
Excursion 24 Heads of Ayr

Key details

Author	F. Whyte
Theme	A large deeply-eroded volcanic vent.
Features	Faulted contacts between Lower Old Red Sandstone lavas and Upper Old Red Sandstone sediments; also contacts between the latter group and Cementstone strata; bedded and unbedded pyroclastic rocks, cut by small intrusions of monchiquitic-basalt and analcime-basalt; Passage Group sediments and lavas; Tertiary dykes.
Maps	O.S. 1: 50 000 Sheet 70 Ayr and Kilmarnock B.G.S. 1: 63 360 Sheet 14 Ayr 1: 50 000 Sheet 14 W Ayr
Terrain	As many of the features seen on this excursion occur on wave-cut platforms within the intertidal zone, it is advisable to start when the tide is falling. Normal precautions for working on a foreshore should be observed.
Distance and Time	The Heads of Ayr lies some 7 km (4 miles) to the SW of Ayr. From the starting point on the shore to Longhill Point is about 3.5 km (2 miles), from which point one proceeds to Doonfoot on the A719. Normally a full day is needed to cover this excursion. It may be shortened by examining the first part as far as desired and retracing one's tracks to the starting point.
Access	Turn off the A719 at [NS 285 178], directly south of Heads of Ayr. Keep straight on past the caravan site on the right and park along the left-hand side of the road. Proceed along the well-defined footpath down to the shore. (SSSI)

Introduction

The twin headlands of the Heads of Ayr occupy about 1 km (0.6 miles) of coast and provide excellent cliff and wave-cut platform sections through a Lower Carboniferous tuff and agglomerate-filled vent. The western part of the vent is composed of well-bedded tuffs showing folding, which may have been caused by compression of original cone deposits into a slowly subsiding basin. Although some bedding is present in the eastern part of the vent most of it appears to be unbedded and may mark the site of the pipe supplying ash to the western end.

Itinerary

Locality 1. Andesite lavas. (Figure 24.1)

Andesite lavas rich in amygdales and veins of quartz, chalcedony, calcite, 'green earths' etc, can be seen here. The amygdales may contain agate showing a characteristic milky white outer skin; these weather out and can occasionally be collected on the shore.

Localities 2 and 5. Fault

At these localities the fault separating Cementstone Group from Upper Old Red Sandstone can be seen. At Locality 2, the cementstones are baked and the sandstones of the Upper Old Red Sandstones are crushed.

Locality 3

A poorly exposed mass of hard red agglomerate composed mainly of blocks of Lower Old Red Sandstone lavas forms one of four vents of this age in South Ayrshire.

Locality 4. Fault and dyke

The sediments are separated from the agglomeratic lavas by a fault which has been eroded to form a distinct hollow along which runs a quartz-dolerite dyke 15 m thick.

Locality 6. Upper Old Red Sandstone

Here the cliffs are of massive mottled pink and white sandstones of Upper Old Red Sandstone age, often showing cross-stratification and containing numerous pebbly horizons. Plates of *Bothriolepis major* have been found at the base of the north end of the cliff, and one specimen of *Asterolepis* was found in the massive sandstone forming the roof of one of the sea caves.

Locality 7. Raised sea-caves

Note the line of raised sea-caves, presumably of the same age as the 12 m (40 ft.) raised beach visible at the NE end of the bay.

Locality 8. Fault and dyke

At the position where the fault (seen at localities 2 and 5) reaches the cliffs of Upper Old Red Sandstone rocks, there is a dyke of olivine-dolerite 6 m (6.5 yds) thick.

East of Locality 8 there are intermittent exposures of gently-dipping cementstones, marls and thin micaceous sandstones. As the margin of the Heads of Ayr vent is approached there is a marked increase in the dip of these sediments towards the vent.

Locality 9. (Figure 24.2). Tuff structures

Here minor structures within the tuffs can be examined, such as cross-stratification, graded bedding, slumping and bomb-sag. Many of the fragments in the tuffs are derived from underlying Old Red Sandstone lavas. Other common fragments are of cementstone, fossilized wood and carbonated peridotite.

Localities 10 and 11. En-echelon dykes

At both these localities thin dykes of analcime-basalt can be seen intruded 'en echelon' along faults. The dyke rocks are vesicular in part and composed of highly altered olivine and pyroxene phenocrysts in a groundmass of an alcime, chlorite, serpentine and feldspar.

Locality 12. Breccia dyke

Here is exposed a 30 cm wide dyke of very hard intrusive breccia, material similar to that described at Locality 13.

Locality 13. Intrusive breccia

Penetrating the sediments on the shore opposite the Central Recess are irregular masses of intrusive breccia and monchiquitic-basalt. The intrusive breccia consists of angular fragments of sedimentary and volcanic rocks in a highly

chloritised groundmass. There is often gradation between the breccia and the monchiquitic-basalt.

Locality 14. The monchiquitic-basalt

Locality 14. The monchiquitic-basalt varies in freshness from one intrusion to another. At this locality it is reasonably fresh and consists of micro-phenocrysts of olivine and augite in a groundmass of plagioclase, augite, olivine and analcime. Occasional fresh nepheline may be found.

Locality 15. Bivalves

The sediments on the foreshore opposite the Central Recess consist mainly of cementstone and shales in which certain horizons contain abundant non-marine bivalves.

Locality 16. Composite dyke

The Central Recess sediments and the eastern tuffs are cut by a Tertiary dyke intruded 'en echelon'. It dips steeply towards the NE and is composite, with a central olivinedolerite and badly decomposed outer tholeiite.

Locality 17. Slumped blocks

There are three 'blocks' of Cementstone Group sediments within the eastern tuffs and at this locality the largest can be seen. They are slumped masses which have fallen into the vent, or blocks which have been blown upwards during vent formation.

Locality 18

In the cave at this locality can be seen a large angular fragment of calcified wood.

Locality 19

At a number of localities the tuffs display spheroidal weathering; here is a good example.

Locality 20

Contorted sediments. Beyond the eastern margin of the vent the sediments are contorted and fractured. The folding often occurs as small basins which suggest localised collapse of sediments over small pipes.

Locality 21

Lithic tuff. Close to one of these basins is a small outcrop of intrusive lithic tuff, comprised of quartz grains in a matrix of quartz, chlorite, sericite and glass.

Locality 22 (Figure 24.1)

Many of the sediments in this area are visibly rich in ostracodes.

Locality 23. Fossils

The shales here yield small mussels, *Lingula mytiloides*, *Estheria striata*, *Spirorbis* and fish remains.

Locality 24. Deil's Dyke

The most prominent dyke cutting these sediments is the olivine-dolerite intrusion of Deil's Dyke. Near High Water Mark a branch of the dyke incorporates a strip of manly sediments, the baking resulting in the development of bands with well-marked pisolitic structure. Nearby is a narrow fissure-vent filled with agglomerate which extends for several metres alongside the dyke, which chills against it.

Locality 25. Greenan Castle

Locality 25. Greenan Castle is built on a knob of well-bedded grey-green tuff similar in fragment content to the bedded western tufts of the Heads of Ayr vent. The cement is highly calcareous. These tufts were probably erupted from the Heads of Ayr volcano.

Localities 26–28. Passage beds

On the foreshore north of Longhill Point rocks of the Passage Group ('Millstone Grit') are exposed. The lavas are olivine-basalts and the overlying red and green mudstones belong to the same horizon as the Ayrshire Bauxitic Clay.

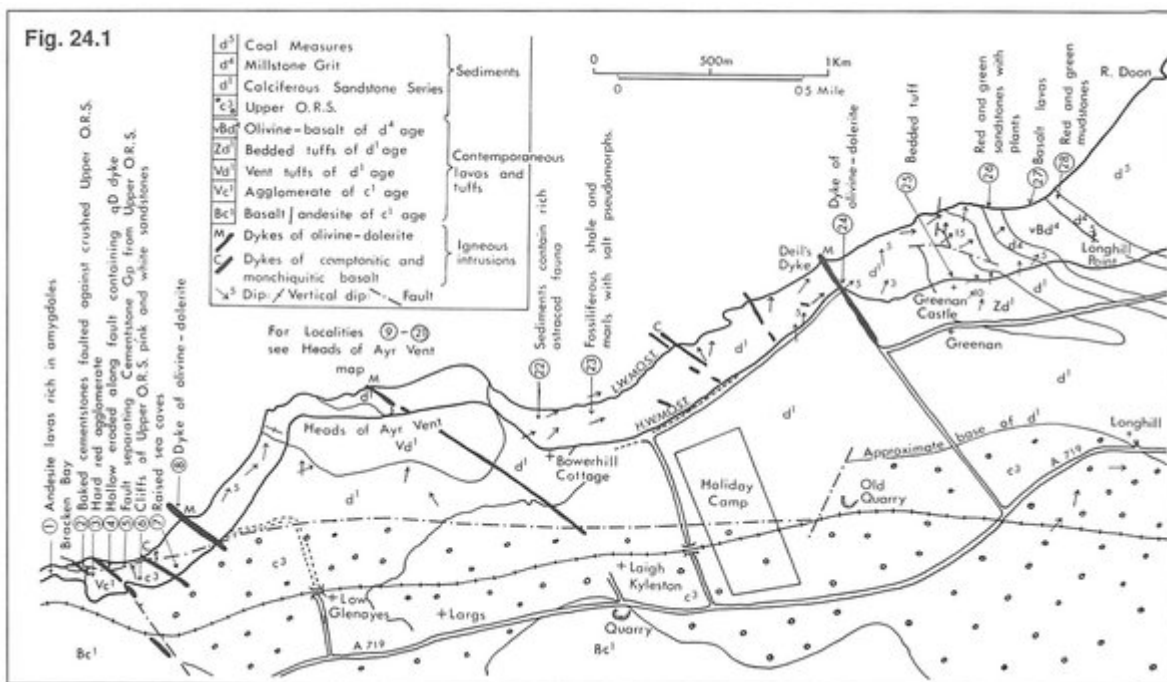
References

TYRRELL, G.W. 1920. The igneous rocks of the Ayrshire Coast from Doonfoot to the Heads of Ayr. *Trans. geol. Soc. Glasg.* 16, 339–63.

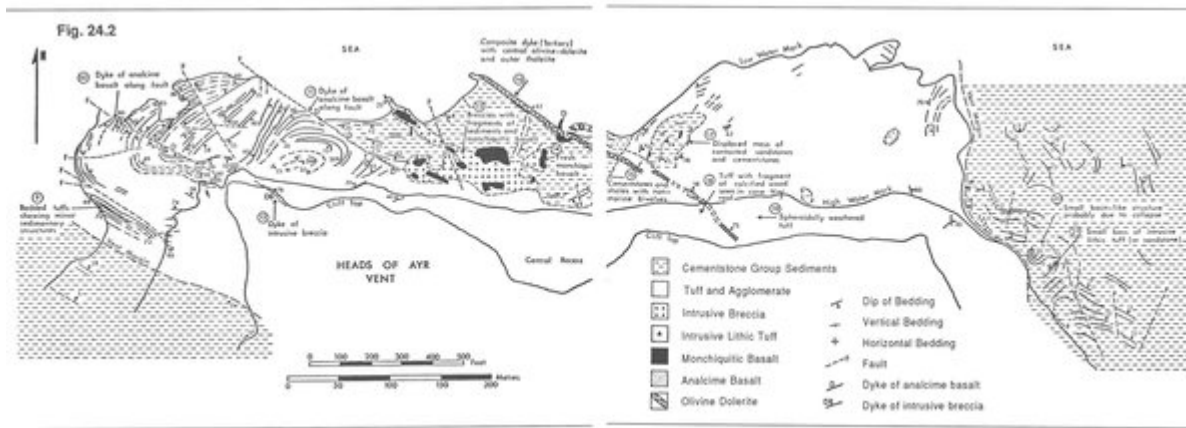
EYLES, V.A. et al. 1929. The igneous geology of Central Ayrshire. *Trans. geol. Soc. Glasg.* 18, 361–87.

EYLES, V.A. 1949. The Geology of Central Ayrshire. *Mem. geol. Surv. U.K.*

WHYTE, F. 1964. The Heads of Ayr vent. *Trans. geol. Soc. Glasg.* 25, 72–97. 300



(Figure 24.1) Geological map of Heads of Ayr district.



(Figure 24.2) Detailed geological map of the Heads of Ayr vent.