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# The geology of Dalkeith Country Park

Produced by Lothian and Borders GeoConservation

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(Front cover)

(Figure 1) Map 1 Locations.

(Figure 2) Map 2 geology map of Edinburgh and Midlothian.

## Acknowledgements

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<https://www.edinburghgeolsoc.org/home/geoconservation/>

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## Sandstones for buildings

Sandstone is the most important rock type used to construct the buildings in Dalkeith Country Park, from the magnificent Dalkeith Palace to more mundane buildings such as the Stables. Magnificent and mundane buildings, as well as sandstone exposures, can be seen at the points marked on (Figure 1). Sandstones consist of grains of minerals, most commonly quartz, that have been packed together and then cemented by other minerals. Good quality sandstones with small grains cemented tightly together can be intricately carved, whereas poorer sandstones have larger grains with cements such as iron or calcite which sometimes don't hold grains together firmly. By looking closely at local buildings you will be able to see variations in the nature of different sandstones.

The sandstones found in the Dalkeith area are not fine-grained or well-cemented enough to use for carvings on prestigious buildings. Dalkeith Palace, St Mary's Church and Montagu Bridge are likely to have been faced by Craigleith Sandstone extracted from one of several quarries at Granton, north of Edinburgh. Imagine the labour of men and horses bringing stone from such a distance!

The close-up photo of a section of a wall in Restoration Yard shows the yellow, orange and brown colouration which comes from iron-rich solutions which drained through the sediments after burial under further deposits of sand. Some of the stones show intensely folded beds, formed when the wet sand grains were stirred up by local movements in the earth's crust.

### 1. Restoration Yard [NT 33788 68095]

The two-storied stables and coach house around the courtyard were designed by William Adam in 1740 and built in distinctive red sandstones, probably brought from the Borders. Coarse-grained sandstones of varying colours were used, as these were not buildings which were designed to impress visitors.

## **2 The Orangerie [NT 33818 68181]**

The Orangerie was designed by William Burn and built around 1832–4, possibly from Craigleith Sandstone which is 340 million years old. The building has twelve sides and twelve Roman Doric columns, with radial iron trusses to support the glazing. Designed to cultivate oranges, the combination of soot from the chimney which darkened the glass and the polluted local water supply meant that the experiment failed and the building was used to grow ferns instead.

## **3 Carboniferous times [NT 33858 68230]**

The pink and orange sandstones seen in the river bank opposite the Orangerie are 310 million years old. The beds of rock slope gently downstream towards the west, because they are on the eastern side of a downfold of Carboniferous rocks running from the Firth of Forth towards the south-west, as shown in (Figure 2).

These rocks were originally laid down in horizontal layers. Then 300 million years ago, a collision of tectonic plates caused the rock layers to be squeezed, bent and broken to form folds and faults.

## **4 Carboniferous rivers [NT 33784 67949]**

In the banks and bed of the River South Esk, seen from the footpaths to the south of Restoration Yard, are red sandstones, slightly older than the sandstones at the Orangerie. These beds are not evenly spaced and this tells geologists that the sediments were deposited in river channels, deeper in the middle of the river than on the banks, so that the beds are curved like saucers. These sandstones don't easily form rectangular building blocks unless worked by stonemasons. Many of the stones in Restoration Yard have chisel marks on their surfaces.

How a Carboniferous rain forest would have looked 320 million years ago. During the Carboniferous period (359–299 million years ago), large river channels meandered across flat plains depositing sand grains as floods receded. The land-mass, of which Britain was a part, was moving northwards due to the process of plate tectonics. By 330 million years ago there were many large rivers and tropical forests because the continent was close to the equator where the climate was hot and wet.

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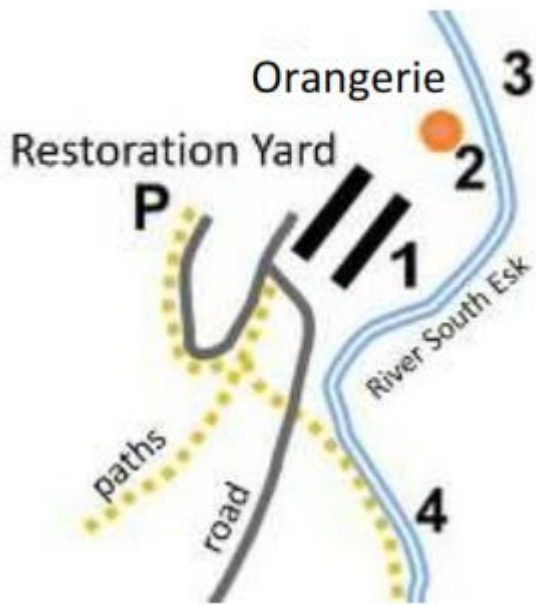
Building in sandstone  
Restoration Yard



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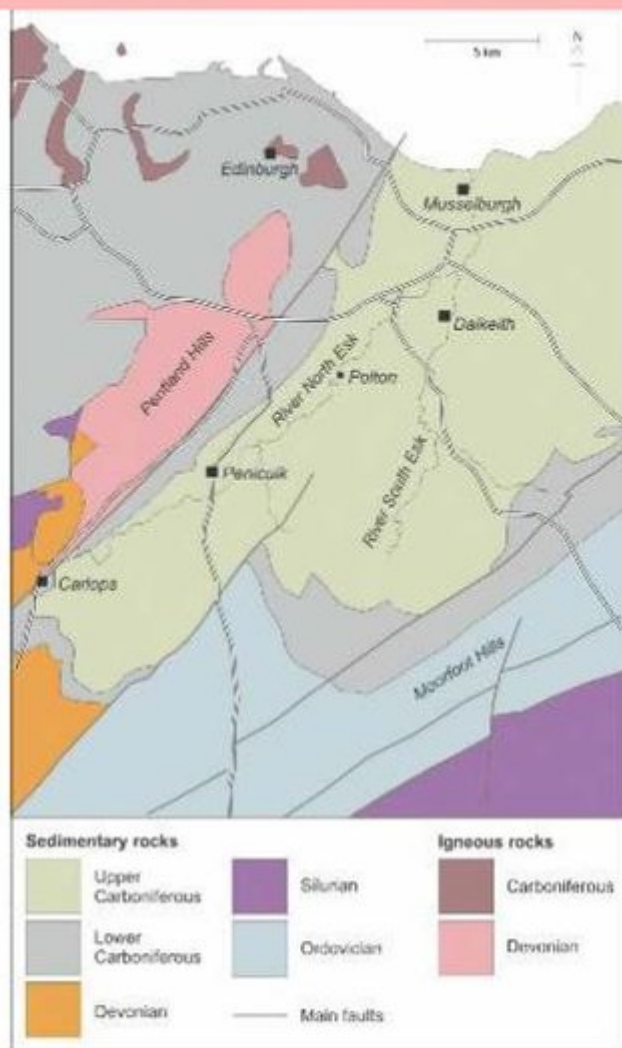
*Front cover.*

## MAP 1 LOCATIONS



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## MAP 2 GEOLOGY MAP OF EDINBURGH and MIDLOTHIAN



Map 2 geology map of Edinburgh and Midlothian.