

GEOLOGY

The rocks of Cannock Chase belong predominantly to the Triassic Period (here 250-245 million years old). These overlie the Upper Carboniferous Coal Measures (314-312 million years old) separated by a 60 million year unconformity during which the older rocks were deformed, uplifted and eroded.



The Carboniferous muds, coals and ironstones were deposited near to the equator in a low-lying muddy delta. Periodic emergence of the delta top allowed plants to colonise the surface, the remains of which were compressed to form coal. These coals, and associated ironstone bands have been

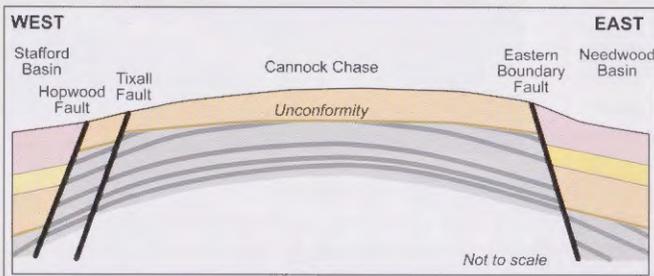
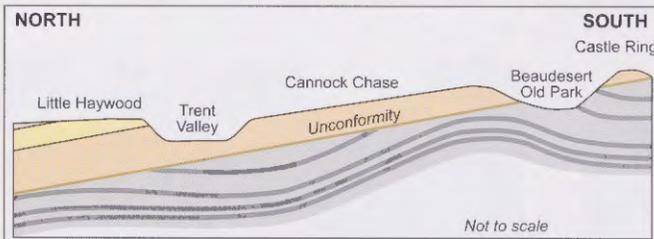
extensively mined on the southern margin of the Chase.

By the Triassic, Britain had moved to the northern desert latitudes. The pebbly Kidderminster Formation was deposited in a large braided river flowing northwards from mountains located in Northern France. The liver coloured quartzite pebbles are believed to have originated there and very rare limestone pebbles have been found to contain fossils from the Ordovician period of Brittany. Other pebbles include white vein quartz used in glass making, pink rhyolites and black basalts. The Kidderminster Formation is both an important source of aggregates and water.

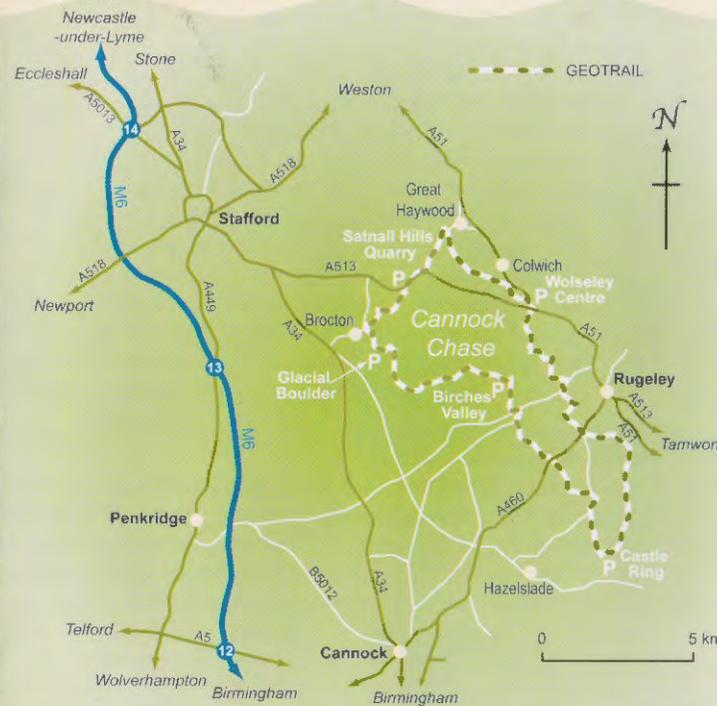


The overlying Bromsgrove Sandstone is finer grained and lacks pebbles, indicating a decline in energy in the Triassic rivers, becoming meandering in nature as the mountains subsided. This unit has been used as a building stone and equivalent rocks beneath Morecombe Bay form a reservoir for natural gas.

Schematic geological sections across Cannock Chase



LOCATION MAP



A project managed by **Ian Stimpson** and **Richard Waller** on behalf of the Staffordshire RIGS Group with financial support from the Staffordshire Aggregates Levy Grant Scheme 2008. Text and photographs by members of the Staffordshire RIGS Group. Design by **Rosie Duncan**.

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- British Geological Survey
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- Cannock Chase District Council
- Staffordshire County Council
- Cannock Chase Mining Historical Society

A member of UKRIGS, the Staffordshire RIGS Group is a voluntary organisation responsible for the conservation of regionally important geological and geomorphological sites in Staffordshire. For more information contact:

Staffordshire RIGS – www.staffs-rigs.org.uk

North Staffordshire Group Geologists' Association – www.esci.keele.ac.uk/nsgga

Staffordshire Wildlife Trust – www.staffs-wildlife.org.uk

Remember to follow the country code and please do not hammer rock surfaces. Be safe, plan ahead and follow any signs; leave gates and property as you find them; protect plants and animals and take your litter home. Keep dogs under control and consider other people. Please adhere to all Forestry Commission instructions and warnings

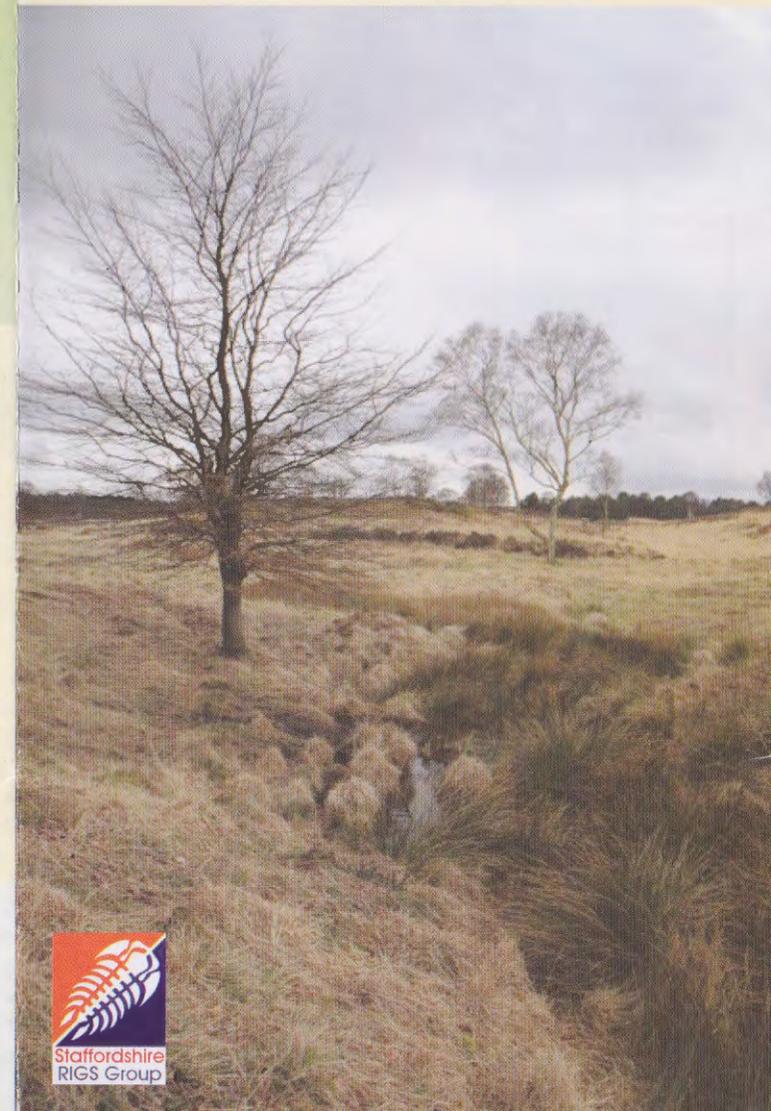
Printed by MC Print Services Tel: 01782 370080 Cover Photograph: Source of the Sher Brook

Staffordshire
County Council



The Cannock Chase Geotrail

A Landscape Evolved from Desert, Swamp and Ice



GEOTRAIL DIRECTIONS

The trail is probably too long to be completed in one go so we recommend attempting it in sections. *Alternative routes making shorter circuits are shown in italics.* We advise visitors to use this trail guide in conjunction with the Ordnance Survey Explorer Map 244 as the proliferation of tracks on Cannock Chase can make navigation difficult. **Take care crossing all roads.**

Satnall Hills - Glacial Boulder 1-6

From Satnall Hills Quarry 1 car park, cross the A513, **taking extreme care**, and take the footpath at the far end of the Punch Bowl car park. The valley passes Harts Hill 2. Follow the footpath straight ahead to Mere Pool 3. Here, take the narrow track straight on upwards forking left after the initial ascent to Broc Hill 4. Continue straight on down to the bottom of the Mere Valley and go right to Brook Lane. Follow Brook Lane to the left. At the T-junction, turn left back onto the Chase. After 300m, take the track right and continue straight on to Milford Quarry 5 & 6. Go back past 5 and take the first path on the right around the top of Milford Quarry to Freda's Grave car park. Turn left then immediately right at the signpost along the Heart of England Way, taking the right fork after 250m to the Glacial Boulder.

Glacial Boulder - Birches Valley 7-10

From the Glacial Boulder 7, head away from the car park towards a signpost on the Heart of England Way and turn right to follow it. After 200m, fork left at the signpost down to cross Sher Brook 8. Follow the path left 150m to a fork. *The left fork follows the alternative route back to Harts Hill.* Follow the right fork up a dry valley. Continue straight on past a trig point and straight on crossing Abraham's Valley. *An alternate route runs down Abraham's Valley, past the Seven Springs car park, crossing the Trent and on to the canal at Little Haywood.*

As the path bends left, meeting several others, take the bridle path sharp right and then turn immediately left at the notice board. The trail descends to a view point across the old part of Rugeley Quarry 9 and rock exposures 10. Continue to the road and turn right along Stafford Brook Road until it meets a T-junction with Penkridge Bank Road. Turn left and then right to the Birches Valley Visitors Centre.

Birches Valley - Castle Ring 11-17

Continue past the entrance to the Forest Centre and the houses, and take the main path to the left. After crossing Stony Brook 11 continue straight on along the wide track to the road. Turn right, beneath the rail bridge 12 and then up the other side of the valley 13. Cross the main road and follow the side road down to the farm. Turn left and follow the track up the valley. *An alternate route turns left near the mountain bike trail, through Regent's Wood to Stile Cop. It continues through Stile Cop car park and follows an escarpment emerging at The Levels near Brereton 27.*

Continue straight ahead along the main path until it meets the Marquis Drive / Heart of England Way at a T-junction and turn left, following it to the crossroads 14. Turn right along Colliery Road and then left through a small car park on to a footpath. After 100m, take the footpath on the right. Continue along the path 15 and when it returns to the road follow the Heart of England Way to the left, continuing straight on to Castle Ring, past the second stream 16 to the crest of a sharp rise 17. Here, take the left fork and turn left to Castle Ring. Follow the north side of the Castle Ring to the view point.

Castle Ring - Slitting Mill 18-32

From the view point 18 continue on to the far corner of Castle Ring. Turn left downhill and then immediately right along the path parallel to the fence 19 then forking left on the main path. Continue down, and cross the Red Brook 20. Take the track to the left at the marker post, continuing on and straight across the road 21. Carry straight on, keeping the ridge to your right eventually heading downhill 22 & 23, over a stream and follow the valley to the right, emerging on a spoil heap 24. Go straight on to the Brereton-Ravenhill Way for 50m and take the path to the left up to the road bend 25. Follow the bridle path on the opposite side of the road on your left into the Victoria Mound quarries 26.

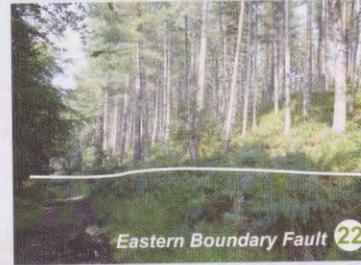
Retrace your steps to the Brereton-Ravenhill Way and follow it to the left, crossing Colliery Road 27. Continue to the end of the business parks 28 and fork right to the outskirts of Rugeley 29. Turn left along Coppice Lane for 400m and take the right fork uphill. Continue straight ahead across the minor road and across the main A460 along the farm track passing through the farmyard 30 and down the path beneath the railway and straight across the field crossing the stream 31. At the Heritage Path, turn left and then right through a gate. Follow the path past Horns mill pond 32. *An alternate route continues past the pub, turns left at the road and then takes the path right, opposite the Victory Hall, back to the Birches Valley Forest Centre.* Back-track and follow the Heritage Path left down the valley. Take the footpath left to Slitting Mill pumping station 33.

Slitting Mill - Wolseley Centre 33-37

Continue along Jones Lane 34. On reaching the main road turn right for 100m, then left along a footpath to Chaseley Road. Turn left and after 450m turn right along West Butts Road to the end. Continue straight across and take the footpath to the summit of Etching Hill 35. Return downhill and turn right along Mount Road. At the junction, take the footpath opposite, following the field boundary and pass through a wood to a farm track 36. Turn right down the track 37 and follow it to Wolseley Bridge.

Wolseley Centre - Satnall Hills 38-42

Follow the A51 towards Stone, cross the Trent by the Wolseley Bridge 38, and at the canal take the towpath left. Approaching Great Haywood, cross the canal by the iron bridge, pass under the railway and take a right fork. Continue across a field taking the second main valley on the right down to a stile into a wood. Follow the path to Cliff Caves 39. Continue through the wood exiting by another stile, and turn left across a field, then follow the path back to the canal. Continue along the towpath to Trent Lane and turn left to cross Essex Bridge 40. Follow the road and Staffordshire Way through the Shugborough Estate 41 to the A513 and turn right. Follow the road 42 to Coldman's Slade and take the footpath from the back of the second car park parallel to the road, straight back to Satnall Hills Quarry.



Eastern Boundary Fault 22

GEOMORPHOLOGY

Cannock Chase comprises an undulating plateau 150-250m in elevation that stands proud of the surrounding valleys. Its prominence reflects the combined influence of tectonic processes (earth movements) and surface denudation (by wind, water and ice). Tectonic processes resulted in the local uplift of Triassic sandstones (see cross-sections). These rocks are harder and more resistant than the mudstones of the surrounding area and subsequent differences in the rates of weathering and erosion have further accentuated the relief.

The episodic growth and retreat of the British Ice Sheet over the last 2 million years has had a dramatic impact on the landscape. Whilst the Glacial Boulder 7 demonstrates the ability of glaciers to



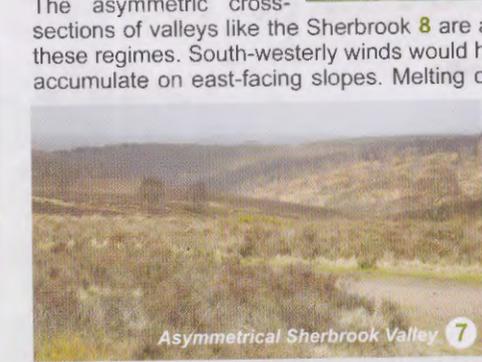
31 Misfit river

transport material long distances, glacial meltwater has generated the most impressive landforms. Both the prominent valley linking Rugeley and Cannock 13, 31 and a series of deeply-incised channels around the northern perimeter of the chase 2, 3 highlight the erosion of glacial meltwater. As water can only flow uphill underneath a glacier, being under pressure beneath the ice, the undulating profile of the northern channels suggests they were eroded subglacially.

At other times, the Chase was free of glacier ice but was still subject to cold conditions similar to northern Canada today. The development of permafrost would have promoted surface drainage when snow melted during the brief summers. This, in combination with the influence of freeze-thaw weathering breaking up the sandstones, explains the occurrence of dry valleys and the dissected nature of the plateau. The asymmetric cross-



Meltwater channel, Alaska



Asymmetrical Sherbrook Valley 7

sections of valleys like the Sherbrook 8 are also characteristic of these regimes. South-westerly winds would have caused snow to accumulate on east-facing slopes. Melting of these snow banks in summer caused small landslides that pushed the stream to the opposite side of the valley, undercutting the opposite bank and generating a steeper west-facing slope.

The Cannock Chase Geotrail

Introduction

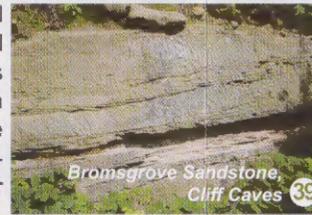
Welcome to the Cannock Chase Geotrail. This geotrail is designed to give a glimpse of the rocks, landscape and the geological industrial heritage of the area. The trail is 36 km, too long to be tackled all in one. We recommend completing it in sections from the car parks at Satnall Hills, Glacial Boulder, Birches Valley Forest Centre, Castle Ring and Wolseley Centre. **Trail directions can be found on the reverse of this leaflet together with background information. Some sections of the trail can be muddy and uneven so the use of suitable footwear is advised. Parts of the trail are in areas managed by the Forestry Commission and areas of active forestry working should not be entered.** Temporary closures of parts of the trail may be necessary and alternative routes should be sought. All features should be viewed from the geotrail unless a permitted access route is indicated.

Satnall Hills - Glacial Boulder 1-6

Satnall Hills Quarry 1 shows the pebbly Kidderminster Formation that underlies most of Cannock Chase. This was deposited in a large braided river. Small pit marks on the pebbles formed due to quartz dissolving where the pebbles pressed against each other. The valley that passes Harts Hill 2 and the Mere Valley 3 are unusual as they go both up and down hill. This is characteristic of erosion by water flowing under pressure beneath a glacier. From Broc Hill 4, the low ground of the softer Mercia Mudstones of the Stafford Basin can be seen beyond the Tixall Fault, the western boundary of Cannock Chase. The Berkswich Sundial is made from blocks of fossiliferous Carboniferous Limestone from Caldon Low in the Peak District. At Milford Quarry 5 and 6, the pebbly Kidderminster Formation includes thin sandstone layers. The quarry is a major national resource of sand and

Slitting Mill - Wolseley Centre 33-37

The Slitting Mill 33 forged nails from iron extracted from local ironstones. This is now a pumping station extracting water from the Kidderminster Formation, a major aquifer for the region.



Bromsgrove Sandstone, Cliff Caves 39

The Bromsgrove Sandstone, deposited in low energy meandering rivers, is exposed at the top of Etching Hill 35. A 15th Century glass furnace which used

KEY

	GEOTRAIL		Major road
	GEOTRAIL/ Road shared		Minor road
	Alternative route		Footpath
	River		Interest point
	Canal		Car Park
	Colliery		Toilets
	Fault with direction of downthrow		Information
	Coal seam		Public House
	Railway		Café
	Railway tunnel		Shop
	View Point		Bus stop

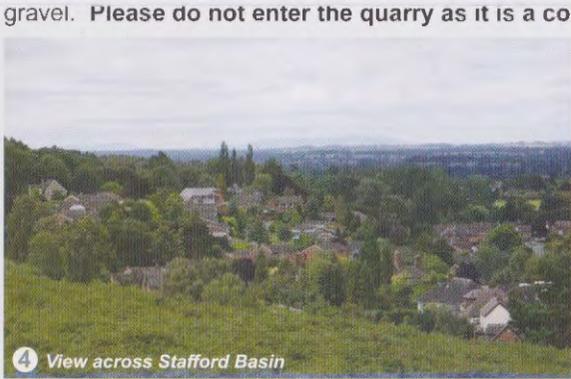
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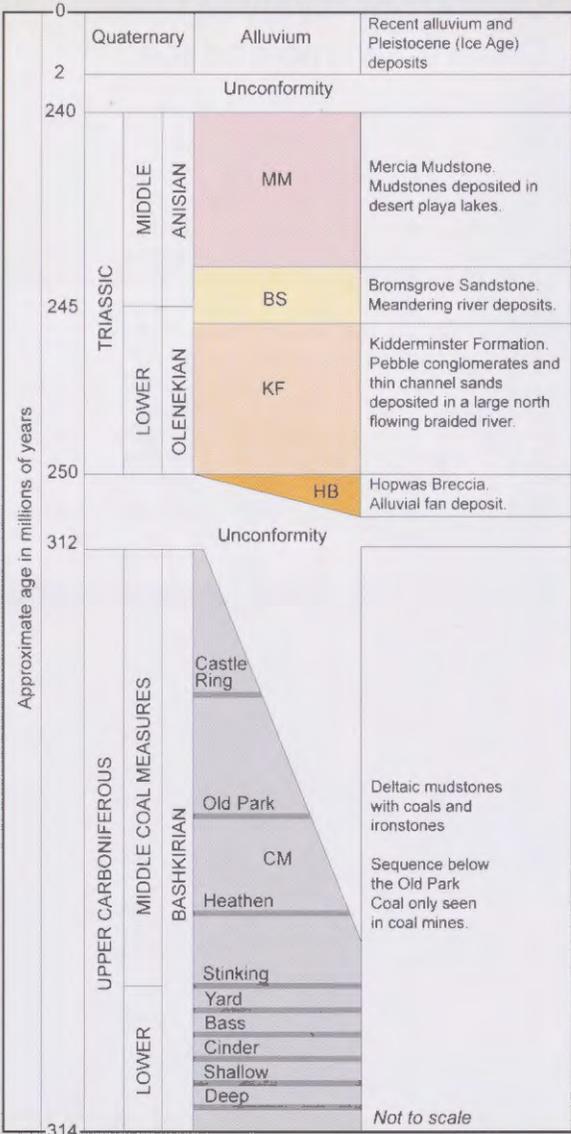
the white quartz pebbles from the conglomerates as raw material has been discovered at 36. The trail crosses two faults marked by valleys near 37 which downthrow the Bromsgrove Sandstone in between Kidderminster Formation rocks. The material in the track and fields changes from pebbles to sand and back again.

Wolseley Centre - Satnall Hills 38-42

Contrast the broad Trent Valley 38 which carried huge quantities of meltwater during the last Ice Age with the valleys seen elsewhere on the trail. At Cliff Caves 39 the Bromsgrove Sandstone is spectacularly exposed in a building stone quarry with pickaxe marks visible on the faces. Excavation followed the main sandstone horizon into the hillside forming caves. **Do not enter the caves.** Essex Bridge 40 took pack horses carrying coal from the mines on to the south to the salt brine works in the Trent Valley. A river terrace can be seen on the wide flood plain near Shugborough Hall 41. Compare the flatter profile of the Sherbrook Valley 42 as it enters the Trent



4 View across Stafford Basin



Glacial Boulder - Birches Valley 7-10

The Glacial Boulder 7 is granite. Its faceted sides were caused by abrasion as it was transported under a glacier, probably from the Lake District. The Sherbrook Valley 8 is asymmetric, steeper on the eastern side and more strongly gullied. This is characteristic of valleys developed under permafrost conditions (see overleaf). The Sher Brook is a misfit river. Its large valley formed during the last Ice Age as meltwater from surface snow and ice was unable to soak into the frozen ground. The Kidderminster Formation can be viewed from the trail in the old Rugeley Quarry 9 and at the trail side 10. It is sandier than at Satnall Hills Quarry, suggesting a lower energy part of the braided river system.



7

Birches Valley - Castle Ring 11-17

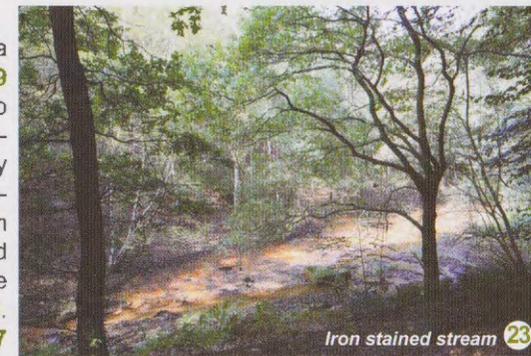
Fair Oak Colliery had shafts through the Triassic rocks to the Coal Measures 90m below. Spoil heaps of dark grey shale 11 contrast the surface pebble beds. The trail continues along the line of the colliery railway. Rising Brook 12 is another misfit river, dwarfed by its deeply-incised valley 13, possibly cut by the draining of a glacially-dammed lake. Triassic rocks were deposited unconformably on top of deformed Carboniferous mudstones and coals (see cross-sections). Colliery Road 14 runs above the unconformity which can be recognised on the trail 15 by the change from drier, pebbly conditions to wetter and muddier ones. The Old Park Coal outcrops just beyond Red Brook 16 and numerous small bell pits were dug here. Circular depressions near the trail mark some of these. Ironstone was also extracted and smelted locally using charcoal. Orange sandstone breccia, the Hopwas Formation, occurs in a metre high section to the left of the trail at the base of the Triassic 17. Below this, the Castle Ring Coal was extracted to the north of Castle Ring.



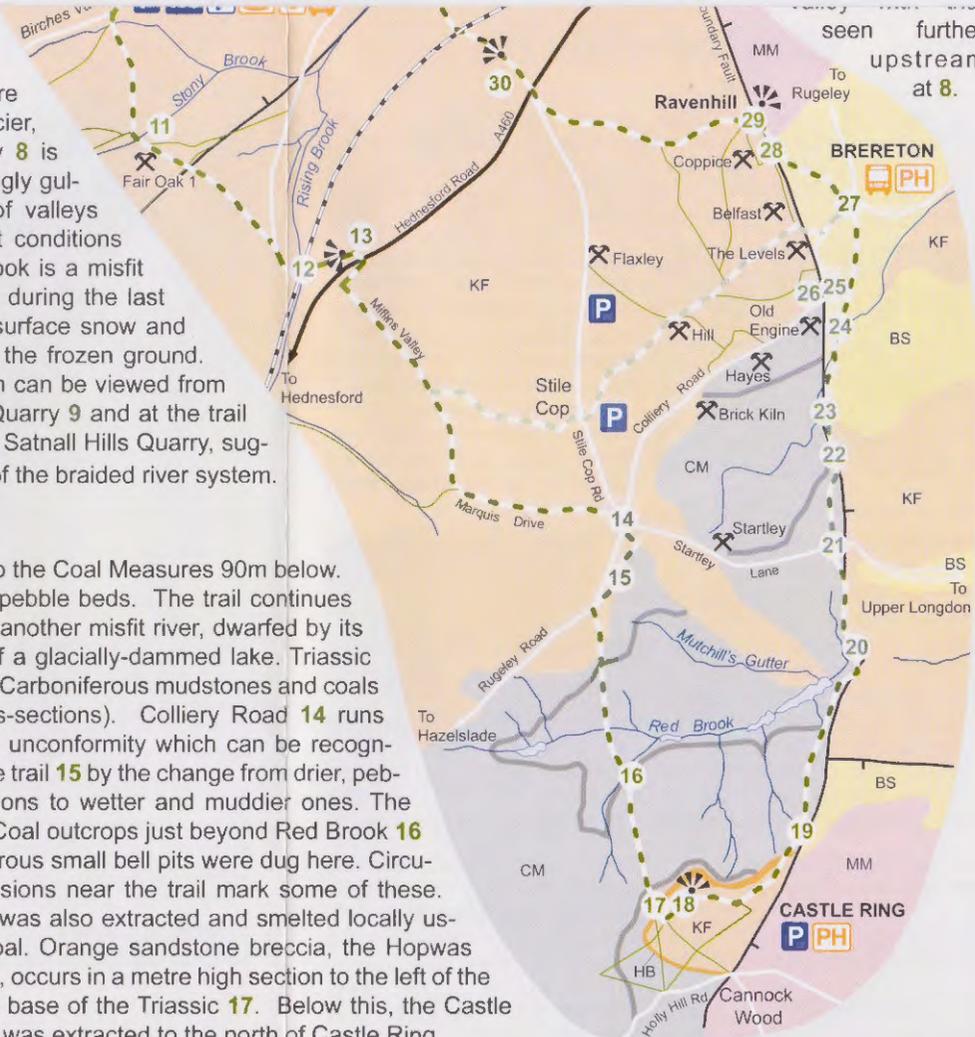
13 Meltwater channel

Castle Ring - Slitting Mill 18-32

The view from Castle Ring 18 shows the low ground beyond Rugeley formed by the soft Mercia Mudstone rocks of the Needwood Basin with the Peak District beyond. The trail between 19 and 29 follows the Eastern Boundary Fault, responsible for bringing the coal close enough to the surface to be mined. At 19 the higher ground marks the Bromsgrove Sandstone across the fault. The Kidderminster Formation forms the ridge between 20 and 21. At 22 coal fragments are visible in the muddy track and bell-pit depressions occur near by. Pebbles return as the fault is crossed and the track becomes sandier as it passes into the Bromsgrove Sandstone 23. The stream here is red-orange from the leaching of ironstones within the coal spoil tip which can be examined at 24, the site of the Old Engine Pit. The Eastern Boundary Fault can be seen at 25 with downthrown Bromsgrove Sandstone nearest the road and Kidderminster Formation behind. The latter unit can be seen in the quarry 26. The track from 24 to 27, 28 & 29 is the old colliery railway. The Levels and Belfast Pits were near 27 and the Coppice Pit at 28. From 29, the view is from the high ground of the Kidderminster Formation across to the lower ground of the Mercia Mudstone beyond the boundary fault. The trail from 30 to 32 re-crosses the misfit Rising Brook 31 valley. Compare the valley profile to that at 13. The far valley edge is a fault with Bromsgrove Sandstone 32. The escarpment at 34 also marks the fault.



Iron stained stream 23



seen further upstream at 8.