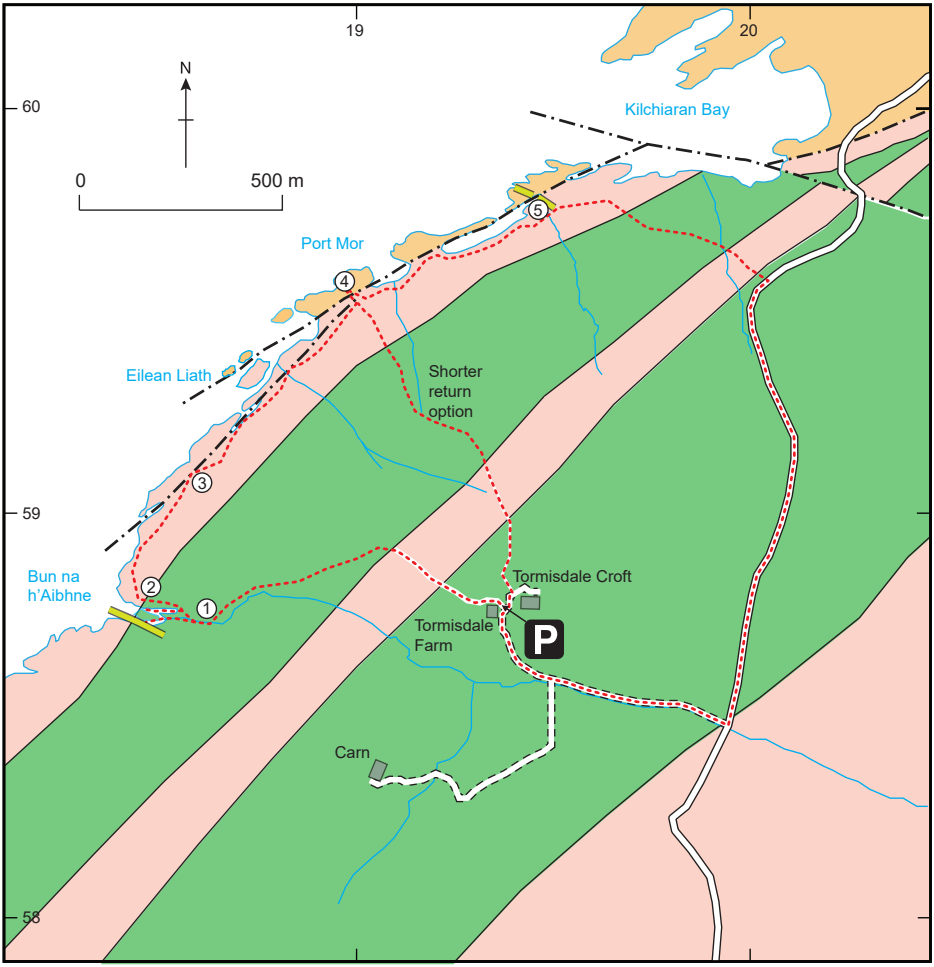

Fig. W16.1 Geological map of the area around Tormisdale after British Geological Survey (1997), showing the localities described in Excursion 16.

Excursion 16: Tormisdale

A spectacular coastal section looking at the oldest rocks on Islay and the billion-year gap between them and the overlying rocks.

Grade: **2**

Terrain: A mixture of farm tracks, roads rocky shores and pathless rough grass and pasture.

Duration: Allow 2-3 hours.

Facilities: Refreshments available at Windswept Farm Shop.

Access: No restrictions but the walk is over crofting land with cattle and sheep.

Distance: 5 km (3.1 miles).

Start: Tormisdale Farm (Windswept Farm Shop) [NR 1934 5877]. The entrance is signposted off the back road from Port Charlotte to Portnahaven about 2 km S of Kilchiaran.

Note: It would be courteous to be a customer at the Farm Shop

Dogs: Probably not a good idea as the route crosses fields with livestock.

The rocks seen on the first part of this excursion belong to the Rhinns Complex, which is a group of rocks some 1,800 Ma that were once igneous rocks and have been altered (metamorphosed) into very distinctive pink gneisses and green metagabbros. The overlying rock sequence, which is a billion years younger, can also be seen along with the Kilchiaran Shear Zone which separates them.

This excursion is a clockwise circuit taking in a 2 km stretch of the coast near Tormisdale. Shorter 'out-and-back' routes from Tormisdale Croft or Kilchiaran Bay to Localities 1 to 3 and 4 to 5 respectively are possible shorter options.

Go through the gate at the end of the Parking Area and follow the track NW for some 200 m heading towards the coast. Near the end of the track go through a gate on the left and head SW downhill over the open field towards the burn, cross a wooden fence and follow the burn past some small waterfalls to a flatter area below them where there is an old red marker buoy lodged in the burn.

Locality 1 [NR 1863 5873]

Tormisdale burn.

The waterfalls and the rock exposures below them are formed of ***metagabbro*** *of the Rhinns Complex. The rock has a mottled dark-green and greenish-white appearance and was originally an* ***igneous*** *rock; probably some*

*form of **gabbro.** It is believed to have formed about 1,800 **Ma** in a volcanic **island arc**. This rock makes up about a third of the Rhinns Complex which dominates the geology of the southern part of the Rhinns Peninsula.*

The metagabbro exposures on the N side of the burn are spectacularly scratched and grooved by ice which moved across Islay about 25,000 years ago in the Ice Age (Fig. W16.2). The ice was probably about 500 m thick at this point and the markings indicate flow from east to west.

*On the opposite hillsides are some extensive and unstable exposures of glacial deposits which are slumping and sliding downhill. These are mainly very poorly sorted **diamicton** composed of all sizes of material from clay to boulders which were deposited on top of the bedrock as the ice melted and are capped by some better sorted gravel beds deposited by glacial meltwater rivers.*

Follow the burn downstream for a further 100 m to reach the sea at the head of a series of gullies, stacks and cliffs at a complex inlet known as Bun na h'Aibhne. At this locality (Fig. W16.3) the rocks can be examined in the north and south gullies, then viewed from the cliff top before traversing up the slope to the north.

Locality 2 [NR 1854 5873 to NR 1849 5878]

Bun na h'Aibhne.

*The rocks exposed at sea level in the cliffs on either side of the prominent stack/island in the centre of the southern gully are the same metagabbros as seen at Locality 2.1. There is a much younger (**Palaeocene-**age) **dyke** made of **dolerite** that cuts NW to SE through the S side of the inlet; this probably follows a pre-existing **fault** line which is responsible for a zone of weaker fractured rock along which the sea has eroded.*

Fig. W16.2 Ice-scratched metagabbro exposure. Locality 2.1.

Fig. W16.3 View looking NW over Localities 1 and 2

Return back upstream about 50 m and climb up the grassy slope on the N side of the burn to reach a narrow promontory at the head of another deep gully to the N. The rocks on the N wall of the gully can be well seen from this point and it is possible to descend down the gully from its head to get a closer look. It is also possible to get into the gully at sea level if the tide is low.

The green mottled metagabbro is exposed at the E end of the gully and some unusual looking, irregular masses of black rock surrounded by lighter rocks can be seen on the N wall of the gully. These are metamorphosed ***ultramafic*** *rocks called* ***amphibolite****. They were originally* ***igneous*** *rocks composed of olivine and pyroxene which were intruded into the metagabbro and they are in turn intruded by later veins of coarse-grained* ***felsic*** *igneous rock known as* ***pegmatite*** *(Fig. W16.4).*

Walk round onto the N side of the gully and head W towards the sea along the cliff top.

Here a large area of pinkish-looking rocks are encountered. These are metamorphic ***gneisses*** *which were originally igneous rocks. They crystallised as a* ***syenite*** *which was later subjected to further heat and pressure which altered the mineralogy and recrystallised the new minerals into compositional bands, producing what is known as* ***foliation****. This happened before the gabbros were intruded because they do not have this foliation. The hillside has a good deal of exposure of the gneiss and it is possible to find contacts between it and the metagabbro (Fig. W16.5), however, these occur over a zone several metres wide and their relationship is quite complex in detail.*

Follow the coast NW for about 300 m keeping to the grass and following the edge of the coastal rock exposure until a prominent narrow linear gully

Fig. W16.4 (L) Black ultramafic rock now metamorphosed to amphibolite with pods and veins of pegmatite. Locality 2.2.

Fig. W16.5 (R). Contact between sheared green metagabbro on the right with sheared pink gneiss on the left. Locality 2.

is visible to the L running parallel with the coast. Cross onto the rocks and scramble down into the gully at an appropriate and suitable place.

Locality 3 [NR 1869 5914]

Foreshore S of Eilean Liath.

The gully is about 2-3 m wide and it runs parallel to the coast near the SE edge of the rock platform for about 800 m; it is a very obvious feature on satellite imagery. The gneiss of the Rhinns Complex outcrops on both sides of the zone. It has been formed by erosion along a fault plane where the sheared rock in the fault zone has been preferentially eroded (Fig. W16.6). In places the fault zone can be examined close up and mostly it very steeply dipping to the NW; in other places it is approximately vertical. Some thin Palaeocene-age dolerite dykes can also be seen.

Continue following the rugged coast for about 300 m along the edge of the rocks crossing or going round some fences and gates. About 200 m after the last gate a flatter grassy area is reached with a wall and large stile at the far NE end. Before getting to the stile go L towards the shore over the grassy area to the large area of pale creamy-coloured rocky outcrops.

Locality 4 [NR 1898 5950]

Foreshore N of Eilean Liath.

*The creamy-coloured rocks which dominate this part of the foreshore are **metasandstones** – some were originally muddy sands (with **quartz**, **feldspar** and clay-mineral **matrix**) with thinner silty and gravelly layers. There are also some more quartz-rich **quartzites** with **cross-bedding** (Fig. W16.7).*

Fig. W16.6 View of the coastal area around Locality 3. The fault gully is prominent just to the left of centre.

Fig. W16.7 The Eilean Liath Grit at Locality 4. Finer grained laminated metasandstones are overlain by creamy-white cross-bedded quartzites.

These were buried and hardened into sandstones then later compressed and metamorphosed during the ***Caledonian Orogeny****. This process has recrystallised the original clay-minerals into* ***chlorite*** *and* ***white mica****. Some of the gravelly layers show signs of stretching and flattening with the once-rounded clasts now highly elliptical (Fig. W16.8).*

The contact between the gneiss and the metasandstone happens over a 5-20 m wide zone which trends NE-SW along the coast. This zone is a marked linear feature on satellite images. It is an area of intense shearing movements and is known as the Kilchiaran Shear Zone (Fig. W16.9). The rocks in the ***shear zone*** *have been drawn out and stretched and are classified as* ***mylonites****. The*

Fig. W16.8 Laminated metasandstones with stretched gravel clasts. Locality 4.

Fig. W16.9 View looking NE at Locality 2.4. Gneiss on R and metasandstone to L of shallow gully which is floored by sheared rocks of the Kilchiaran Shear Zone.

*Shear Zone and the fault zone seen at Locality 3 are almost parallel and intersect around this locality. It is likely that they were both active as **reverse faults** or **thrusts** during the Caledonian Orogeny (about 470 Ma) and that they originated as normal faults at the time of deposition of the sediments.*

*The metasandstones are the oldest parts of the thick rock sequence that forms the northern Rhinns peninsula known as the Colonsay Group. The rocks here represent the lowest part of the Group and are termed the Eilean Liath Grit. Analyses of these early Colonsay Group rocks suggest that they were probably deposited in a **deltaic** environment (i.e. from rivers at the edge of the sea), probably around 800 Ma. Therefore, walking across the shear zone crosses a gap in Earth history of about 1 billion years.*

At this point there are two options: to ascend the grassy slopes and via some gates join the farm track heading SE to Tormisdale Croft. To continue to Locality 5 and the full circuit go NE and cross the wall by the large ladder stile and follow the line of pebble beaches and tidal pools which extend for about 1 km NE from the wall. Follow this line to the rocky and grassy area overlooking a second tidal pool (Fig. W16.10).

Locality 5 [NR 1943 5970]

Lodan Mor.

The tidal pools and beaches have formed along the erosion hollow of the shear zone. The rocks on the NW side are the metasandstones of the Eilean Liath Grit and those on the SE side are gneisses of the Rhinns Complex.

At the NE end of the tidal pool, a 3 m thick Palaeocene-age dolerite dyke cuts across the shear zone at right angles and has been displaced by about 10m in a sinistral sense by late movement on the shear zone. (Fig. W16.11)

From here there are two options: either to retrace the route back down the

Fig. W16.10 One of the tidal pools at Lodan Mor, Locality 5. The line of pools and pebble banks follow the eroded gully of the Kilchiaran Shear zone.

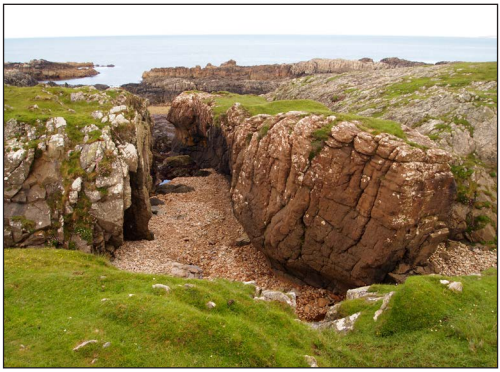

Fig. W16.11 A thick Palaeocene dolerite dyke at Locality 5. It can be seen on the far side of the shear zone and is offset by 10 m or so in a sinistral sense.

coast, cross the large stile and go up the fields and track to Tormisdale Croft or to complete a circuit back to Tormisdale via the road.

For the circular option keep following the coast for about 100 m looking out for a flat grassy area with old field walls and then start a rising traverse uphill to the NE away from the coast. After about 500 m a small burn is crossed at a muddy ford and the route continues uphill across a rough grassy field from here for a further 100 m to the road. Aim for a gate in the roadside wall close to the point where the power line crosses the road. Go through the gate onto the road, turn R and follow the road S for 400 m until the turn for Tormisdale is reached. Follow the farm track for the last 700 m back to the start.