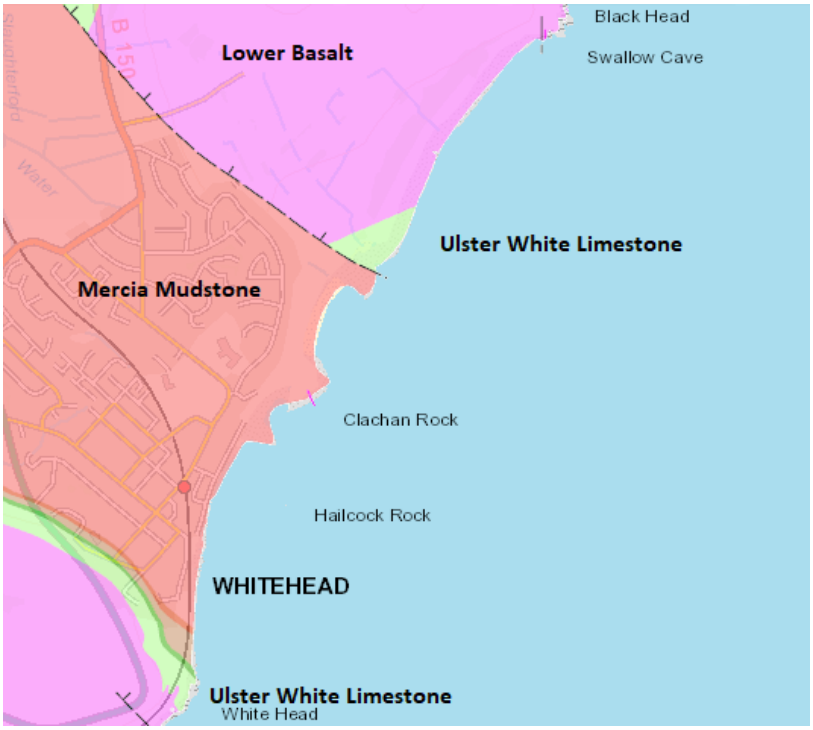
East Antrim U3A geology group report – Black Head 7th June 2022

Ian Enlander group convenor

A select group of 8 East Antrim members of the Geology Group turned out on another wonderfully sunny day (we have been incredibly lucky with the weather for our excursions) to enjoy the seaside and learn about the geology of the Whitehead – Black Head area.

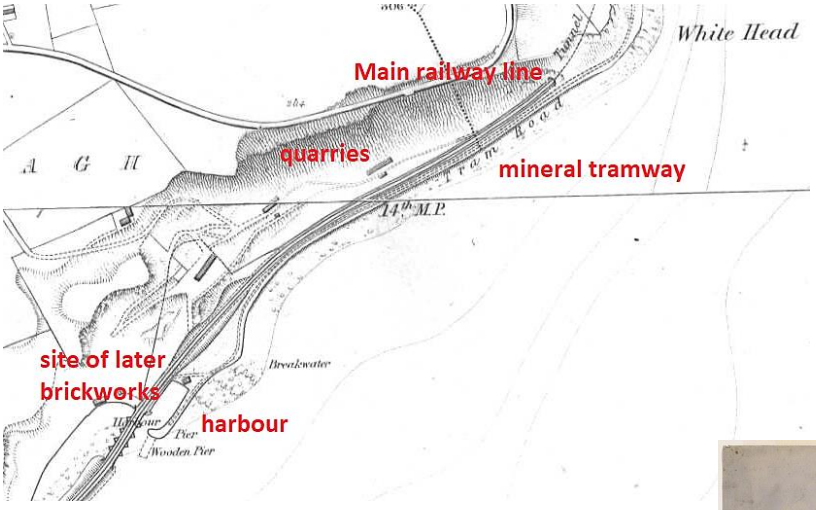


The geology here is straightforward – indeed the place names say it all. Whitehead is the former headland south of the town (now largely quarried away) made of chalk. Black Head, to the north, surmounted by the lighthouse, is made of basalt. In between, our friend the Mercia mudstones, form the low lying ground in between.

The mudstones, as has been so often the case in the Belfast and Co. Antrim areas, were an important raw material for the manufacture of bricks – the former brickworks (now long gone) was south of the town close to the White Harbour. It operated around the turn of the 20th century.

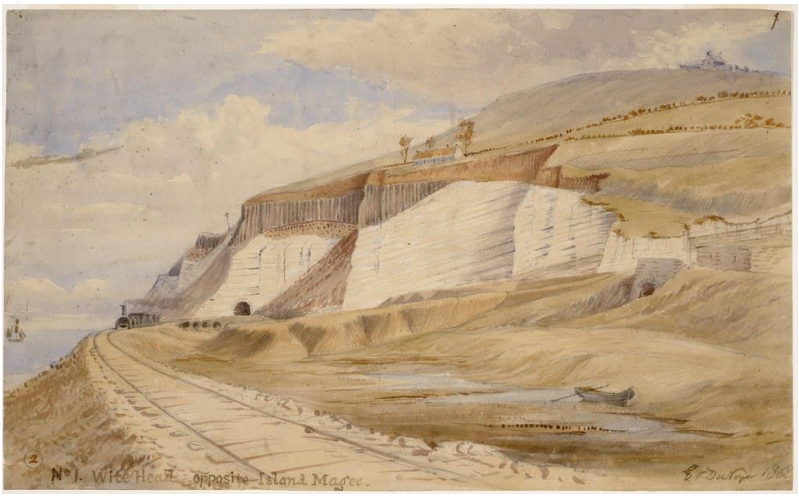
The small harbour must have been a busy place as by the mid 1800's chalk quarries were also operating linked to the harbour by a tram line as shown on the 3rd edition of the OS map.

The quarrying and the relatively new railway line (and tunnel) is captured wonderfully by George Victor du Noyer, the geologist surveying the area for the Geological Survey of Ireland – this is likely from around 1867.



Our main focus was on the basalts at Black Head. Lava flows erupted some 65 million years ago, built up in successive layers. The Black Head area is the south-eastern limit of the much larger Antrim basaltic plateau – the largest remaining basaltic plateau in Europe extending over an area of 1650 Km^2.

The coastal path from Whitehead town was originally designed and built by Berkeley Deane Wise, Chief Engineer to the Belfast and Northern Counties Railway. He was responsible for a number of major tourist attractions in the wider area, including the original Gobbins Path.



The Triassic Mercia mudstones play an important part in the story of the redevelopment of the Black Head path. The mudstones tend to fail and slip when saturated, causing the path, which was built on this material, to break up. The recent rock armouring has led to the beach area to be scoured by wave action – the loss of sand now exposes a large area of these red mudstones.

On to Black Head. The wonderful cliff exposure show examples of basalt flow intervals (the top of one flow followed by the base of the next), near-vertical intrusive dykes (thought to be the conduit that the magma took to the surface where it was erupted via elongated fissures – rather than actual volcanoes) and the plentiful zeolites found in the basalt. In places, red horizons can be seen at the base of some lava flows. These represent localised explosive events, caused by the interaction of the hot lava (>1000^{0}C) coming in contact with groundwater and also the degassing as the magma reached the surface and pressure was released. Angular fragments of early erupted basalts can be seen included in the red ash layers.

Red bed of volcanic ash and angular blocks of basalt formed by short-lived explosive activity at the start of a lava eruption

Basalt lava flows at Blackhead

Gases played an important role in defining some of the features seen here. Trapped gas bubbles resulted in voids (vesicles) being formed in the cooling basalt. These later became the sites for crystallisation of zeolites – the white minerals seen through much of the basalts. The Antrim basalts are important for their range of zeolites with a number of types being identified here for the first time anywhere in the world. Gobbinsite (named after the Gobbins), Garronite (named after the Garron Plateau) and Gmelinite (hmm – named after an Italian chemist but first identified near Glenarm – so it should be Glenarmite) were all first identified from the Antrim basalts.

Zeolites

Where streams of gas bubbles were more persistent, pipes (pipe vesicles) formed – literally captured at the very moment the basalt had cooled sufficiently to prevent the lava occupying the gas voids. Black Head is the easiest place in the Antrim basalt series to see these pipes in section.

Pipe vesicles at Black Head

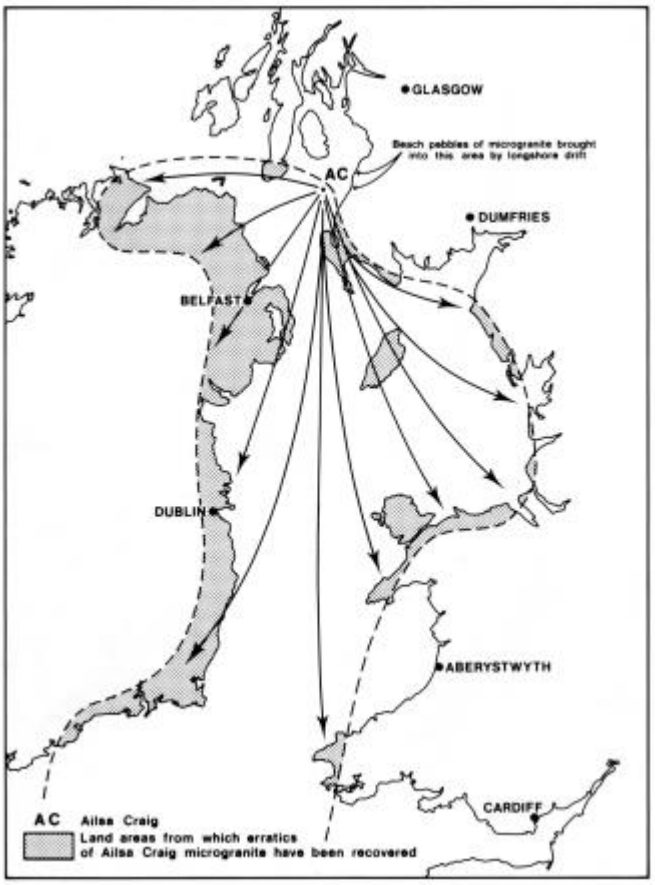
Detail right

The most recent geological features noted were the Wrens Eggs – large blocks of basalt probably deposited by the last movement of Scottish ice travelling west and south west into the Irish Sea and onto the Irish coast.

One of the characteristic rocks carried by this Scottish ice is the distinctive granite from Ailsa Craig – famous now as the raw material for the world's finest curling stones.

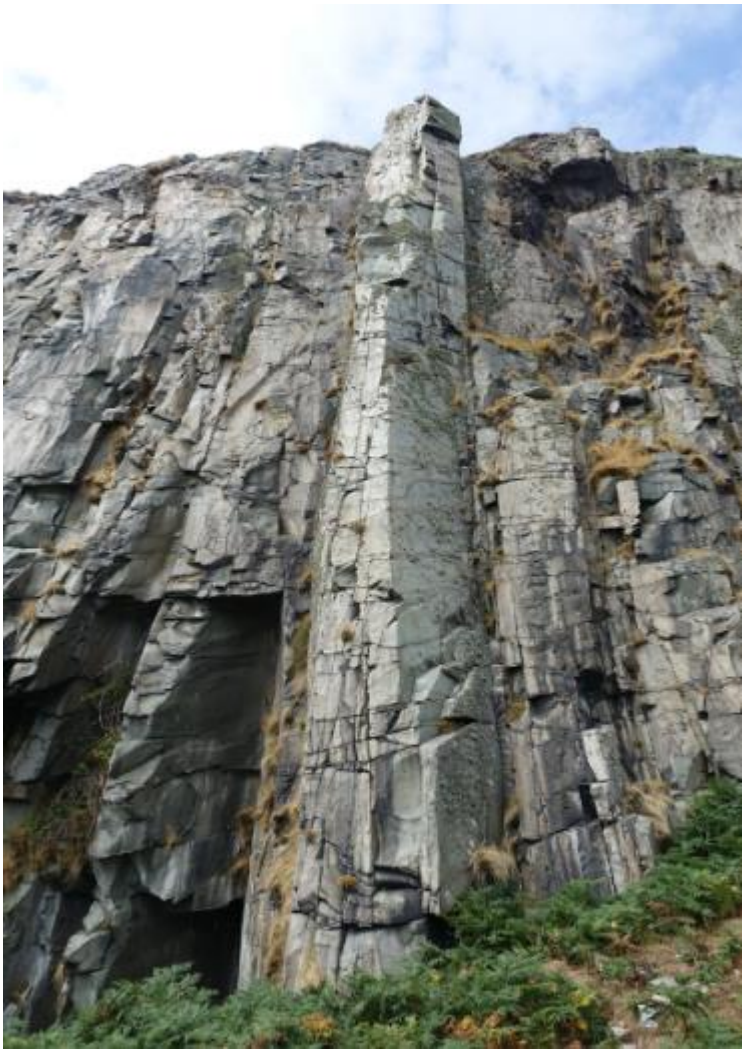
We didn't find any pieces of Ailsa Craig granite but we did find a range

of rocks around the Wrens Eggs which could have originated either from south-west Scotland or from the Ballycastle – Cushendun area – at least confirming the movement of ice from the north.



Ailsa Craig granite – directions of ice flow and distribution of erratics originating from that island (above) – granite cliffs on Ailsa Craig (right)

Wren's Eggs glacial erratics



A miniature curling stone made from Ailsa Craig granite

A fissure eruption in Iceland