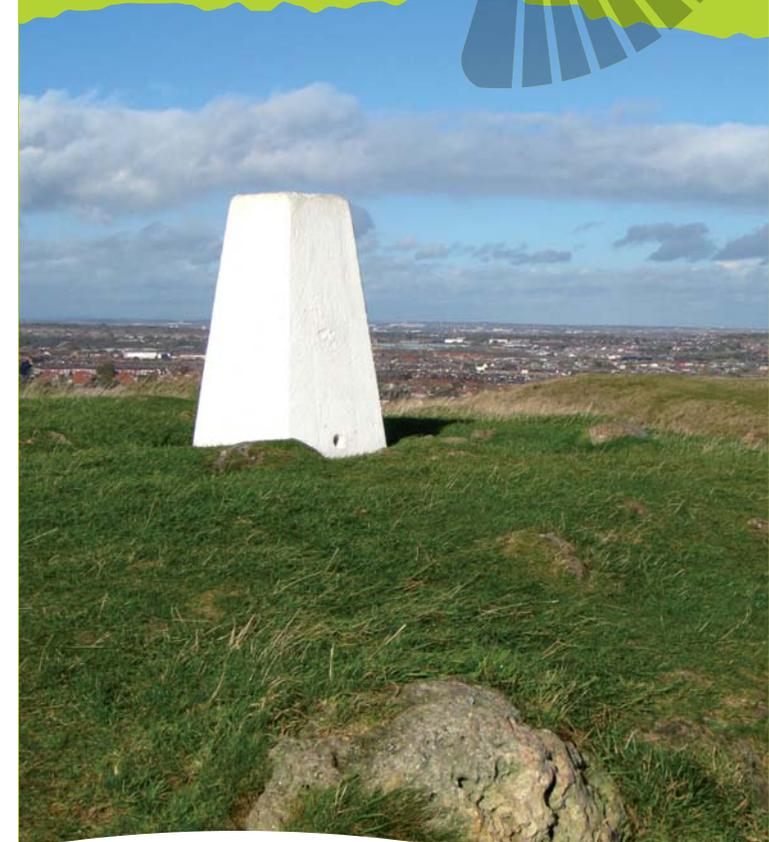


On top of a tropical reef

A 2¼ mile walk with superb views on and around the Tunstall Hills



Limestone Landscapes

Making a positive difference to the unique environment of the Magnesian Limestone area

The Tunstall Hills, with their twin 'Green' and 'Rocky' summits, dominate Sunderland's southern skyline and provide a panoramic view of the city and far beyond. Rising over 100m above sea level, they are the remains of the great barrier reef over 20 miles long that once separated a lagoon from a tropical sea (see overleaf).

Take a closer look

As well as providing a calm, green space for locals to enjoy, the Tunstall Hills are a very special wildlife habitat, recognised as a Local Nature Reserve and Site of Special Scientific Interest (SSSI). The Magnesian Limestone of the barrier reef has resulted in thin lime-rich soils which support a unique mixture of wild flowers and grasses – there are only 274 hectares of this type of grassland in the UK, of which 75% is on the Magnesian Limestone Plateau (see map on back of this leaflet).

The bright yellow petals of the **Common Rockrose** (which, despite its name, is quite rare these days) make it one of the most noticeable flowers growing in the Magnesian Limestone grassland. Look for it from late spring to early autumn.



© www.northeastwildlife.co.uk



© Rob Sutton



The **Dinky Skipper butterfly** (above) feeds on Birdsfoot Trefoil which flourishes on the lime-rich grasslands of Tunstall Hills. **Blue Moor Grass** (left) is at its best in March and is an important plant associated with Magnesian Limestone grassland.

The Limestone Landscapes Partnership is working with many different people to conserve the landscape, wildlife and rich heritage of the Magnesian Limestone and to enable communities to learn about, enjoy and celebrate their local area.

This walk is one of five we have produced which introduce the unique geology of the Magnesian Limestone Plateau.

- 1 Marsden cliffs and Souter
- 2 Sunderland City Geotrail
- 3 Tunstall Hills
- 4 Nose's Point, Seaham
- 5 Coxhoe



The Tunstall Hills are owned by Sunderland City Council. www.sunderland.gov.uk

This project has been coordinated by Groundwork NE & Cumbria; Changing Places, Changing Lives – one green step at a time. Find out more at www.groundwork.org.uk/northeast or follow us on Facebook and Twitter.



We would like to thank Sunderland City Council and the Tunstall Hills Protection Group for their support.



Design and production © Marcus Byron. Additional information and advice from Tunstall Hills Protection Group, David Lawrence and Elizabeth Pickett. Illustrations © Elizabeth Pickett. Maps © Crown copyright 2014. All rights reserved. Licence 100042893.

A walk on the Magnesian Limestone Plateau

This walk is one of five self-guided trails that help you to explore east Durham, South Tyneside and Sunderland and find out how the geology has influenced the area's natural habitats and the lives of local people.

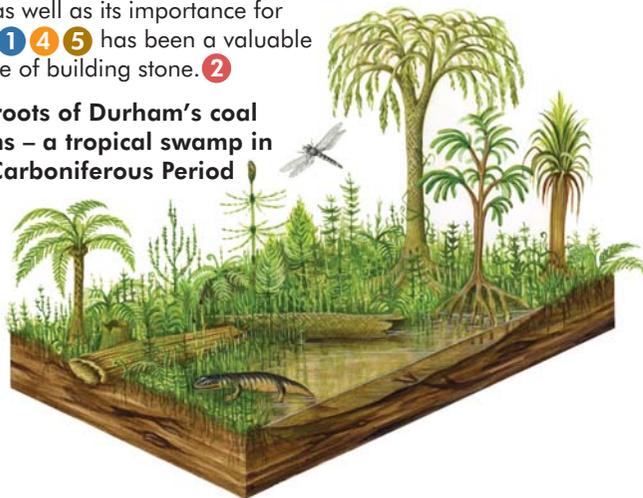
Together the walks offer a fascinating overview of the many processes that shaped the landscape you see today.

An introduction to the area's geology

The numbers in circles show which walk is best for seeing a particular geological feature.

310 million years ago, in the Carboniferous Period, this area was part of a large continent that lay across the equator. Low lying tropical swamps covered the land. Dead trees and other plants built up as a layer of peat, which was then buried under layers of sand and mud. Eventually the peat hardened to form coal seams and the sand and mud became sandstone and shale. This sequence of rocks is known as the 'Coal Measures' and as well as its importance for coal **1** **4** **5** has been a valuable source of building stone. **2**

The roots of Durham's coal seams – a tropical swamp in the Carboniferous Period

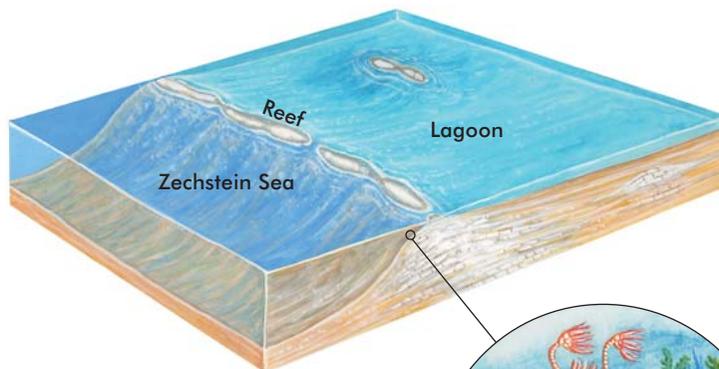


About 300 million years ago the land moved slowly further north of the equator and the climate became hotter and drier. This area became a barren desert covered by sand dunes. The remains of these dunes, the 'Yellow Sands', are quarried today for building sand. **5**

A large part of the desert lay beneath sea level and around 260 million years ago, in the Permian Period, water from the surrounding ocean flooded it to create a shallow inland sea, known as the Zechstein Sea. Over the following several million years the sea level rose and fell several times, causing the Zechstein Sea to periodically dry up.

A reef formed a barrier running roughly in a north-south direction, separating a shallow lagoon to the west from deeper water to the east. The reef can be seen today as a

number of hills in the area, including the Tunstall Hills featured on this walk and Beacon Hill near Seaham. **4** A large variety of animals lived on and within the reef. Tiny fragments of shell and skeletal remains built up as lime-rich mud on the sea floor. It is this limy mud that eventually became limestone. In places fossilised shells can still be seen in the rock (see panel on right).



The Magnesian Limestone reef and a close-up showing some of its many sea creatures (see panel to right)



During periods of falling sea level, the hot arid climate caused the sea water to evaporate, making it much saltier. Salt minerals known as evaporites built up on the sea floor. Thick salt deposits still exist deep beneath the surface further south, but in this area they have dissolved, causing the rocks above them to collapse. **1** **4**

This area continued to drift north for 250 million years until it reached where it is today. We do not have any record of the geology of the area during that time as any rocks formed have been removed by the work of rivers and seas. Some of these 'missing' rocks have been quarried elsewhere and brought into the area for building stone. **2**

Over the last 2.5 million years the climate alternated between colder periods ('ice ages') and warmer periods. At times, ice sheets up to 1km thick covered County Durham and the North Sea. The ice finally melted about 15,000 years ago. The action of the ice and meltwater were largely responsible for shaping the landscape you see today. Rivers and seas continue to wear away the land, deepening valleys and further altering the dramatic coastline. **1** **3** **4** **5**

Signs of life!

The reef, of which the Tunstall Hills are a part, is a unique geological feature in Britain. Like today's Great Barrier Reef off the coast of Australia, this would have been an environment teeming with life. However, unlike the Great Barrier Reef, which is made up of corals, our ancient reef was built up mainly from colonies of tiny filter-feeding animals called bryozoans.



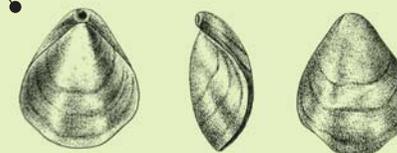
This bryozoan fossil was found in the exposed reef at the Tunstall Hills. These branching and cone-shaped colonies would have dominated parts of the reef.

Many other animals lived on, within and around the reef. These included crinoids (sometimes known as sea lilies) and echinoids (sea urchins), as well as shellfish such as bivalves, brachiopods and gastropods (see below). Fish and nautiloids with coiled shells swam in the surrounding clear, warm waters of the Zechstein Sea.



Yunnania tunstallensis

This was a tiny gastropod (sea snail) that looked rather like a modern periwinkle. From its name you can guess where this species was first found and described!



Dielasma elongatum

This was a type of shellfish known as a brachiopod. Brachiopods were common reef animals 250 million years ago. This particular species lived in groups and anchored itself to the seafloor with a long muscle.

Walk information

A walk around the Tunstall Hills

2¹/₄ miles/3.5km

Mainly fairly easy walking, but some paths can be muddy with steep, slippery sections.  At point 3 you may prefer to climb down the end of Rocky Hill, but we recommend retracing your steps as described, especially when wet.

Keep dogs under control and pick up after them – there is a dog waste bin at the starting point car park.

 Top car park GR NZ395543

 Route 38 Sunderland – Tunstall Bank, Mon-Sat. Stops on Leechmere Road www.nexus.org.uk

 Lots of options in Sunderland city centre

Directions

- 1 Exit the top of the car park.  Turn right and head to a gap in the hedge ahead.
- 2 The path climbs gradually to go through a second hedge, heading towards trig point on top of Rocky Hill.  
- 3 Retrace your steps back through the last hedge, turn left to the field corner and go through a gap in the hedge down onto a track. Turn left and follow the track to a junction with a road at the foot of Rocky Hill. Turn right on to the road and follow it to a low wooden barrier with a stile. Cross the stile and climb to the top of Green Hill. 
- 4 Retrace your steps to the junction of the road with the track below Rocky Hill and then follow the road downhill. At the white cottage keep left and follow the path to the left of the fence.
- 5 After about 300m bear right and follow hedge downhill. 

Look for a gap in the hedge ahead which leads to a narrow path down a steep slope.

- 6 At bottom of hill go through gap in low metal barrier onto old railway (now a cycle path) . Turn left, passing an exposed cliff face after about 200m.  (Just after this is an optional short cut – see map.)  Keep on path all the way to another car park, boxing club and the miners memorial. 
- 7 Retrace steps but soon bear right to climb up bank behind houses.  The path levels out before going down some steps. Keep on path to meet the cycle track again. Take next right on another tarmac path. Halfway up the hill bear left on a grassy path, crossing a meadow.
- 8 Head to far left corner of field through gap in hedge and onto a grassy path which climbs back up to the playing field. Turn right to walk along edge of field back to car park.

A farm, football and flowers!

This area was once a farm and between the car park and the first hill are two rows of hawthorn trees which were planted as hedges to keep stock from straying. The farm fields were turned into football pitches which were well used once upon a time – the disused buildings near the car park were the changing rooms. Tunstall Hills were finally designated a Local Nature Reserve in 2003.

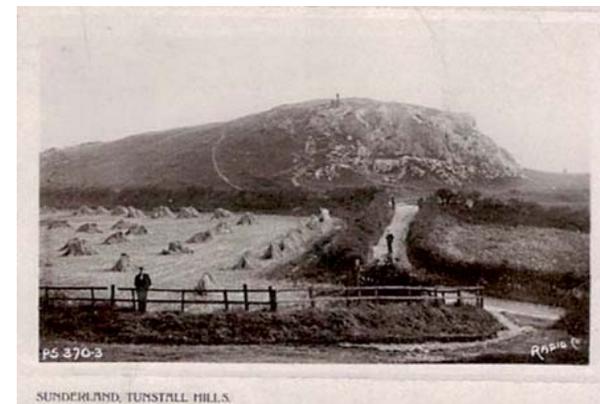
Sight of home

Standing here on Rocky Hill it's hard to imagine that you are near the top of what was once a tropical reef (see geology section overleaf for more information). This and neighbouring Green Hill were known by sailors in the past as the 'Maiden's Paps' and were used as landmarks to help them find their way back to harbour.

Hill with a view

Come, let's away to Tunstall Hill,
In twenty minutes we'll be there;
And on top we'll get our fill
Of the pure bracing country air.
William Brockie, (1811–1890)
Editor, 'The Sunderland Times'

On a fine day, with the whole of the city spread out at your feet, you can see the Cheviot Hills to the north and the cliffs of North Yorkshire to the south (see panorama below). In summer the slopes of Green Hill are a mass of limestone grassland flowers.

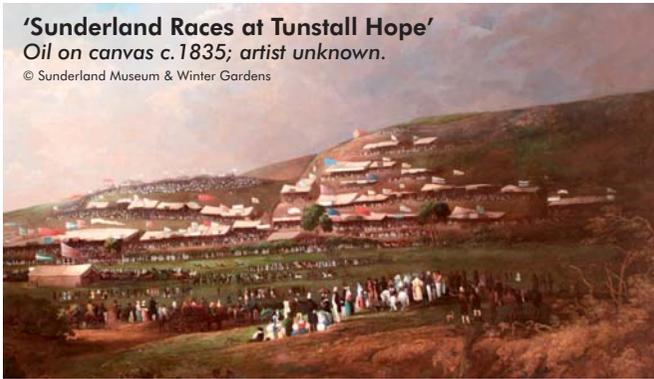


Sunderland Antiquarian Society Photo Archive

As you turn back to retrace your steps from Green Hill look for this view. In the 100 years or so since this was taken there have been a few changes – but the hills are much the same. Below the bare rock outcrop, allotments have replaced the field where once corn stood in stooks ready for harvesting.

d A day at the races

In the 1830s the slopes of Tunstall Hills 'afforded pedestrians an uninterrupted view of the horses all the way' when Sunderland Race meetings were held between Tunstall village and the hills.



'Sunderland Races at Tunstall Hope'
Oil on canvas c. 1835; artist unknown.
© Sunderland Museum & Winter Gardens

e Days of steam

The old railway line, built to serve the colliery at Ryhope, follows the line of a channel carved by glacial meltwater at the end of the last ice age, around 15,000 years ago. This section of the old line is now part of National Cycle Route 1 linking Dover with the Shetland Islands.



65879 'J27' Class steams up the cutting from Ryhope Colliery to Silksworth in the late 1960s. The last survivor of the class is currently being restored at Darlington. © Ian Carr

f Reef on show

The cliff on your left as you walk along the old railway is the remains of the ancient tropical reef, which stretches from Sunderland to Hartlepool (see map right). As it has been cut through at this point (see e above), what you are looking at is a section through part of the reef.

g Lime lovers

To the left of the bike track is an area of meadow which is a great place to spot flowers and grasses supported by the Magnesian Limestone. In late May to July there is a particularly spectacular display of orchids, such as the Common Spotted Orchid (right). Eight different species of orchid can be found at Tunstall Hills.



h Fossil fuel

Coal was mined at Ryhope Colliery for over 100 years until its closure in 1966. At its height over 2,500 men and boys were employed here. Nearly 300 of them are known to have lost their lives, the youngest aged just 11, 'crushed by empty waggons'. Today the site has been reclaimed and landfilled. The memorial sculpture shows a pair of pithead wheels seemingly half buried in the ground, framing ghostly figures and buildings.



Ryhope Colliery in the 1960s

Reproduced by kind permission of the East Durham 'Then & Now' website: www.east-durham.co.uk

i Local hero

Pilot Officer Cyril Joe Barton crash-landed his Halifax aircraft here on the night of 30th March 1944. Some of his crew had bailed out over Germany after being attacked on a bombing raid to Nuremburg. With only three of his crew and one engine of the four left working and running out of fuel, he just managed to cross the North Sea and make the English coast. Avoiding the rows of miners' houses in Ryhope to minimise casualties on the ground, he brought the plane down by the gangway that crossed the railway tracks from the pit village to the colliery. He died from injuries sustained in the crash, while the rest of the crew survived. A miner on his way to the pit was also unfortunately killed. Barton was awarded the Victoria Cross, 'in recognition of most conspicuous bravery'.



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Where Tunstall Hills were in the Permian Period!



Cleadon Water Tower
Cleadon Mill
Fulwell Windmill
The Stadium of Light
Home of Sunderland AFC

Whitburn Mill
Wear Bridge

General Havelock statue
(Building Hill in Mowbray Park)

Roker Pier

The view from Green Hill looking north to north east. Cleadon Water Tower and Mill and Whitburn Mill are visited on Walk 1 (Souter-Marsden) and Mowbray Park is featured in Walk 2.