FIELD TRIP TO THE ISLE OF MAN
led by John Morris

After a bumpy and somewhat delayed flight to Ronaldsway Airport on 8th May, IGA and MHTI members made their way in a number of vehicles to the Manx Museum in Douglas. Here trip leader Dr John Morris of the Geological Survey of Ireland introduced us to the topography and geology of the Isle of Man, aided by frequent interruptions from two speaking stones, a slab of slate and a lump of lead ore. John explained that the island consists of a spine of metasedimentary Lower Palaeozoic slates intruded by several granites, with younger mostly sedimentary rocks clinging to its margins in the west (Old Red Sandstone), south (Carboniferous Limestone) and north (Quaternary glacial sediments). The Isle of Man was a major producer of lead, zinc and copper during the 19th century. These metals were mainly extracted from hydrothermal vein deposits hosted in the Manx Group, with the largest deposits in the Foxdale and Laxey areas intriguingly close to granite intrusions.

It is impossible to do justice in a short report to all of the many localities we visited over the next four days. Due to the need to avoid high tides and road closures due to car rallying, our itinerary could not fully respect the sequence of geological events. In this report I have presented some of the highlights, not in the order visited but in order of the age of the rocks, starting with the oldest.

Slates of the Manx Group make up much of the Isle of Man and we saw them in several places. They started life as sands, silts and muds deposited from marine turbidity currents on the margin of the ancient continent of Avalonia. On Marine Drive southwest of Douglas and at Port Erin at the southwest end of the Island, John showed us some of the sedimentary structures used to work out current directions and whether the beds had been overturned or not. He explained that fossils, mainly graptolites and acritarchs, show these turbidites to be early Ordovician. Apart from the sedimentary structures, the most obvious feature of the Manx Group is their metamorphic foliation, acquired during the Caledonian orogeny when Avalonia collided with Laurentia to the north.

It had long been thought that all the metamorphosed turbidites on the Isle of Man were Ordovician. However in the mid-1990s John was part of a team which discovered that a small proportion are Silurian. To be more exact they are Wenlock in age as demonstrated by fossil orthocones and graptolites. He showed us these younger turbidites, named the Dalby Group, in the disused Traie Dullish quarry on the west coast, just south of Peel. There followed a lengthy story of how St Patrick had assisted in recognizing the these rocks as younger than the Manx Group! It turns out that the Dalby Group includes a very distinctive type of sediment called hemipelagite. The origin of hemipelagite is uncertain, but its alternating laminae of silt and carbonaceous matter suggest annual cycles of deposition. Like the Manx Group, Dalby Group rocks are metamorphosed and foliated, indicating that these features were acquired after Wenlock times.

Folded Silurian turbidites, Traie Dullish Quarry

The Niarbyl Shear Zone: significance uncertain

A major question of Manx geology is the relationship between the Ordovician Manx Group and the Silurian Dalby Group. At a beautiful spot called Niarbyl Point, on the southern west coast, we looked at the geological contact between them. The contact is a zone of high strain called the Niarbyl Shear Zone. John's favoured interpretation was that the Silurian rocks were thrust obliquely over the Ordovician rocks and that this represents a major tectonic feature related to closure of the Iapetus Ocean which separated Avalonia from Laurentia. On the other hand, he pointed out that others have suggested that the shear zone is of little tectonic significance and is perhaps no more than a sheared unconformity.

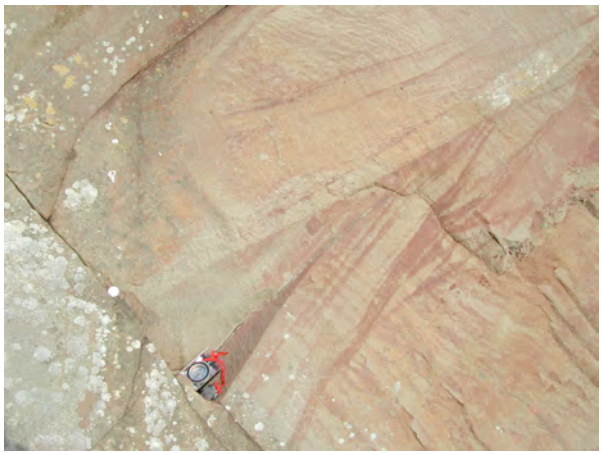
John took us to several abandoned mines in the Foxdale region, near the centre of the island. Here we learnt how the dimensions of the surviving engine houses can be used to estimate the size of the steam engines they held to pump the mines dry of water. At Beckwith's mine, we saw the remains of several boddles, ingenious structures which used running water to concentrate the denser ore from waste rock. We also foraged successfully for zinc and lead ore on the spoil heaps. At the Cornelly mine we could see that the Manx Group slate hosting the ore had developed metamorphic minerals in an aureole around the buried Foxdale granite, reminding us of the close but as yet unexplained association between granites and the hydrothermal ore deposits. Pieces of the granite seen in mine buildings around Foxdale did not show the foliation of the Manx and Dalby Groups, demonstrating that the granite postdated the Caledonian orogeny.

The other main centre for mining on the island was Laxey, on the east coast north of Douglas. Water wheels were built at Laxey in the mid-19th century, to pump out some of the many mines but also as a tourist attraction. Peter Geddes MBE explained how he had masterminded the remarkable restoration of the Lady Evelyn Wheel, unveiled in 2006 after years of work by the local community. He also showed us a small section of the Great Laxey Mine which has been opened to visitors and explained the workings of the Lady Isabella Wheel. In its working days this wheel transmitted power, via a wooden beam supported on a viaduct, to the pumps in the Great Laxey Mine.

Petter Geddes MBE recalls the community effort which led to the restoration of the Lady Evelyn Wheel in 2006.

IGA members successfully negotiate a group discount to see the Great Laxey Wheel.

Prominent red sandstones of the Peel Formation dip steeply out to sea just north of Peel. They are believed to be Devonian from palaeomagnetic evidence and therefore can be called Old Red Sandstones. John pointed out how these rocks record a change from desert conditions at the base of the sequence, which consists mostly of wind blown sand, to fluviatile (river) deposits higher up. The fluviatile deposits include conglomerates with a variety of pebble types and the rivers probably drained mountains raised in the then geologically recent Caledonian orogeny.



Thick Aeolian cross-bedded sandstones, Peel Formation.

Fluviatile conglomerates and sandstone, Peel Formation.

In the southeast of the Isle of Man, near Castletown and Ronaldsway Airport, are some excellent coastal exposures of limestone and basaltic volcanic rocks, all of Carboniferous age. John showed us originally horizontal features in the limestone at Poyllvaaish which demonstrated that it partly consisted of blocks of reef which had foundered on the unstable edge of a carbonate platform. More impressive still were the exceptionally preserved pillow basalts at adjacent Close-ny-Chollagh, whose eruption took place during limestone deposition.

On the nearby Langness Peninsula, in the southeast corner of the island, can be seen an unconformity to rival Hutton's unconformity in Scotland. Gently dipping coarse, red conglomerates of Courceyan age, the oldest Carboniferous rocks on the island, lie unconformably on cleaved, steeply dipping Manx Group slates. This vividly demonstrates that much happened here during the period of about 70 million years represented by the unconformity!

John Morris points out beautifully preserved pillow basalts at Close-ny-Chollagh, his hand on an older pillow over which a younger one is draped.

A spectacular unconformity: gently dipping red Carboniferous conglomerate rests on steeply dipping foliated Manx Group slate, Langness Peninsula.

The northern tip of the Isle of Man has dramatically different topography and scenery to the rest of the island. The other localities we visited were rocky cliffs or lay amongst the hills and mountains of the interior, but the north consists of gentle hills and plains. We saw why on a long walk, or forced march according to some members, along the northeast coast to Shellag Point. Here a massive cliff of sand and gravel is exposed. It represents a section through the Bride Moraine, which forms a low east-west ridge running across the northern end of the Isle of Man. Although only weakly lithified, the moraine is nevertheless deformed by a series of almost isoclinal folds, steeply dipping faults and low angle thrusts. John explained that this moraine probably formed at the end of the last Ice Age when a thick, south-moving ice sheet laden with glacial debris ran up against the mountains of the Isle of Man. Much of the debris was deposited, partly reworked and redeposited by glacial melt water and almost immediately folded and faulted, as the ice sheet continued to drive southwards over it.

Steeply dipping gravel beds in the Bride Moraine, Shellag Point.

A fallen piece of partially cemented till of the Bride Moraine, Shellag Point.

Whilst the Bride Moraine is being steadily eroded away by the sea, the opposite is taking place at the Point of Ayre. Here at the northern tip of the Isle of Man an extensive pebbly beach is still growing northwards, as pebbles are added by longshore drift from the eroding Bride Moraine and by reworking from offshore deposits. John pointed out the wide range of rock types represented as pebbles, including large pebbles of distinctive riebeckite granite derived by glacial erosion from Ailsa Craig in the Firth of Clyde to the north. Those familiar with the small pebbles of Ailsa Craig granite on Killiney beach in Dublin were impressed by the much larger and more abundant pebbles here, closer to the source of the granite.

The growing shingle beach at the Point of Ayre (Photo: Peter Lewis).

The lighthouse at the Point of Ayre, the northern tip of the Isle of Man.

Apart from the wealth of geology and mining history, the excursion was not without its broader cultural moments. At St John's, near the centre of the island, we escaped a heavy shower to visit a small museum where the history and political system of the Isle of Man were explained. Just outside the museum was Tynwald Hill, an artificial mound which was once the seat of the Manx parliament, said to be oldest unbroken parliament in the world. To this day, laws enacted in the past year are read out every 5th July by the Manx government. The IGA also availed of this facility (see below).

IGA President Peter Lewis (centre) announces the Removal of Beach Materials Act, 2009, to the surprise of members and dismay of the assembled people of the Isle of Man. (Photo: Peter Lewis)

The four day trip to the Isle of Man trip presented a considerable logistical challenge. Assistance was provided in various aspects of the trip by Martin Davies, Peter Geddes, John Kelly and Alastair Lings. Excursions Secretary Dan O'Shea successfully co-ordinated the accommodation, transport and dining arrangements. We owe our thanks to them all. Most of all, many thanks to John Morris for putting together a comprehensive, well-researched itinerary which gave all participants an excellent overview of the geology and mining history of the Isle of Man.

Julian Menuge.