

This walk is in the North Pennines Area of Outstanding Natural Beauty (AONB) and UNESCO Global Geopark.

What is a UNESCO Global Geopark?

The North Pennines AONB is a UNESCO Global Geopark. Geoparks are places with outstanding geology and landscape, where there are strong local efforts to make the most of Earth heritage through interpretation, education, conservation and tourism. To find out more go to www.visitgeoparks.org

Find out more about North Pennine geology

This leaflet is one of a series of geological trails and publications for the North Pennines. To discover the others and find out more visit www.northpennines.org.uk

This is an original publication by the North Pennines AONB Partnership, with thanks given to members of the AONB Partnership's Geopark Advisory Group for their expertise and input.



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The North Pennines Area of Outstanding Natural Beauty (AONB) and UNESCO Global Geopark is one of England's finest landscapes. Explore flower-rich hay meadows, wide open moorlands, intimate woods, tumbling rivers and dramatic waterfalls; discover world-class geology and mining heritage; experience truly dark night skies; and encounter special wildlife.

A 6km (3.8 mile) walk exploring the mining history and geological heritage surrounding the village of St John's Chapel in Weardale.

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St John's Chapel Geotrail

Echoes of the past



NORTH PENNINES
Area of Outstanding Natural Beauty



Welcome to a special landscape...

...shaped by millions of years of natural processes and thousands of years of human activity.

This circular route takes you from the village of St John's Chapel out into the surrounding countryside to explore the area's rich geological and mining heritage. The trail identifies nine points of interest along a set route and leads you through the neighbouring village of Daddry Shield.

Walk length:
6km (3.8 miles)

Start/finish:
Start in St John's Chapel. There is a parking area on the east side of the village.

Grid reference:
NY 886 379

Terrain: This trail uses public footpaths, bridleways and minor roads, although some of the route crosses fields where paths are not always obvious. In places the route passes old mine workings, parts of which may be unstable. Please keep to the footpaths and do not attempt to enter tunnels or surface excavations. If you are walking this route between April and July, please be aware of ground nesting birds and always stick to footpaths. Strong boots, warm clothing and good waterproofs are advised.

Public transport: For timetable information call Traveline on 0871 200 2233 (www.traveline.info)

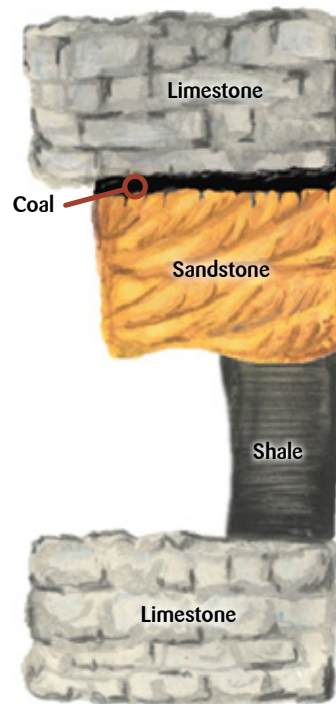
Useful maps:
Ordnance Survey
1:25 000 Explorer OL31 North Pennines Teesdale and Weardale

British Geological Survey
1:50 000 Geological Sheet 25 Alston



Layered rocks

Between 360 and 300 million years ago, in the Carboniferous Period of Earth history, the area that was to become the North Pennines lay almost on the equator. Remains of the abundant marine life formed a limey mud on the sea floor, which eventually hardened to form limestone. River deltas periodically covered the seabed in sand and mud when sea levels were low, forming layers of sandstone and shale. When the sea level rose again, a new layer of limestone formed over the top and the process repeated. Much of the North Pennines consists of regular alternating layers of limestone, shale and sandstone called cyclothem. Shale is much softer than the limestone and sandstone so erodes away more easily, causing the repeated bench-like profile of many of the hillsides, along with many impressive waterfalls



Method in the mining

Hushing is one method of mining that was used in the North Pennines. It involved gathering water in a reservoir, digging out a channel and releasing the water down the slope. It was either used to reveal the location of mineral veins, or to extract material.

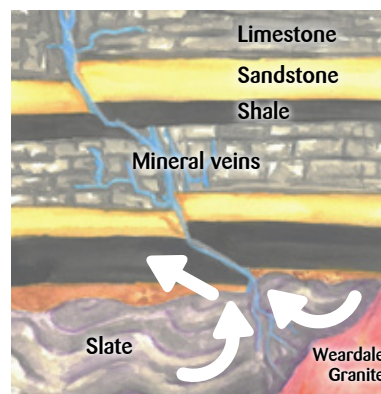
Underground mining became more common as the veins were followed beneath the surface. Shafts were sunk and levels were driven into the hillside on a slight incline, allowing water to drain out easily. The main 'horse levels' were built to accommodate the size of ponies that helped move materials.

Miners worked in 'partnerships' (often family units) and mined an area for a price set by the mine owners. Miners were paid for the amount of ore they produced and all the costs they collected were deducted from their final pay. This included things like candles, tools and the cost of maintaining them, explosives, the cost of hauling crude ore from the mine and the cost of dressing it on the washing floor outside.

The crude ore was dumped into 'bouseeteems'; stone alcoves in which each partnership's ore was kept before processing. Children as young as eight worked on washing floors, where they would separate the galena (lead ore) from the host rock. Lead minerals are very dense, so by shaking the ore in water the minerals could be separated into layers as the galena sank to the bottom.

Minerals and mines

The North Pennines rocks are cut by numerous mineral veins, which carry ores of metals such as lead, iron, zinc and occasionally copper, together with a variety of other 'spar' minerals. The veins in Weardale were primarily worked for lead and for fluorspar. These were formed around 290 million years ago as warm waters, rich in dissolved minerals, flowed through cracks and faults, driven by heat deep beneath the surface. As these solutions cooled, the dissolved minerals crystallised inside the cracks to form the veins.



1 St John's Chapel

The village is named after the church of St John the Baptist. The church was built to serve the Bishop of Durham and his friends during their 'great hunts' in the area in the 15th century. The village became properly established when the mining industry swept into the area. The present church in the village was built in 1752.

2 Harthope Burn

This is one of the few places where the native high forest has survived. 'Native' refers to a small number of British tree species growing within naturally regenerating woodland. A 'high forest' is grown from seed and usually consists of large, tall, mature trees with a closed canopy. Red deer once made their home here, hence the name 'Hart'.



3 Valleys and waterfalls

These natural waterfalls are formed through erosion. Different rock types show different erosional resistance. For example, limestones and sandstones tend to be more resistant to erosion than shales and siltstones. As the waterfall retreats, a gorge is formed.

The burn cuts through layers of Three-Yard and Five-Yard Limestone. The names were given by miners and quarrymen who would recognise the different beds of rock when they met them in different places. The names were based on where they could be seen, what they were used for and the thickness of the beds.



4 Harthope Quarry

Ganister - a hard, fine-grained, silica-rich sandstone - was quarried here until 1927. It was used to line furnaces because it is resistant to heat. The path you are walking along is the old tramway, where horses would transport the rock out of the valley.

Lead ore was found in this valley too. Geological maps show a small vein here, but it is assumed, due to the lack of records, that the mine was unsuccessful.



5 Terraced hills

From this high point you can see examples of the prominent terraced features found in the North Pennine hills. These are produced by the differences in resistance in the layers of the Carboniferous rocks (see overleaf). Instead of a continuous slope, some hills have step-like profiles.

6 Greenlaws Mines

These are the remnants of Greenlaws Level. Greenlaws was hushed first (see overleaf), then levels were driven underground later. Two parallel veins were worked. Mining at Greenlaws was spread over the 18th and 19th centuries, reaching its peak in the 1860s and 70s.

Much of the vein material extracted by the miners was mineral waste or 'gangue'. At Greenlaws, as in many other Weardale mines, this consisted predominantly of fluorite, a mineral which became sought-after around the late 19th to early 20th centuries for steel making, and is used in many everyday products that contain fluorine. Greenlaws reopened for fluorite mining in the 1940s and though it was never a commercial success, it produced many fine specimens of purple and yellow fluorite crystals, examples of which can be seen in the Natural History Museum, London.

In the valley there are remnants of some 'bousesteems' (see overleaf). There is also an old cart track, with its rails now hanging off the eroded bank, and the remains of the mine shop. This building would have accommodated the blacksmith and the stable. A bit further up the valley is Greenlaws Middle Level entrance.



7 St John's Chapel Drumlins

Drumlins are teardrop-shaped hills that form under moving glacier ice. 20,000 years ago, the North Pennines, along with much of northern Europe, was beneath a vast ice sheet up to a kilometre thick. As the ice crawled across the land it shaped the valleys in the uplands of the Pennines. You can tell the direction of glacier flow from the shape of a drumlin. The 'tip' of the tear-drop points in the direction of flow. The stone walls marking the field boundaries highlight the gentle slopes of the drumlins. They can be seen from Daddry Shield to Ireshopeburn (to the west of St John's Chapel). These landforms are a Local Geological Site.

8 Daddry Shield

There is a row of cottages on your right when you turn onto the main road. These are early 19th-century miners' cottages. Often, miners would also be farmers. While the men were down the mine, the farms were largely worked by the women. It is likely that the families living in these cottages had to juggle these two physically demanding jobs.



9 River Wear

The river has cut down through the geology. The hill tops are predominately sandstone and shale cyclothem (see overleaf). They sit on top of an older series containing limestone, but both were deposited during the Carboniferous Period. The river now runs over much younger, glacial beds of boulder clay.

