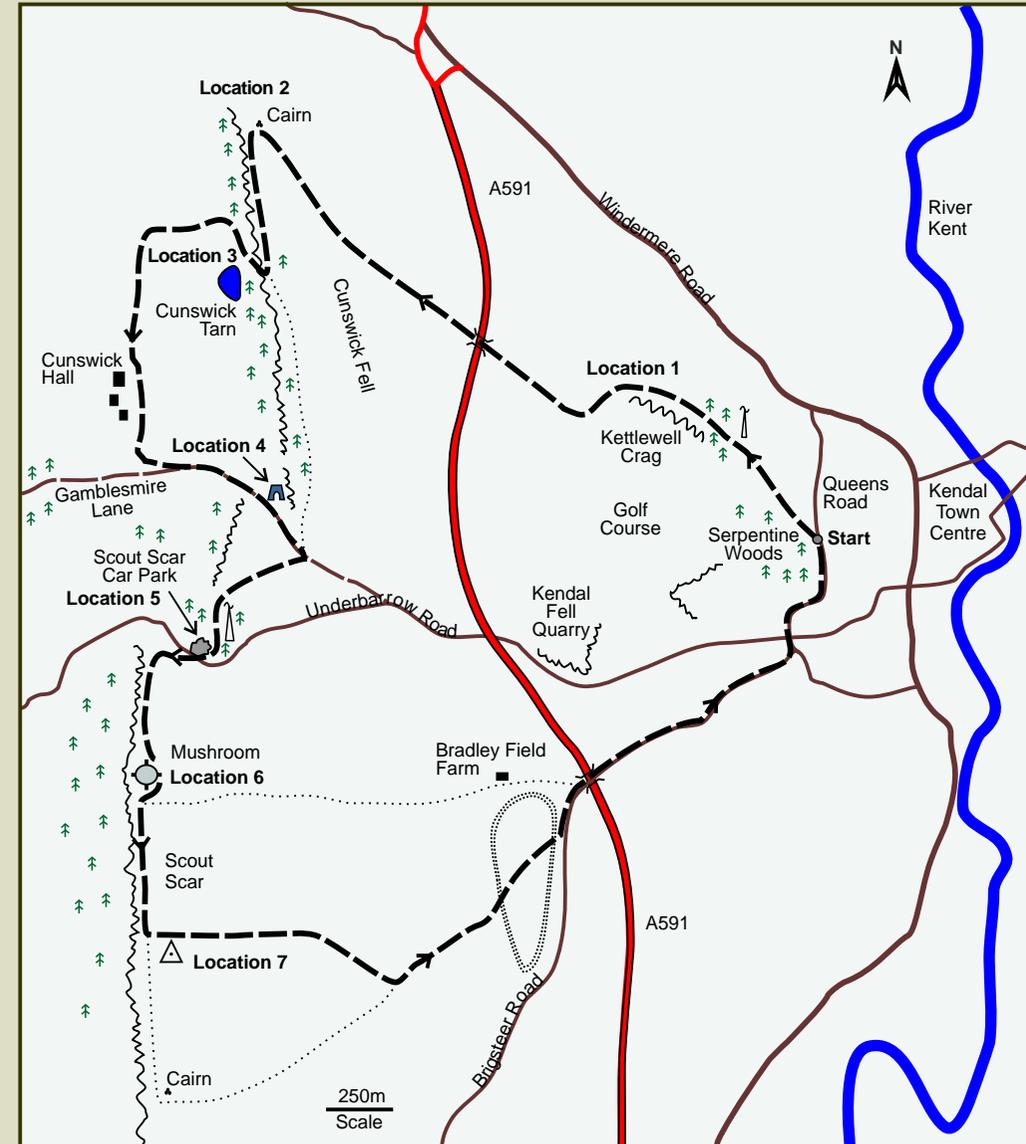


# A Geological Walk from Kendal

## Geological Sites to visit on Cunswick Fell and Scout Scar

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Route map for the Kendal Geological Trail



Cumbria RIGS



## The geological route from Kendal

The route starts from a lane off the Queens Road, grid reference SD512928 (Outdoor Leisure Map Number 7). Some parking is available here but it may be full, otherwise use car parks in the centre of Kendal. The distance of the walk is 7.2 miles (11.5 kilometres). Allow 4 to 5 hours to complete the route. The route is entirely on public footpaths.



*The starting point at Queens Road*

After the parking area follow the lane with a wall on the right. Sign-posted Helsfell Nab which leads to Kendal Fell. The fell is an upland area of Carboniferous Limestone. Quarrying and lime-burning has been an important activity on the fell since the middle of the eighteenth century.

Follow the wall on the right, the lane narrows to a path. In spring and summer there are many calcareous (lime-loving) wild flowers in this area. Further on the path is tree lined and in a short distance you will reach Kettlewell Crags situated on the left-hand side of the path.

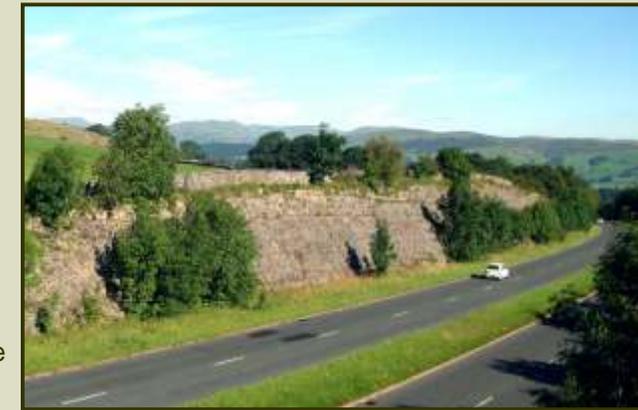


*Dalton Limestone at Kettlewell Crag*

After the crags rejoin the path and continue with the wall on your right until the wall ends. You will have reached Kendal Golf Course. The path turns right and crosses the golf course. The route has waymarked posts. Cross the slot-stile in the wall leading into a field. Follow the wall on your right-hand side and through another slot-stile. In a wall ahead are two ladder stiles take the left-hand stile crossing a pedestrian bridge over the A591 (the Kendal Bypass).

## Location 2. The pedestrian bridge over the Kendal Bypass

The pedestrian bridge affords a good view of Park Limestone in the road cutting. This was laid down on top of the Dalton Formation seen in Kettlewell Crag. Park Limestone (see diagram on page 11) is generally not as strong as Dalton Limestone as it is prone to shatter and is not used as a building stone, but it is used in field walls.



*Park Limestone at the A591*

Directly after the bridge cross the stile on your right and continue straight on towards Cunswick Fell. At the top left corner of the field cross the slot-stile and continue to the top of the fell with its cairn at the summit.



*The summit cairn at Cunswick Fell*

## Location 4. Cunswick Fell.

At the summit cairn there are fine views towards the Lake District with its ancient eroded volcanos. They erupted about 450 million years ago when the England area was near the southern side of an ocean called Iapetus. There was a continent called Laurentia to the north. At this time Scotland was a part of Laurentia on the other side of the ocean from England.



*The Kentmere valley from Cunswick Fell's summit cairn*

*Take care to find the correct path onwards from the summit cairn*

From Cunswick Fell's summit cairn turn left then veer left (you will be leaving the higher path) to join the lower path adjacent to the escarpment. The path follows the line of Cunswick Scar with the wooded escarpment ahead of you. When you reach the wood take the waymarked kissing-gate in the fence on your right and follow the path down the scar through the woodland.



*The lower path along Cunswick Scar*

Care should be taken on the steep path down the scar.

A few yards down the steep path you will see on the right-hand side well-bedded limestone this is near the top of the Dalton Formation.

The path leads down to a stile and further on to a kissing-gate into a field with Cunswick Tarn on the left.

### **Location 3. Cunswick Tarn.**

You do not normally find lakes in limestone country but we have moved down the succession to the middle section of the Dalton Limestone at Cunswick Tarn. The middle section of Dalton Limestone has shale partings and they provide an impermeable floor to the tarn, thus providing a waterproof barrier that prevents the water from draining into the limestone below. Cunswick Tarn has been here since the end of the last ice age and the vegetation has produced peat.



Cross the field towards a wooded area, pass through the slot-stile and continue on the woodland path that ends with another slot-stile to enter a field. Turn left and follow the wall on your left towards Cunswick Hall Farm.

The rounded stones in the wall were collected from the surrounding fields. These stones are erratics and were left behind when the ice melted at the end of the last ice age 10,000 years ago. They are mostly made up of rocks from the Kentmere area.

Cross the cattle grid just before Cunswick Hall Farm and take the signposted kissing-gate in the wall on the left, thereby bypassing the farm. Turn right and continue to another pedestrian gate into the next field. Follow the wall on your right and cross the wall at the kissing-gate. Turn left away from the farm and a few metres further on turn left onto Gamblesmire Lane, reputed to be a Roman road. The lane goes gently uphill and through two farm gates. Continue on the track until you reach a lime kiln.

#### Location 4. Lime Kiln and Quarry

The lime kiln stands within a small Dalton Limestone quarry. It was the agrarian revolution of the eighteenth century, when vast areas were enclosed for farm land, that created an enormous demand for lime which would reduce the acidity of the soil and make it more fertile. Vast numbers of kilns were built and many farmers had their own.



*Erratics in a wall near Cunswick Hall*



*Lime kiln at Location 4*

#### The chemistry of limeburning

The purpose of a lime kiln is to burn limestone rock and convert it into quicklime. It can be used for many purposes, but a farm lime kiln was primarily used to improve land fertility. They are usually built a short distance away from habitation as the fumes are very unpleasant. (There is a double lime kiln in Kendal situated beside the Underbarrow Road at grid reference SD 507924 and is worth visiting).

The process of converting limestone into lime is called calcination. This involves the reduction of the stone by thermal decomposition into its two molecules, calcium oxide and carbon dioxide. The chemical formula for limestone is  $\text{CaCO}_3$  and when it is subjected to temperatures in excess of 800 to 900 degrees Celsius, the calcium oxide ( $\text{CaO}$ ) is left as a residue after the carbon dioxide gas ( $\text{CO}_2$ ) has been driven off.

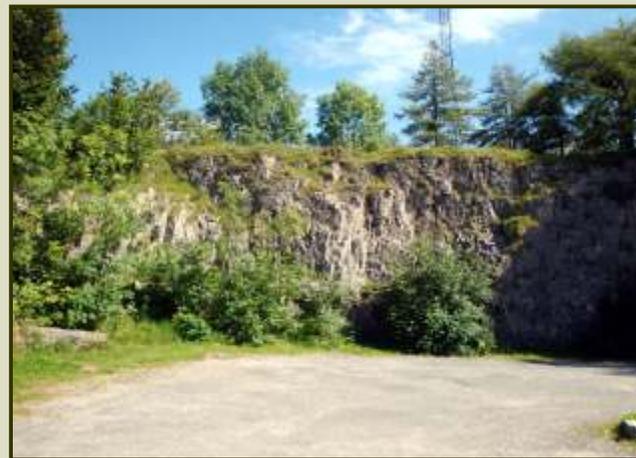
The limestone pieces are packed into the kiln but once burnt much of its original weight is lost. Approximately 56% of limestone content by weight is calcium oxide: the remaining 44% is carbon dioxide, so it follows that quicklime is 44% lighter than the original stone.

For agricultural purposes the quicklime has to be slaked. If produced in a tank, the formulae is one third water and two thirds quicklime mixed together to form a slurry or paste. In reality slaking was normally achieved by exposing quicklime to rain water. Calcium oxide ( $\text{CaO}$ ) added to water ( $\text{H}_2\text{O}$ ) gives calcium hydroxide -  $\text{Ca}(\text{OH})_2$ .

Continue along Gamblesmire Lane and through the sign-posted gateway into a field. Turn right and continue towards the aerial mast situated in a wood. Go through a kissing-gate on the right-hand corner taking you into the wood. The path goes left following a wall. After a few metres (just after an electricity pole on your left) turn right. After a short distance you will reach Scout Scar Quarry now used as a car park.

#### Location 5. Scout Scar Quarry

The quarry exposes Dalton Limestone. Chemical weathering and freeze-thaw action has produced broken limestone near surface, but the quarry exposes mostly a blocky massive limestone with fossils in pockets. There are many broken fossil fragments, which indicates a high energy reef margin.



*Scout Scar Quarry*

From the Scout Scar Quarry car park cross the Underbarrow Road and take the kissing-gate to Scout Scar and the Mushroom viewpoint.

### Location 6. Scout Scar

From the kissing-gate by the road take the path uphill towards Scout Scar's escarpment. Just before you reach the escarpment look to your right in the direction of the road. You will see that Cunswick Fell and Scout Scar are out of alignment. This is due to faults that are situated between the fells that have moved in the past and offset the two fells.



*Cunswick Fell from Scout Scar*

The Scout Scar Mushroom viewpoint has 360 degree vistas with fine views of the Lake District to the west, Morecambe Bay to the south and the Howgill Fells to the east.

As you have walked this geological route, you will have probably noticed that the Kendal side of Scout Scar and Cunswick Fell are gently sloping down towards Kendal. This is due to past movements on the Kendal fault, which runs through Kendal towards Junction 36 of the M6. The limestones are on a block that has tilted to the due to faults on the eastern boundary of the block.



*The Mushroom on Scout Scar*

Look across the Lyth Valley to Whitbarrow, which is a limestone block similar to Scout Scar and has a similar fault on its eastern side, causing it to tilt in the same way.

Continue walking along the cliff edge with the Lyth valley on your right. After 500 metres there is a wall. Go through the wall gap and turn left and follow the wall which will be on your left-hand side. You will pass a trig point on your right-hand side.

### Location 7. Trig Point

At the trig point you have good views of the Howgill Fells. They are formed from rocks that were laid down around 430 million years ago.

Shortly after you leave the trig point you will see two large boulders near the path. They are erratics and were left behind when the glacial ice melted at the end of the last ice age. These rocks have been moved by glaciers flowing out of the Lake District mountains. Eighteen thousand years ago Kendal would be under 300 metres of ice.



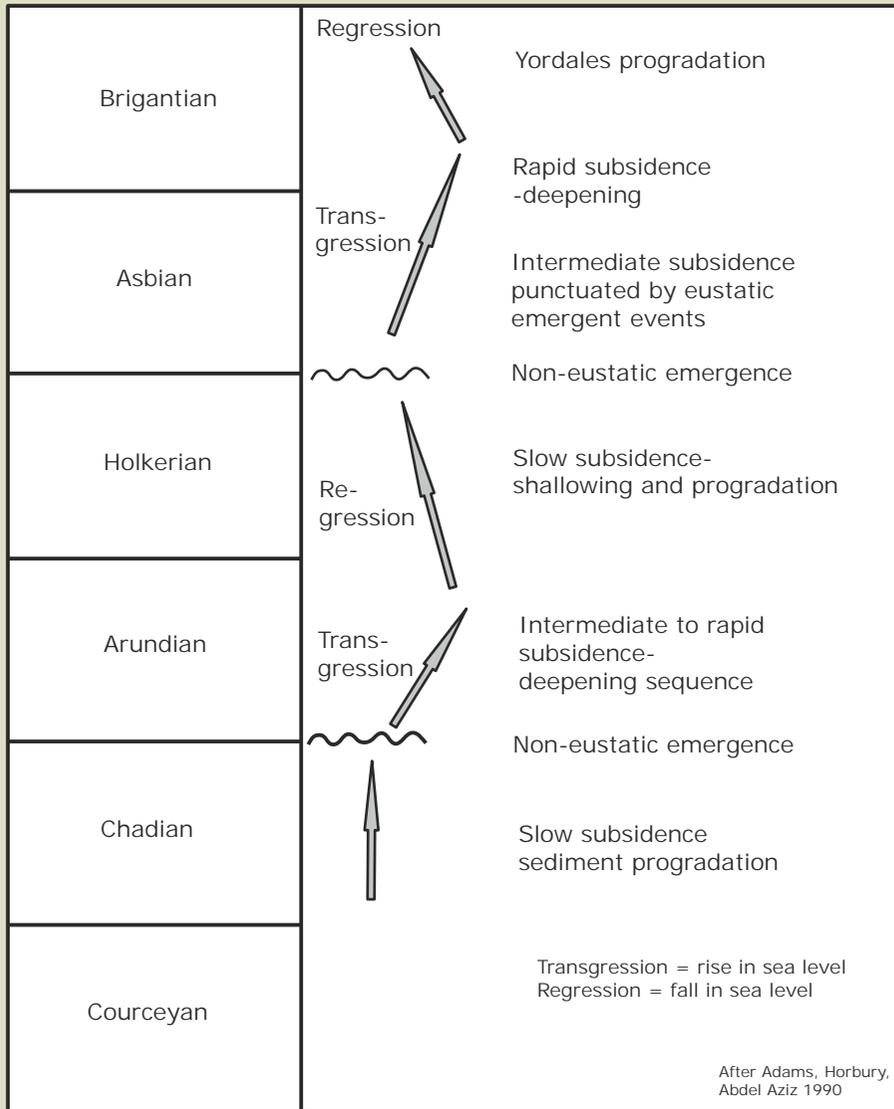
*The trig point on Scout Scar*



*Erratics on Scout Scar*

Continue along the path towards Kendal, following the wall downhill. At the bottom of the slope you will meet a path, turn left and pass through a kissing-gate in the wall. You will soon come to another kissing-gate where you will enter Kendal's old racecourse. Cross the racecourse to the wall on the opposite side and through a slot-stile. Turn left onto the Brigsteer Road and walk towards Kendal and over the bridge crossing the Kendal Bypass. Continue downhill into Kendal. Turn left at the first cross roads by the Green followed by crossing the Underbarrow Road and continue to the starting point at Queens Road.

**Some further information:** The limestones in South Cumbria were laid down in a shallow tropical sea. A similar environment to today's Bahamas.



The diagram above shows the relationship of the Lower Carboniferous limestone formations in South Cumbria.

The succession of limestones resulted from the reactivation of pre-existing faults, that periodically moved by the stress produced by past movements of tectonic plates. This caused sea levels periodically rise and fall, resulting in the deposition of new limestone formations.

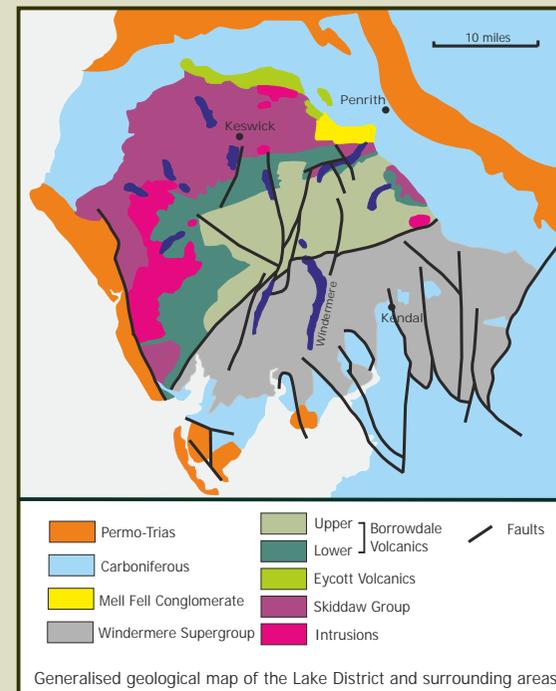
# Cumbria RIGS

Conserving Geological Sites



[www.cumbriarigs.co.uk](http://www.cumbriarigs.co.uk)

Cumbria RIGS was formed in 1992 to identify and record important places for geology and geomorphology. Cumbria RIGS are supported and funded by Cumbria County Council. The group consists of voluntary professional and amateur geologists. Once RIGS are approved and recorded they need to be conserved, they are visited periodically and if funds are available clearance work is carried out.



Eras	Geological Period/Epoch	
Cenozoic	Pleistocene	Ice Ages
	Pliocene	
	Miocene	
	Oligocene	
	Eocene	
Mesozoic	Cretaceous	
	Jurassic	
	Triassic	St Bees Sandstone
Palaeozoic	Permian	Penrith Sandstone
	Upper Carboniferous	Coal Measures
	Lower Carboniferous	Carboniferous Limestone
	Devonian	Mell Fell Conglomerate
	Silurian	Windermere Supergroup
	Ordoevian	Borrowdale Volcanic Group
		Skiddaw Group
	Cambrian	

Timescale of rocks deposited in Cumbria

