

# Carboniferous rocks of the Roman Wall and Haltwhistle Burn - an excursion

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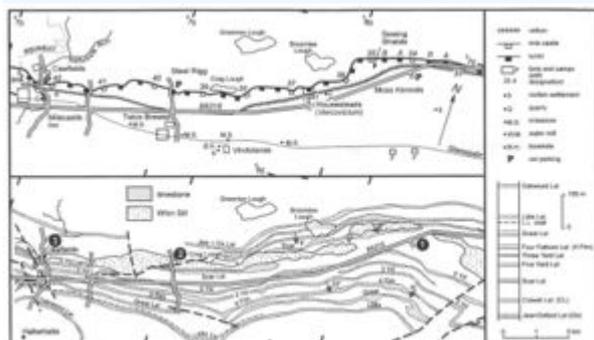


Figure 11.1 Geological and archaeological maps of the Roman Wall country.



Figure 11.2 The Whin Sill crag at Steel Rigg, with the Roman Wall at its crest and Crag Lough at its foot in the distance (Locality 2). Photo: C. T. Scrutton.

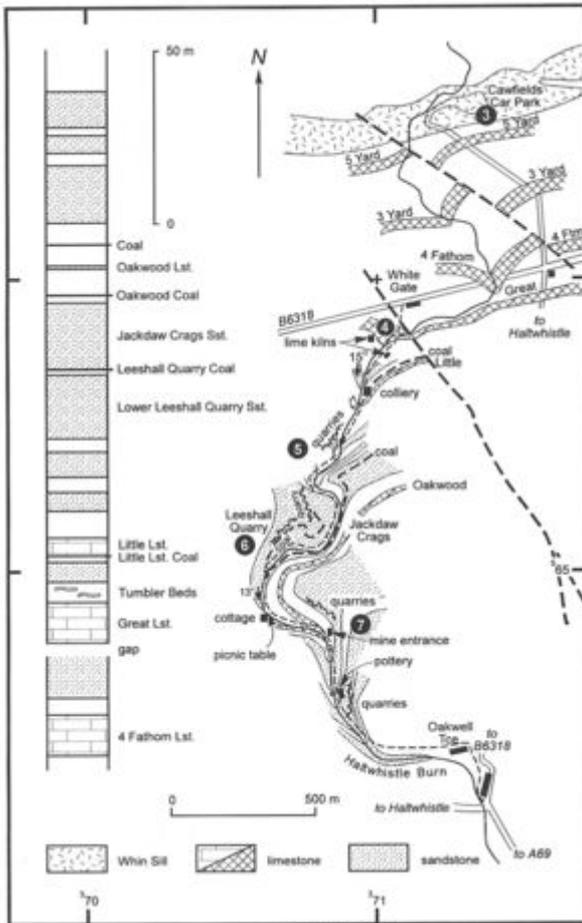


Figure 11.3 Geological map of Haltwhistle Burn.

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## Purpose

The area is outstanding by virtue of three interrelated features: the outcrop of the Whin **Sill**, the associated geomorphology, and the siting of Hadrian's Wall on its outcrop. The excursion will cover all three elements together with the stratigraphy of the local succession which spans the Dinantian/Namurian boundary.

## Logistics

This section was compiled in 2006 when the printed guidebook was published. Before visiting this site please ensure you have up-to-date contact and access information.

The excursion is in three parts: the dip and scarp topography along the B6318 (Military Road) from Sewing Shields to Cawfields ([Figure 11.1](#), Localities 1, 2; less than 1 hr). The geology and archaeology of Cawfields Quarry area (Locality 3; 1 hr). An easy 3 km walk along an old railway track from Cawfields, down Haltwhistle Burn to Haltwhistle and the A69 ([Figure 11.3](#), Localities 4-7; 2 hrs). For groups, the return walk from Locality 7 could be avoided if a car could be parked at either end. Parking, refreshments and toilet facilities are widely available in the area.

## Maps

O.S. 1:50 000/1:25 000 Hadrian's Wall; 1:50 000 Sheets 86 Haltwhistle, Bewcastle & Alston, 87 Hexham & Haltwhistle; B.G.S. 1:50 000 Sheets 13 Bellingham, 18 Brampton (both solid and drift editions), 19 Hexham.

## Geological background

The striking landforms of the area arise from a combination of three factors. Firstly, the succession exposed, which ranges from the Jew (=Oxford) Limestone (Dinantian) to the Oakwood Limestone (Namurian) and consists of sediments deposited in typical **Yoredale** cycles. This repeated sequence of limestone, shale, sandstone, shale, coal produces an alternation of hard and soft beds with very different weathering characteristics. Into this succession was intruded the Whin Sill, of variable thickness and frequently **transgressing** from one horizon to another, but very durable and resistant to weathering in comparison to the enclosing sediments. Secondly, the post-Carboniferous uplift of the Cheviot **pluton** resulted in doming of the sediments laid down in the Northumberland Trough, imparting a significant southerly **dip** to the strata in the southwest of the county. Dips of around 15°, coupled with the alternation of hard and soft beds, produced a strong dip and scarp topography. Thirdly, although these conditions occur over most of Northumberland, the spectacular scenery displayed in the Roman Wall area is not evident elsewhere. This is because ice movement in south Northumberland was from west to east, parallel to the **strike** of the beds, as demonstrated by an **erratic** of Cumbrian Shap **Granite** found in the area by Johnson (1952). The movement of ice along the strike direction will have preserved, and possibly enhanced the dip-scarp topography, whereas movement of ice across the strike fills in the shale depressions with glacial debris, flattening out the topography. Drilling in east Northumberland has also revealed strong dip and scarp topography in rockhead underlying the flat ground surface, with thickness of glacial **till** from 0 to 80 m.

The Roman Wall is an outstanding structure, literally and metaphorically, accentuated in the excursion area by its location on the scarp edge of the Whin Sill outcrop. It is 118 km long, 4.6–6.1 m high and 2.1–3.1 m thick, with accompanying forts and turrets, crossing from one side of the country to the other. Archaeological investigations have revealed that the Wall is a complex frontier zone with a great wealth of Roman remains. In AD 121 Hadrian set out on a tour to examine the military dispositions in his empire and during his visit to Britain he initiated the construction of the wall which had been proposed by his predecessor Trajan to define the limits of the Roman Empire and to defend the Stanegate frontier road. The building of the Wall seems to have been completed by AD 140, and it continued to operate as a fortification and customs control until the final withdrawal of the Romans from Britain in AD 400.

Where the wall was stone built, as far west as Gilsland, the dressed faces were constructed almost exclusively of Carboniferous sandstones, quarried locally. The core was filled with any available rock material. The Romans found the Whin Sill too hard to work and where the wall crosses the dolerite outcrop on Limestone Bank [NY 875 715], the excavation of the vallum is incomplete.

Over the centuries the wall has been gradually degraded, mainly because the dressed stone was an easy source of building material for local farms, houses and castles. The greatest degradation took place following the 1745 Jacobite rebellion when General Wade constructed an east-west road, still known in the north as the Military Road (B6318), to speed troop travel across the country. The first 48 km west from Newcastle were built almost wholly on top of the foundations of the Wall, and only the Wall's construction on the rugged scarp edge of the Whin Sill in the area west of Carrawburgh saved it from total destruction.

## Excursion details

### Sewing Shields-Cawfields

From Newcastle, take the A69 to Heddon on the Wall. Turn onto the B6318 (Military Road), which from Heddon to Chollerford is almost wholly along the foundations of the Roman Wall. The ditch on the north side and the vallum with the two accompanying mounds on the south can often be clearly seen. Continue westwards, until beyond the fort of Carrawburgh (*Brocolitia*) [NY 859 712], the dip and scarp topography of the 'Roman Wall Area' is seen ahead. At Turret T33B [NY 821 706] the road leaves the line of the wall which climbs up to the scarp edge of the Whin Sill at Sewing Shields.

#### Locality 1

From the telephone exchange on the south side of the road [NY 816 702], the view west consists of the Whin escarpment, overlain on the lower part of the slope by the Scar Limestone, a peat filled depression, then the conspicuous scarp of the sandstone between the Scar and Five Yard Limestones which the road traverses ([Figure 11.1](#)). Westwards, the scarp and outcrop of the Five Yard Limestone runs parallel to the south side of the road as far as Moss Kennels [NY 803 691] just west of which the features break down which suggests **faulting**. Although no fracture has been located, the Whin to the north shows a large break in outcrop and transgression at this point. Housesteads (*Vercovicium*) [NY 793 784] can be seen 1 km west on the dip slope of the Whin. The car park is built on the scarp of the sandstone between the Five and Three Yard Limestones and the road continues at this level. To the north the scenery is dominated by the top surface of the Whin, dipping at about 12°, and to the south by the strong scarp feature of the sandstone between the Three Yard and Four Fathom Limestones. Only the upper half of the scarp feature is composed of sandstone, a marked change in vegetation indicating the junction with the underlying shale. The top of the Three Yard Limestone can be seen at the west end of the escarpment [NY 783 676]. The Whin Sill escarpment is

heavily indented, particularly at the site of Milecastle 39 [NY 760 767] which has recently been excavated and consolidated. The indentations are probably due to small faults crossing the sill which tend to shatter and weaken the brittle **dolerite**. The most westerly of the indentations is larger and better defined [NY 753 675] and can clearly be seen to have acted as a water channel at the end of the last glaciation, draining a lake which lay on the north side of the escarpment, a remnant of which persists as Crag Lough.

## Locality 2

Make a short detour at Twice Brewed [NY 751 668], turning north to Steel Rigg. From the car park just north of the wall [NY 751 677], walk 100 m from the southeast corner along the wall to the edge of the **overflow channel** and a superb view of the Whin escarpment, with its columnar **jointing**, and Crag Lough in the middle distance ([Figure 11.2](#)).

Return to the Military Road, which over the next 2 km west has the dip slop of the Whin continuing on the north side but to the south the features are buried under till. They gradually emerge near the junction at NY 730 663 where quarries in the Four Fathom Limestone can be seen alongside the road and in the Great Limestone near the skyline; these features strengthen and the Four Fathom Limestone crosses the road at [NY 720 662]. To the south quarries and lime kilns indicate the position of the Great Limestone with further quarries in the sandstone above it.

Turn north at the Milecastle Inn [NY 716 660] to Cawfields. Immediately on the right is a good section of the Four Fathom Limestone exposed in an old quarry, while on a raised hillock on the left, between the road and Haltwhistle Burn, is the site of the fortlet that guarded this section of the Stanegate. Between the Four Fathom Limestone and the top surface of the Whin are the remains of old workings in coal below the Three Yard Limestone and **siderite** ironstone bands in shales in the same part of the succession. The most striking feature, however, is the vallum and mounds running along the base of the Whin feature. Continue to Cawfields quarry car park.

## Locality 3, Cawfields Quarry [NY 713 666]

The car park and lake are on the site of the old whinstone quarry which removed not only the scarp of the Sill but also the Roman Wall that ran along its top; working ceased when they approached Milecastle 42 and the break in the continuity of the escarpment.

The top surface of the Sill defines the land surface; a thin skin of **metamorphosed** sediment can be found in places. Columnar jointing is developed perpendicular to the top, cooling surface, of the intrusion. In the old quarry walls on the south side of the car park the fine grained chilled margin of the sill can be seen, but is very thin. More obvious is the band of vesicles 2 m below the top. These formed by gas, released from the magma by reduced pressure as it rose towards the surface. Their presence at a definite level in the sill suggests that the magma close to the surface contact had cooled to a viscosity that prevented the bubbles rising any further, most of the vesicles have later been filled with **calcite**.

Along the north side of the lake, a stile over the low stone wall permits access to the main quarry face, which at its northern end exposes the base of the sill, resting on sandstone dipping southwest at 45°. To the east, behind the quarry face, the Whin escarpment is offset along the line of a small northwest-southeast valley. The valley may mark the position of a fault, **downthrowing** east, displacing the Whin escarpment to the north. Recent geophysical work, however, suggests that the displacement is due to a transgression of the sill and it seems probable that both faulting and transgression are involved. On the east side of the small valley Milecastle 42 occupies a sloping site and has short stubs of broad wall on either side joining on to the narrower linking wall section.

If time permits, the walk westwards from Cawfields via the fort of *Aesica* to Walltown, largely on the Whin dip slope, is very rewarding archaeologically.

## **Haltwhistle Burn**

As well as a good dip section through the Carboniferous succession, Haltwhistle Burn provides an insight into the rich industrial heritage of the area ([Figure 11.3](#)). The Whin quarry at Cawfields was linked by a narrow gauge railway, down the burn to Haltwhistle and the main Newcastle-Carlisle railway. Other industrial activities in the vicinity were mining of ironstone from below the Three Yard Limestone, probably smelted at Haltwhistle; mining of coal from three separate seams; quarrying of the Great and Four Fathom Limestones, burnt in lime kilns for agricultural lime and mortar; quarrying of sandstone for building; mining of **fireclay** for bricks, pots and pipes; quarrying of **ganister** for firebricks for furnace linings; and the working of **galena** for lead and silver.

### **Locality 4 Approach the burn from the white gate just west of the cottage on the south side of the Military Road [NY 714 659]**

The Four Fathom Limestone is exposed in the stream bed under the road bridge but can only be reached from the south side of the burn. The track down Haltwhistle Burn, mostly the old railway line, is well marked. From the gate, the field surface is the top of the sandstone between the Four Fathom and Great Limestones and it can be seen outcropping in places through the thin soil. At the stream the upper half of the Great Limestone is exposed, about 7 m thick, in well defined **posts** with clay partings; the bedding is disturbed by a small fault crossing just upstream. Further exposures are present in the stream bed but nowhere is the full thickness of the limestone exposed. Overlying the limestone are the Tumbler Beds, calcareous shale with thin bands of limestone, so called because they often show small scale **folding**. On the east side of the burn the shale fragments provide a rich fauna of small **brachiopods**, **crinoid** ossicles and calyx plates, **echinoid** plates, **corals** and **bryozoa**.

Downstream, beyond lime kilns on both banks, the basal section of the sandstone above the Great Limestone is exposed in the east bank. It is thin bedded and shows fine detail of sedimentary structures picked out by severe wind erosion in its exposed position. Around the next bend are the remains of the colliery which worked the Little Limestone Coal; the chimney and engine block are still standing. Fragments of the coal can be found and the overlying Little Limestone, rich in bryozoa, is exposed in the hillside behind the chimney; there is a smaller exposure downstream in the west bank. The Little Limestone is rarely exposed, since it is only 3–4 m thick.

### **Locality 5 [NY 709 655]**

Cross to the west bank by the footbridge. South dipping interbedded massive sandstones and shales are exposed in the banks, with two of numerous quarries in the sandstones adjacent to the footbridge. Apparent changes in the dip of the sandstones downstream, particularly well seen at Jackdaw Crags where the massive sandstone in the east bank, underlain by a thin coal, appears to be synclinal, are due to the frequent changes in stream direction. The dip is constant. Stream erosion across the shale/ sandstone alternations has produced a very sinuous course.

### **Locality 6 [NY 707 651]**

In Leeshall Quarry, on the west bank, two sandstones are separated by a 25 cm coal, the same as that at the base of Jackdaw Crags, underlain by **seatearth** 2 m thick. The sequence reflects the build up of the Carboniferous delta top to water level allowing the growth of plants and the formation of peat. Downstream of Leeshall Quarry the path returns to the east bank via the old railway bridge in

which the narrow gauge tracks are still embedded. Continue downstream to the picnic place where an excellent dipping top bedding surface of the Upper Leeshall Quarry Sandstone can be seen in the stream. Stay close to the edge of the stream where the Oakwood Limestone crops out just above water level on the west bank. The exposure continues for 20 m downstream to just above the wooden footbridge. The 2-3 m thick limestone is impure with a high clay content and is a significant marker horizon in this part of the succession dominated by sandstone and shale.

### **Locality 7 [NY 708 649]**

Downstream on the east bank, sandstone, underlain by the shale above the Oakwood Limestone, forms the main face of a large quarry, set back from and running parallel to the burn. Nearby are the remains of another colliery, a drift into the base of the cliff marked by some stone packing and a concrete tunnel from which issues a flow of water, white with alum. The colliery initially worked a thin coal above the Oakwood Limestone but later it mainly mined fireclay for the pottery, recently closed, a few metres ahead. The remains of the kilns and the large sandstone wheels used to grind up the clay are still in the yard and glazed pipes can be found.

On the east side of the burn there is another large sandstone quarry just past the pottery, now used as a coal merchant's yard. Follow the path along the bank and then along the back of a row of old miners' cottages (with its water supply coming out of the bank side in the middle of the row), past the allotments and out on the main road at the east end of Haltwhistle village.

## **Glossary**

## **Bibliography**

At all times follow: [Countryside code](#) and [Code of conduct for geological field work](#)

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