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# River North Esk

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O.S. 1:50000 Sheet 66 Edinburgh

B.G.S. 1:50000 Sheet 32E Edinburgh (Solid) B.G.S. 1:63360 Sheet 32 Edinburgh (Drift)

Route: (Map 20)

## Introduction

At the end of the last ice age, torrential meltwater from a decaying ice-sheet lying between the Moorfoot Hills and the Pentland Hills, cut deep gorges through glacial deposits and into the underlying rocks as it rushed to the sea. The gorge of the River North Esk between Polton and Roslin cuts deep into the Passage Group rocks known locally as the Roslin Sandstone, and further upstream there are fine exposures in the sandstones of the Upper Limestone Group and the Roslin Sandstone (Tulloch and Walton 1958, pp. 61–92).

The whole excursion, along the River North Esk from Potton to Penicuik, makes a good day, or it can be split into two half day excursions, with Roslin as the mid-point. Rights of way beside the river exist for the whole length of the excursion.

### 1. Polton Bridge: landslide, glacial deposits

The northern part of the excursion starts from the north side of the river by Polton Bridge [NT 288 648]. The path on the west bank skirts the head scarp of the huge landslide of 1979 (Baird and Smellie. 1980). The top part of the landslide is sand and gravel in which several rock types, including andesites and basalts, can be recognised as originating from the Pentland Hills. The bottom third of the slope is boulder clay.

### 2. Maiden Castle: meander, earthwork

Passing the landslide, a detour can be made over the narrow neck of land into the loop of the North Esk known as the Maiden Castle. This barely discernible earthwork is the remains of a Bronze or Iron Age defended area. Cliffs at the far side of the meander show basal posts of red Roslin Sandstone overlying yellow bedded sandstones and grey or purple mudstones. The route continues south through a fairly open valley with over-steepened sides.

### 3. Hawthornden Castle: gorge in Roslin Sandstone

Upstream, south-west from Hawthornden Castle, once the home of the poet Drummond (Macgibbon and Ross 1887), the North Esk runs through a 1.5 km long gorge. From a point about 100 m downstream of Hawthornden Castle, it is possible to leave the path when the water is low and wade up the gorge, but once this route is commenced one must continue to the end of the gorge or return to the starting point. Should one venture by this way, then from the riverside just 100 m upstream from Hawthornden Castle can be seen the highest cliff section in the whole excursion. Sheer cliffs of a beautiful rose-red sandstone rise abruptly from the north bank of the river to a height of 30 m, stretching for over 100 m along the gorge. Massive posts of sandstone in this section show very fine examples of current-bedding. Along the bottom of the gorge the river has scoured out the softest parts of the bedrock to form pot holes, undercuts and deep narrow channels.

Alternatively, superb geological and historical views of Hawthornden Castle can be seen from the cliff top high on the west bank of the river. By following the path which gently descends to just above the river, beautiful exposures of the pinkish red Roslin Sandstone can be seen. Current-bedding, apparent everywhere, often on a large scale, shows that this sandstone was laid down in a high energy, continually changing river environment. Bands of pebbles at the base of this pebbly, gritty sandstone indicate each surge of current.

## **4 and 5. Roslin Gorge: Roslin Sandstone, tufa**

Towards Wallace's cave below Gorton House (4), the gorge becomes narrower and even more spectacular. Note how cliffs undercut by each river meander alternate along the valley with steep wooded slopes of slipped rock and glacial deposits. High on the west side of the gorge, 100 m downstream of a sandstone sluice, a small area of calcareous tufa lies on the Roslin Sandstone. This unusual deposit, of uncertain source and age, can be attributed to a supersaturated stream of lime-rich water. Just beyond the tufa, is the first of several streams which plunge in cascades down the cliff face from the hanging valleys above. Upstream one emerges from the gorge below the towering walls of Roslin Castle (5), home of the Sinclair family since the 14th Century (Macgibbon and Ross 1887). A fault throws down the Roslin Sandstone seen in the gorge against Upper Limestone Group strata to the south.

## **6. Old Roslin Powder Mill: decalcified sandstone**

The southern part of the excursion starts at the gates of the Old Roslin Powder Mill, the area surrounding which is a country park supervised by Midlothian District Council. The gates are at the sharp bend on the B7003 below Roslin village [NT 273 633]. On the right of the track through the Old Powder Mill are several embayments cut into the sandstone to provide secure and separate sites for the various buildings connected with the manufacture of gunpowder. In the walls of many of these embayments considerable decalcification of the sandstone has taken place, possibly due to acid water from peat banks on the high ground beyond running down the steep faces (Sinclair 1794). The basal portion of these sandstones contains fragments of the underlying mudstone, bands of small pebbles and, in several places, plant fossils such as *Calamites*.

## **7. Hare Craig: Upper Limestone Group**

The track crosses the North Esk on a wooden bridge [NT 266 621] from which can be seen a superb section of Upper Limestone Group sediments on the east bank of the river. Upwards from river level are several cycles of sandstone and mudstone overlain by a fireclay some 3 m thick. Massive sandstones have channelled into the top of the fireclay and continue upwards for 10 m to the viewpoint of Hare Craig on top of the cliff. Leaving the river just beyond the bridge, the path goes up the steep slope of the south bank to join the track of the old Eskbank to Penicuik railway which forms the rest of the route to Penicuik.

## **8. Hare Craig to Firth Viaduct: Castlecary Limestone, Roslin Sandstone**

A scramble down the ditch [NT 261 617] will reveal a small exposure of a fine-grained grey limestone which occurs 15 m above the sharp bend in the river. Mineralogically this is a dolomitic limestone, suggesting correlation with the Castlecary Limestone. The beds seen down river are therefore high in the Upper Limestone Group. Returning to the track, the journey continues along a more open stretch of the North Esk Valley with the river sweeping to the right. Just downstream from the Firth Viaduct, a fault brings a return to the Roslin Sandstone which continues all the way to Penicuik. This sandstone, however, lacks the coarseness, current-bedding and colour of the Roslin Sandstone at the type locality downstream from Roslin Castle. The rocks around Auchendinny either exhibit lateral changes in sedimentation, or lie at different stratigraphic horizons.

## **9. Firth House: sandstone, artificial tufa**

When the water is low, and one is clad in wellington boots, it is possible to leave the track of the railway at the Firth Viaduct, descend to the riverside and follow the river bank around the two spurs opposite Firth House. About 100 m downstream from the waterfall formed by a small stream on the south bank between Auchendinny House and Firth House, well-defined current bedding can be seen on the massive bottom post of two major sandstone ribs exposed high on the cliffs of the south bank. Only 25 m upstream from the waterfall, 15 m of the river margin are covered in a calcareous tufa deposited by water seeping from further up the bank. This tufa, although appearing similar to naturally occurring tufa, has been deposited as a secondary mineral by water percolating through the caustic dump of the Dalmore

Paper Mill - an interesting example of a geological feature resulting from man's activities.

## **10 and 11. Dalmore Mill: Roslin Sandstone**

Rejoin the track just downriver from the Dalmore Mill (10), pass through the tunnel under the B7026 and cross to the west bank of the North Esk by the old railway bridge which starts just beyond the tunnel. On the opposite side of the river, poorly exposed sandstone with almost horizontal bedding can be seen (11). Beyond, sandstones with a westward dip of 15° gradually become horizontal further upstream. In a rapidly eroding bank 6 m high, one can see an exposure of sandstones and mudstones which have almost certainly slumped from further up the bank.

## **12. Glencorse Barracks: sandstone quarry**

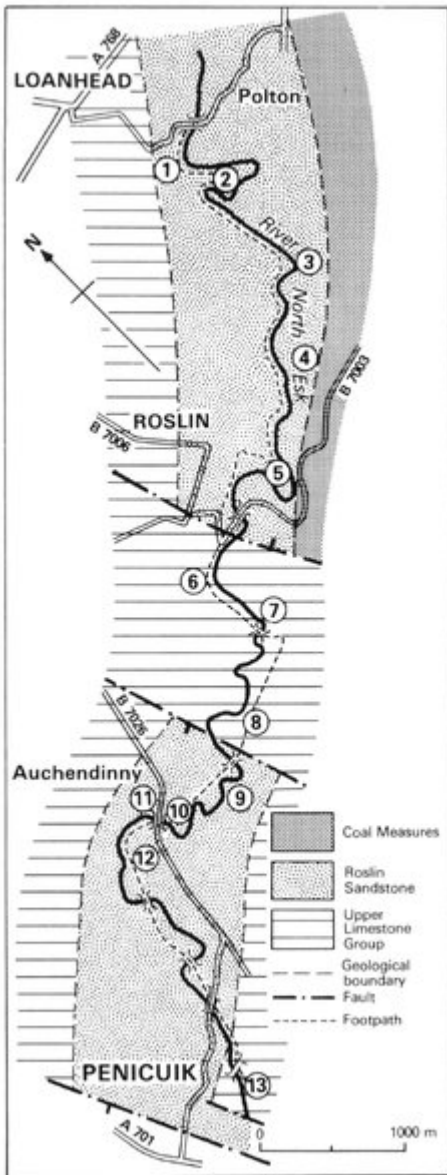
Opposite Glencorse Barracks sewage works, an old quarry exposes some 6 m of pale creamy buff sandstone, in places stained with iron. Within the horizontal beds, posts of sandstone up to 45 cm thick are separated by thin mudstone bands.

From the old quarry to Penicuik, a distance of 1 km, the valley opens out and takes on a more mature aspect. This appearance, however, is deceptive as the slopes up to the surrounding farmland are steep and liable to landslide under adverse conditions.

## **13. Penicuik: Calmy Limestone**

Continue beyond the Penicuik sewage works, across the bridge at Harper's Brae [NT 245 605] and take the walkway upstream on the east bank of the river to a point 60 m upstream from the wooden walkway bridge. Exposed just at water level on the east bank, is a limestone correlated with the Calmy Limestone. Return to the bridge at Harper's Brae and take the Kirkhill Road which rises steeply into Penicuik.

### **[References](#)**



(Map 20) River North Esk.