Edinburgh's dramatic landscape owes much to the varied nature of the underlying geology, even though the rocks were formed some 300 to 350 million years ago, in the era known as the Carboniferous. The hard volcanic rocks stand up as hills, while the softer sedimentary rocks have been worn down to form the low ground. Erosion, especially by ice, has given the hills their sharp and ridged appearance.

Calton Hill is typical and displays many of the features of Edinburgh's volcanic hills. In addition it is surrounded and surrounded by buildings of the Edinburgh New Town, now a World Heritage Site. Finally the short climb to the top is rewarded by one of the most spectacular panoramas in the Lothians.

Calton Hill is protected by Scottish Natural Heritage as a Site of Special Scientific Interest as part of the Arthur's Seat Volcano SSSI complex which also includes Edinburgh Castle Rock.

To the south, lies the Arthur's Seat Volcano (see drawing opposite). The top part of the tilted volcano has been lost, and only fragments are left. The double summit is the remnant of the two central vents where the molten rock, or magma, came to the surface. The ridges on Whinny Hill, to the left, are the remaining part of the cone built up by lava flows from many eruptions, with layers of volcanic ash, or tuff, thrown out during explosive episodes. Each rocky ridge is formed of one lava flow, each grayly yellow hides tuff. [Salsbury Crag is a quite different geological formation called a sill, formed where the magmatic flow did not reach the surface, but was squeezed between sedimentary layers.]

Calton Hill is a fragment of the cone of the Arthur’s Seat Volcano, displaced by a geological fracture, the Calton Fault, to the south, and bounded to the west by the Greenside Fault. On Arthur’s Seat there are 12 lava flows, with bands of volcanic ash, there are fewer lava flows, but more ash, on Calton Hill. To the west, the lower lavas are formed of basalt, a black rock with crystals; on the eastern summit, the upper lavas are formed of igneous, a paler crystalline rock. Geological forces tilted the rocks so that they slope, or dip, to the east, just as can be seen on Arthur’s Seat. Thus the lowest, oldest rocks occur on the west side of Calton Hill, and the younger rocks form the east slopes.

The Carboniferous sedimentary rocks, including the sandstones, which were quarried for the building of the New Town, occur in the low ground. During their formation in Carboniferous time, eastern Scotland was occupied by river deltas depositing great thicknesses of sand and mud. The quarries are mostly filled. Fortunately at the former Craigmillar Quarry in Blackhall, now a RIS (Regionally Important Geological Site) the upper parts of the Craigmillar Sandstones are preserved and accessible. This sandstone is very fine-grained and grey-white.

The final major geological act was the ice age which lasted from over 2 million years ago to as recently as 15 thousand years ago. On several occasions, a thick ice sheet covered the Edinburgh area, and moved from west to east, moulding a west-east grain and forming the geological feature called craig-and-tail. Calton Hill is a craig-and-tail, as is Edinburgh Castle. Each has steep cliffs round the west side worn by the ice, and a long, gently sloping tail to the east in the lee of the ice flow.

A walk is described overleaf. The first ten localities describe the outcrops and buildings on Calton Hill itself, and give access to the panoramic views. Localities 11 to 36 describe many of the important buildings around the north, west and south sides of the hill. The later classical buildings on Calton Hill are associated with the extension of the New Town and constructed in the late 18th and early 19th century designed by some of Scotland’s most famous architects. They have a story to tell about the use of stone.
A walk amongst monuments of stone

1. Start at Calton Hill Steps where you can see the rocks which form Calton Hill; coarse-grained bedded tuff is overlain by basalt lava.

2. Climb steps to Dugald Stewart Monument (built 1831, designed by William Playfair) of yellowish-grey sandstone from Humble, West Lothian.

3. Townscape panorama towards Edinburgh Castle.

4. Old City Observatory House (1775, James Craig), earliest building on Calton Hill, of local volcanic materials in rubble work which can be matched with the lava exposed on W side of Observatory, note the oblong white crystals and rounded gas bubbles. The rubble walls contrast with dressed sandstone masonry of the Observatory extension and adjacent New Observatory (William Playfair, 1818).

5. Playfair’s Monument (1826, William Playfair) to his uncle Prof. John Playfair, built of sandstone from Craigleith Quarries, west Edinburgh.

6. The Nelson Monument, in the shape of an inverted telescope, c.1810, Robert Burn of Craigleith Sandstone.

7. Panorama of the Arthur’s Seat Volcano. Cliff belt formed by two lava flows.

8. Unfinished National Monument (1820, C R Cockerell and William Playfair) 12 columns each of 13 pieces surmounted by impressive architrave of Craigleith Sandstone with wavy bedding of mica flakes.

9. NE part of New Observatory (1895, Robert Morham) octagonal building with copper dome, sandstone from Binny Quarry, West Lothian. Panorama across Firth of Forth.

10. Note two glacial features here: glacial erratics, large boulders carried and dumped by the ice sheet, ring the turning area; and the Triangulation point on glacially smoothed pavement of mica-gneiss showing typical closely spaced joints.

11. Take path downhill to Royal Terrace, passing the 'Stiff gothic' Greenside Church (1830, James Gillespie Graham). Royal Terrace Gardens were extensively quarried for stone prior to 1820s. Continue along the upper part of Leith Walk and along Queen Street.

12. St Mary’s Roman Catholic Cathedral (1813, James Gillespie Graham) repaired with fine greenish grey sandstone from Woodburn, Morley, Yorkshire.

13. St Paul’s and St George’s Episcopal Church (1810, Archibald Elliot) of fine-grained sandstone from Redhall, Edinburgh.

14. Paton Building faced with warm coloured Trinny sandstone from Clashach near Elgin; as in Museum of Scotland, Chambers Street.

15. National Portrait Gallery (1890, J R. Arnot and Andrews), reputedly first use in city of gaudy New Red Sandstone (Permian-Trias); red sandstone from Moat near Longtown, Cumbria, with recent repairs from Coshill, Annan, granite pillars on first floor windows at side and front.


17. North side of St Andrew Square note contrasting styles of rubble work. Nos 21, 22 (1770-72) of coursed rubble, probably local stone from Beauford’s Park; ashlar facing of ground floor dates from 1845-46; No 21 has Doric porch (1840), probably of Binny stone; No 22 Cornish porphyry (1856) stonework around lower windows also looks like Binny stone c.1840.

18. Monument to Henry Dundas, Viscount Melville—Column (1821) of Callanish sandstone, Fife; Statue (1828) by Robert Forrest.

19. In Thistle Street the Standard Life Extension Phase One (1964, Michael Laird & Partners) is constructed of sandstone from Blelter, Otterburn, Northumberland. In Thistle Street South East Lane the rear of building is constructed of sandstone with a pronounced wavy lamination.

20. Thistle Court (c.1784) is of locally derived rubble including volcanic rocks. Reportedly the first house built in the New Town.

21. The Scottish Life building (1962, Gordon & Blyth), 19 St Andrew Square, has superb entrance columns of polished larchvite, a blue syenite from Norway. The sandstone cladding is from Springwell, Gateshead and Weifield, West Yorkshire.

22. The Standard Life building of rusticated sandstone mhill (1897–1901, J M Dick Peddie & George Washington Browne) occupies the corner of St Andrew Square and George Street. Next to this building in George Street is the Phase Three Extension (1975, Michael Laird & Partners) with sloping cladding below the ground floor windows of a granite gable of large pale feldspar in matrix of quartz, black biotite and ruby-red gneiss. The adjacent building, No 13 George Street, with grey granite columns, was designed for the Royal Insurance Company (1898, W. Hamilton Beattie).

23. Column and portico of St Andrew’s and St George’s Church (1745, Major Andrew Fraser) of Craighleith Sandstone, wavy with oxidised inclusions. Main building is polished ashlar front and droved circular body, reputedly of Redhall stone but looks like Craighleith.

24. The Corinthian Portico of the Dome (formerly Royal Bank of Scotland, 1847, David Rhind) is of Binny Sandstone.

25. Former Guardian Royal Exchange building (1940, Leslie Gammie-Thomson) of grey Creetown Granite over polished black granite.

26. Former Scottish Widows building (1962, Basil Spence, Glover & Ferguson), 9–10 St Andrew Square, has Carboniferous Devonian limestone with bands of hardy and brachiopod fossils over black Bon Accord granite.

27. Charles Jenner’s Workshop (1802) of bright red sandstone from Gateheadbridge, Thornhill, Dumfriesshire. Jenner’s Store, which fronts on to Princes Street, of very pale orange sandstone from Craigy, Bellingham, Northumberland.

28. The Scott Monument (1846, George Meikle Kemp) of Binny sandstone. Recent indis of Clashach and Binny stone.

29. The Royal Bank of Scotland Dundas Mansion (1772-74, Sir William Chambers, and Sir Laurence Dundas) of sandstone from Redhall, NB cross-ifications on right side. Morgan House fourth pavilion to Dundas mansion (1769, Robert Adam) is of Craighleith.

30. Register House (Robert Adam’s masterpiece, started 1774) mainly of Craighleith; northern extension (1834) possibly Binny Sandstone; later extensions (1862) of Lomondstone. In front, Lord Iron Duke (Duke of Wellington) by Sir John Steell, is bronze on pedestal granite.


32. The former General Post Office (1860, Robert Matheson) of Binny Sandstone. The rear, seen from Regent Bridge of Duddingston Sandstone from Wooler, Northumberland.

33. Regent Bridge (1815, Archibald Elliot), top of Craighleith Sandstone, below of sandstone from the Criggimill quarries, south Edinburgh.

34. Old Calton Burying Ground, monuments display varying weathering. Governor’s House of Calton Gaol (1817, Archibald Elliot), of sandstone from Hermad, West Lothian.

35. St Andrew’s House (1934-39, Thomas Tait) of sandstone from Darnay, Northumberland.

36. The former Royal High School (1820, Thomas Hamilton) of Craighleith Sandstone. This building used for the Scottish Assembly considered for the Scottish Parliament, now destined as museum of early photography.