

325 million years ago



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Hidden away in this small wooded dell is evidence of much older woodland from 325 million years ago - a **fossilised tree** trunk. Although difficult to see, you can still feel the rough bark that was turned to stone when the tree became buried under sediment. Other pieces of fossilised tree can be found in the walled garden and in the Pavilion.



The main **waterfall** at Rouken Glen is a spectacular sight, especially after heavy rain, but it is also a bit of a cheat! The regular blocks on its face show that its height has been raised substantially to create a weir.

This construction happened in the 18th Century to give a much larger supply of water to the mills downstream from here. The obvious power of the water cascading over the edge and down the gien suggests how it can make dramatic geological changes over thousands of years. The rapids formed here because the Auldhouse Burn has been wearing away for millennia at tilted layers of different rocks which vary in hardness.



This large boulder on the grass between the path and the railway line looks unremarkable from a distance. Look closely at the boulder however and you will see it is made up of a mixture of large and small rock fragments.

This type of rock is called a **conglomerate** and nothing like this can be seen in the park today. This boulder may have been carried here by the ice sheet and left when the ice melted. Boulders like these are called **erratics**.



Your immersion into the geology of Rouken Glen starts with a gentle stroll from the old boathouse around the boating pond to these large flatish rocks.

Here you are plunged immediately into the **Ice Age**. As recently as 10,000 - 11,000 years ago this area would have been covered by almost a kilometre of ice. These rocks provide the proof of this. They are made of sandstone and if you look closely at the surface you can see long straight scratches.

These gouges were made by deep glacier ice dragging rock fragments over them to feel how smooth the rock has been worn. The glacier was part of a huge ice-sheet moving south from the Highlands.



Special Designation

Rouken Glen is the best place in Scotland to see the Orchard Beds. Most of the other exposures have been lost by filling in of quarries or development. Because of this the part of Rouken Glen Park on either side of the Auldhouse Burn is designated a Site of Special Scientific Interest (SSSI).

The rocks which you can see in Rouken Glen were mostly formed during the **Carboniferous geological period** about 325 million years ago. At this time Scotland was close to the equator with a humid tropical climate. This area was part of a huge coastal plain on the edge of a shallow sea - a bit like parts of Borneo today. The landscape was changeable. Sometimes the sea flooded the land and the shallow tropical seas allowed corals to grow and marine plants and animals to thrive. Sometimes there were large river deltas and muddy swamps. The thick sandstones represent river channels. The thin-bedded sandstones were formed in wet swamps, or in the shallow tidal seas. Coals represent forests growing in drier swamps and mudstone represents quiet water - either in swamps or offshore. Limestones represent deeper marine conditions. The Rouken Glen gorge is the best remaining place in Scotland to see these rocks.

More recently, about 20,000 - 15,000 years ago, Scotland was covered by a large ice sheet.

The ice above where you are now standing would be over one kilometre thick. As it moved it dragged along boulders and rock fragments. Today when you look round the park most of the rocks formed during the Carboniferous lie beneath deposits of mud and rock left behind when the ice melted.



This leaflet has been produced in partnership with the Strathclyde Geoconservation Group - part of the Geological Society of Glasgow.

Its members aim to conserve and promote local geology and identify sites which highlight local geodiversity and earth heritage. Geodiversity is the variety of rocks, minerals, fossils, soils and landscapes and the natural processes which form them. If you would like to find out more about the Group, visit its page on www.geologyglasgow.org.uk

To find out more about Scotland's geology, visit www.scottishgeology.com

In particular, thanks go to Dr John Faithfull who carried out the original survey of the geology of the park and to Margaret Greene who adapted this information for this leaflet.

Additional text and photographs were provided by Steve Edwards and Sharon McMurtrie, and Ian and Lynda Chisholm

Visit the Pavilion Visitor Centre for more information about the geology of Rouken Glen Park and any events which might be planned.

www.roukenglenpark.co.uk
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The orchard beds geo-trail

Time travelling between ice flows and tropical deltas



Rouken Glen Park



Explore

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Giffnock Sandstone

The **Picnic Rocks**, along with the waterfall and the steps down to the burn below, are all parts of one thick layer of sandstone called the **Giffnock Sandstone**.

This rock was one of the most important building stones in the Glasgow area during the 19th century with huge quarries near Orchard Park Road, and at Braidbar. These are now mostly filled in so Rouken Glen is the best place to see the Giffnock Sandstone. Many of the houses in the area are built of this stone as well as some buildings in the city centre.

The sandstone was laid down as sand in wide river channels. At the waterfall the layer, or bed, of sandstone may be up to 15 metres thick, but at the Picnic Rocks the sandstone bed seems much thinner – this may have been near the edge of the channel.

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Sandstone steps

The **steps at the waterfall** were carved from the natural sandstone layer. At the bottom of the steps you can see the upper part of the Giffnock sandstone on the far side of the burn.

These upper parts are finely layered which made it useless for building. This fine layering indicates a change in the environment – the flow in the river was reduced, and these layered rocks were deposited in quieter swampy waters, which were sometimes briefly flooded by the sea.

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Layers

Downstream from the first bridge at the base of the steps, you can see that the **layers or beds** of rock in the river are quite thin and tilted. There are layers of sand, silt, mud, and even coal.

These were deposited in shallow swampy areas, which sometimes dried out, and were sometimes crossed by small rivers. As you walk downstream you are walking over younger and younger rock layers.



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Limestone

Further downstream just above the second bridge down from the steps, a little side stream comes in. This marks the position of a thin layer of **Limestone** – formed in open sea water, and indicating a major change in conditions. This rock contains many crinoids – and you can see their size compared to a 20p!

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Orchard beds

For about 150 metres downstream from here a very important series of rock layers - the **Orchard Beds**, are exposed in and around the burn. When geologists talk about rock beds they are referring to the smallest divisions they can identify in sedimentary rock layers. Each bed demonstrates a distinct set of environmental conditions present at the time the sediments were deposited. These are called the Orchard Beds because they were first found in the Orchard Farm area of Thornliebank, where quarries were worked in the 19th Century.

These rocks provide a detailed record of changing environments and life in the sea 325 million years ago. The rocks contain lots of different kinds of **fossils** that provide evidence of marine creatures which lived in the sea or on the sea floor.

The fossils were formed because the bodies of small dead creatures were quickly covered by underwater sediments like sand, silt and mud. As the layers of sediment built up they compacted into rocks surrounding the hard remains of the original creatures.



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Sandstone

Between the second and third bridges down from the waterfall steps, and above the Orchard Beds, are thinly-bedded siltstones and sandstones and finally a thick sandstone layer that forms the prominent overhanging cliff on the bank opposite the path.

These sandier rocks were formed as rivers brought increasing amounts of sand into the sea.

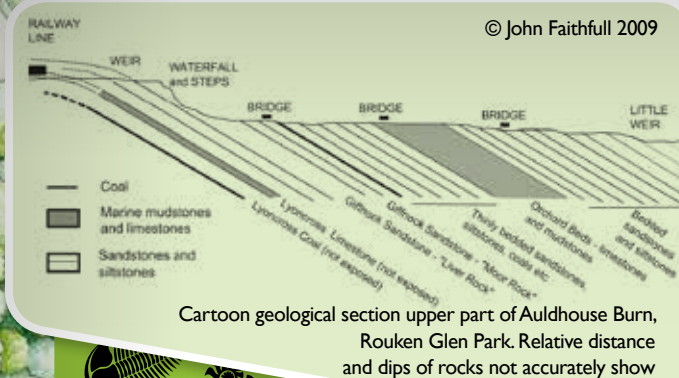
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Concretion

This mystery rock looks like a giant halved stone cannon ball but is almost certainly not man-made. It was rescued from the Auldhouse Burn after the river bank collapsed in December 2012 and may be an example of a **concretion**. Concretions form within sediments before the surrounding layers harden into rock. They are made of mineral cement which hardens around some form of nucleus like a stone, leaf, small water creature or other organic matter. Alternatively, it may be the root bole from a tree-like plant growing during the Carboniferous period. Even geologists struggle sometimes when trying to explain unusually shaped rock features.....!

A much smaller but proven concretion can be seen in the Pavilion.



Further information on the geology and fossils of Rouken Glen Park can be found in the Pavilion Visitor Centre.