded by a dark brown igneous rock which is about 20 m thick and, as it is parallel with the bedding (Fig. W9.12), it is termed a ***sill*** *rather than a dyke. Here the rock is unmetamorphosed with its original igneous mineralogy and it is interpreted as a Paleocene-age (c. 60 Ma) sill.*

The waterfall exposes a fault (Fig. W9.13), which trends NW-SE and is probably of Mesozoic age, like the one at the Singing Sands. Preferential erosion along the fault has created the bay. It downthrows to the NE and the rocks around the fault are stained red-brown by iron and manganese minerals. These were deposited by hot fluids in the fault zone during the Triassic.

Fig. W9.13 Triassic-age fault splitting the cliff, Locality 5.

To return retrace the outward route for 500 m to the main vehicle access track at Lurabus. Follow this NE for 1.3 km, where it winds down the hill and joins the coast road by some new houses.

WHISKY RECOMMENDATION

Try a Laphroaig 10 year old – an iconic peaty whisky. The view from the lighthouse takes in the distillery nestled in a hollow in softer metamudstones (which gives the distillery its name (the beautiful hollow by the broad bay).