

City of Edinburgh, The Castle - an excursion

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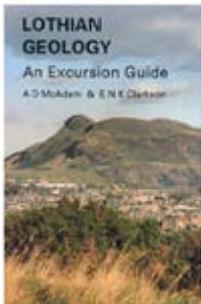
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City of Edinburgh. The Castle Hill

Author: C. D. Waterston. From: [Lothian geology: an excursion guide](#) . Edited by A.D. McAdam and E.N.K. Clarkson. 1996.



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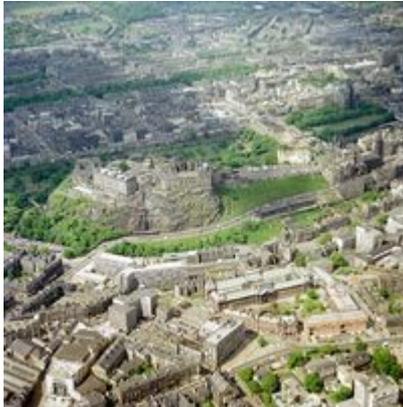
Walking Time/Distance: The Castle Hill 3.5 hours 2km

The Excursion starts at the Half-Moon Battery (NT 252 735) in the Castle. A Lothian Region Transport bus from Waverley Bridge goes up the Mound. Turn off at Johnston Terrace and go to the Lawnmarket.

1. Within the Castle Walls: Crag-and-Tail, Plug/Carboniferous Junction

The Castle Hill and the Royal Mile form a classic example of crag-and-tail featuring. The ice sheet moved from the west and impinged on the western face of the basaltic plug on which the Castle is

built. Ice was deflected towards the north and excavated the valley now occupied by Princes Street Gardens and the railway line leading to Waverley Station. Ice which was deflected to the south excavated the valley now occupied by the Grassmarket and the Cowgate. The 'tail' composed by sediments protected by the 'crag' and overlying drift, forms the gentle slope or the Royal Mile leading from the Castle to the Palace of Holyrood House. These features are well seen from the vantage points of the Half-Moon Battery and the Fore Well Battery.



Oblique aerial view of Edinburgh Castle from the south. A classic example of crag and tail featuring. The Castle is built on a basaltic plug of Lower Carboniferous age intruded into Cementstone Group (Dinantian) strata. The Castle Hill, together with the Lawnmarket and the High Street to the east, form a classic example of crag and tail featuring.

The Fore Well, situated at the northern end of the Half-Moon Battery, marks the position of the junction of the basaltic plug with the lower Carboniferous sediments which lie to the east. The basalt may be seen at the summit of the Castle Hill between the National War Memorial and the Half-Moon Battery, which is itself built on sediments (see below). Descend by the steps adjoining Argyll's Tower and turning right pass through the Portcullis gate. Some 10 m short of the Inner Barrier the northern part of the eastern junction may be seen in the right-hand gutter of the roadway. Here the basalt and greenish-grey Carboniferous marl are exposed close together, the marl having been hardened by contact with the basalt. Continue down the roadway and on reaching the souvenir shop opposite the guardhouse look at the cliff behind it towards the Half-Moon Battery when it is possible to see the sediments upon which the Battery is built. They lie between the junction with the basaltic plug, and the Castle Fault to the east, and consist of greenish marly shales dipping very steeply inwards towards the basalt. This dip was beneficial in accumulating water for the Fore Well.

2. Johnston Terrace (NT 251 734): Plug/Carboniferous Sediments Junction, Castle Fault

Leaving the Castle cross the Esplanade and descend the stairs to the right at Castle Wynd North. On reaching Johnston Terrace turn right and proceed downhill for 200 m. Above the grassy slope to the right, in the corner formed by the Half-Moon Battery and the Old Palace, the southern part of the eastern junction is well seen. It is vertical and the Castle Fault lies just to the east. The dip of the

sediments near the junction is steep but the sandstones under the esplanade, which are to the east of the Castle Fault, are dipping gently away from the plug. Continuing down Johnston Terrace the margin of the basalt rises as a steep cliff. The basalt which composes it is microporphyritic and of Dalmeny type. In thin-section it shows small altered olivines and augites embedded in a mesh of felspar crystals with microlithic augite and magnetite granules. The natural appearance of the basalt in the cliff above Johnston Terrace, and in the cliff overlooking Princes Street Gardens on the north side of the plug, has been somewhat altered by grouting and rock-bolting to stabilise the cliff face.

3. West Princes Street Gardens: Plug/Carboniferous Sediments Junction, Glacial Striae

Follow the base of the Castle Rock by entering West Princes Street Gardens by the Gate on the right 20 m short of the bridge carrying Johnston Terrace over King's Stables Road. On the left of the footpath is the valley excavated by ice whose easterly movement has been arrested by the west face of the Castle Rock. Use has been made of this valley as a site for the Car Park entered from Castle Terrace. On the right of the footpath the western junction of the plug with the Carboniferous sediments may be followed. Where it is first seen the contact is with sandstone, then some 100 m to the north-west with sandstone and marl, and then another 30 m to the north with marly shales. Follow the footpath to the northern face of the Castle Rock where marginal chilling of the basalt is well displayed.

Glacial moulding may be seen at a height of some 5 m on the northern face of the plug where it most closely approaches the railway. Near the ruins of the Old Well House glacial striae occur with an approximately east-west orientation. Looking westwards from the Well House there is evidence in the plug of horizontal columnar jointing controlled by cooling against a vertical margin. These joints are radial in plan and, although best seen at this position, may be traced all round the outcrop of the plug.

The railway traverses the site of a post-glacial lake which occupied the ice-excavated valley between the Castle and Princes Street. Between A.D. 1450 and 1816 the site was occupied by a smaller artificial lake called the Nor' Loch.

Access to Princes Street may be gained by way of one of the footbridges which span the railway.

The Royal Museum of Scotland (NT 258 733)

The Museum is situated in Chambers Street, which may be reached from Princes Street by way of the Mound and George IV Bridge or the East End and the Bridges. Opening hours are weekdays 1000 to 1700, Sundays 1400 to 1700.

The museum houses extensive geological collections, in particular Scottish minerals and Scottish fossils. In addition to displays of Scottish material there are exhibitions of a more general geological interest, to be seen in the Mineral Hall and the Evolution Exhibition.

At all times follow: [The Scottish Access Code](#) and [Code of conduct for geological field work](#)

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