Excursion 17 Saltcoats

Key details

Author	D.S. Weedon
Theme	Sediments of Coal Measures (Carboniferous) age and the intrusive igneous rocks associated with them.
Features	Baked mussel bands; fossil trees in their growth position; differentiation in a picrite/teschenite sill.
Maps	O.S. 1:50 000 Sheet 70 Ayr, Kilmarnock and surrounding area. B.G.S. 1:50 000 Sheet 22W Irvine
Terrain	Coastal section comprising low-lying rocks, generally fairly close to the Saltcoats promenade.
Distance	Saltcoats lies about 16 kin (10 miles) SE of Largs and on the coast road (A78).
Time	Easily accomplished in half a day.
Access	Any part of the shore section is easily reached via one of the sets of steps down from the promenade. Cars can be parked in many places along the B714, but preferably in one of the official car parks along the sea front. (SSSI)

Locality 1. [NS 249 411] Coal Measure sediments and sill. Opposite Seaview Road

Here Coal Measure sediments are well exposed, together with the top of the underlying teschenite sill, whose resistance to erosion has formed the headland which terminates at the pier (Figure 17.1). Heat from the underlying igneous intrusion has produced noticeable thermal metamorphism in the sediments immediately above, which are baked and hardened. The sill outcrops at the base of the promenade wall and immediately above occur two mussel bands, which contain the basal fauna of the similis-pulchra Zone, with *Anthraconaia salteri*, *Anthracosphaerium turgidum* and species of *Anthracosia*. With the baking and hardening, the non-marine bivalves in the lower of the two bands are well preserved but have become welded together: hence individual specimens are difficult to obtain. The overlying Wee Coal is visible at low water.

Locality 2. Fault

Between here and Locality 1, the succession has been displaced seawards by a NW–SE trending normal fault. This latter feature is well worth examination, as the respective rock units can be easily traced to the line of the fault from each side and their displacement measured. These are excellent exposures for study by those new to geology. Only the top of the sill is seen to the east of the pier, as the greater part of the sill has been built over: however, in a cutting of the former Caledonian railway, some 1 km inland, the sill consists of three layers, an upper and lower teschenite layer and a median picritic layer (cf Saltcoats Main Sill, Locality 4).

Locality 3. Fossil trees

Coal Measure strata are well exposed in the extensive inter-tidal platform known locally as the Hirst. A thin coal (probably the Lower Wee Coal) is exposed together with overlying sandstones. These are cut by a sinuous, generally NW-SE trending, basic dyke which forms a distinctive feature across the bay at low water. On the seaward side of the dyke two small teschenite sills are exposed. It is immediately above the larger sill (shown on the map) that fossil trees are located (Yuill 1963). The trees occur in three groups within the sandstones lying immediately above the larger sill (approximate positions indicated on (Figure 17.1) at localities A, B, and C. In all, some 30 tree stumps were identified by Yuill, each in its position of growth. It should be noted that they were located after a succession of gales had swept clear the area of

sand and shingle: as this is in constant motion, some or all of the stumps may not be exposed at any one time. The trees have been eroded to the general overall surface level and therefore diligent searching is necessary to locate them. The original outer layers have been preserved (unlike the trees at Fossil Grove) and they are of the sigillarian type, showing a ribbed appearance.

Please do not use hammers at this locality.

Locality 4. Saltcoats Main Sill

The foreshore south of the Bathing Pool is formed by the Saltcoats Main Sill, an intrusion of Permo-Carboniferous age about 18.5 m (60 ft) thick, conformable with the regional dip towards the SE. It comprises three main units, believed to have been intruded successively (Patterson 1946): flow-banded teschenite, biotite-teschenite and p icri te. A flight of steps leads directly on to the upper margin of the sill, whose topmost unit, comprising flow-banded teschenite, is in sharp contact with the overlying sandstones, which are hardened and altered to spotted hornfels.

Stoping of the overlying sediment has occurred as xenoliths of hornfels are common within the marginal teschenite: they normally lie parallel with the flow-banding. The flow-banded teschenite is about 2.7 m (8 ft) in thickness. Its contact with the underlying biotite teschenite is somewhat irregular but generally conformable with the overall dip of the sill. The contact between these two rock types is relatively sharp.

The biotite teschenite is characterized by its weathering into smooth rounded masses of fresh black rock accompanied by segregation veins and patches rich in pink analcite. The latter have been related mineralogically to lugarite (Patterson 1946) albeit with a higher percentage of potassium than the type rock (Lugar Sill, Excursion 23). There is no apparent chilling of the veins against the host teschenite and they appear to be segregation veins formed at a late stage in the cooling history.

The underlying central picrite occupies the central portion of the sill. It is approximately 9 m (30 ft) in thickness, and is essentially hornblende-picrite. There is no visible chilling of either picrite or the overlying biotite teschenite, but offshoots of picrite appear to intrude the teschenite and 'rafts' of the latter are present in the uppermost part of the picrite. The lower contact of the picrite with the underlying biotite teschenite shows similar relationships, namely no visible chilling of either rock type.

The Lower biotite teschenite forms the base of the sill, a layer about 3.6 m (12 ft) in thickness. The lower contact is with the Kilwinning Main Coal, which has been metamorphosed by the intrusion into a columnar coke. The lowermost part of the sill (some 1.5 m or 5 ft) has been altered into 'white trap'.

Locality 5. Dykes

Below the Main Sill and the underlying Kilwinning Main Coal the Carboniferous sedimentary rocks, dominantly sandstones, are cut by a number of sinuous dykes with an overall E–W trend: they are generally doleritic affinities.

Locality 6. Ayrshire Bauxitic Clay

Further west, close to the low-water mark, the Ayrshire Bauxitic Clay is poorly exposed (bauxite, see Glossary). Varying in thickness from 1.2–1.6 m (4–5 ft), its upper highly-oolitic portion passes down into a reddish clay which contains specks of sphaerosiderite. The clay is underlainby decomposed lavas.

Locality 7. Limestones

Exposure of the limestones present at this general locality is unpredictable, owing to the shifting beach sand cover. Three limestone bands may be exposed, the highest being distinctly siliceous (note the relative hardness) and underlain by an arenaceous fireclay rich in ferruginous concretions. These limestones have been correlated with rocks of the Upper

Limestone Group exposed to the north of Saltcoats, but this age is problematical.

A further feature of geological interest in this general area is the picrite sill forming the headland of Castle Craigs at Ardrossan [NS 226 414]. It is described by Falconer (1907) as a banded intrusion composed of a lower marginal layer of olivine-feldspar rock (picrite) overlain successively by hornblende-dolerite and a fine-grained banded dolerite. The sill is exposed both on the shore at Castle Craigs and also inland along Hill Street, where curved columnar jointing is pronounced.

It is not recommended that the far end of Castle Craigs be visited, unless specimen collecting is vital. The intertidal rocks are seaweed covered and slippery and little may be observed on the weathered surfaces. Also, they are accessible only at low tide and as there is an overhanging unclimbable breakwater along the headland, unless care is exercised one may easily become cut off by the tide; this would result in at least a very wet return journey.

In contrast, there are many exposures of the sill which are easy to find inland, in the vicinity of the ruined castle on the hill above the headland.

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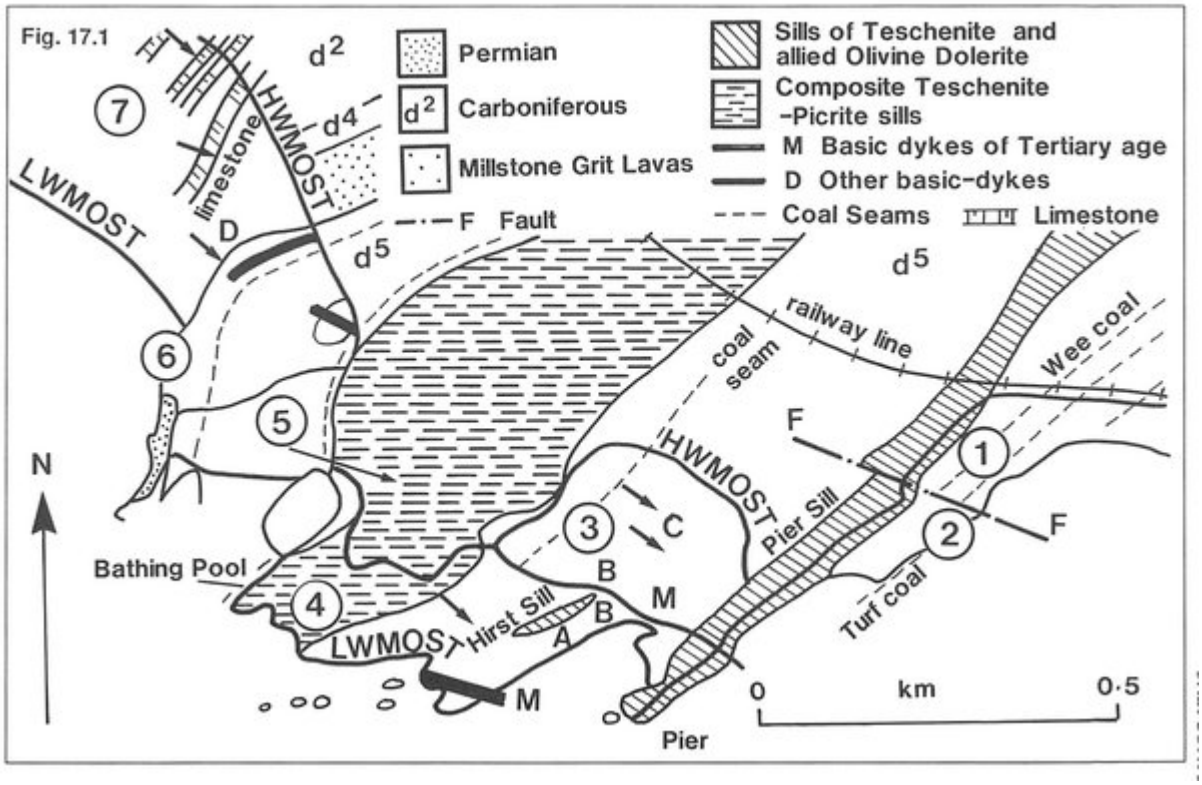

(Figure 17.1) Geological map of the coast near Saltcoats.