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## 4 The North Swaledale Mineral Belt around Gunnerside

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### Purpose

This full-day excursion examines part of the richly mineralized North Swaledale Mineral Belt, hosted by Dinantian and Namurian (Carboniferous) rocks. Spectacular examples of Swaledale's mining landscape will be seen.

### Logistics

The excursion proceeds from Surrender Bridge [SD 988 999] to the upper part of Gunnerside Gill [NY 940 000]

For maximum enjoyment it is recommended that arrangements are made for transport to be available in Gunnerside village at the end of the day. Alternatively the route should be retraced from the final locality to Surrender Bridge. The approximate walking distance from Surrender Bridge to Gunnerside is 9 km; from Surrender Bridge to Locality 11 and back, 13 km.

Windproof and waterproof clothing and stout footwear are necessary.

*Note: **Do not attempt to enter any of the mine workings*** — the tunnels are unstable and the workings are in a very dangerous condition.

### Maps

O.S. 1:25 000 Outdoor Leisure Sheet 30 Yorkshire Dales, North and Central areas; O.S. 1:50 000 Sheet 92 Barnard Castle, and 98 Wensleydale & Upper Wharfedale; B.G.S. 1:63 360 Sheet 41 Richmond, and Sheet 50 Hawes.

### Geological background

This area north of the River Swale has been called the North Swaledale Mineral Belt. It is the most highly mineralized zone within the broad area known as the southern part of the Northern Pennine Orefield. The ore deposits — mainly in veins and flats and principally confined to limestone beds — were emplaced in a system of roughly east–west and east-northeast–west-southwest faults. The ore mined was galena, the major source of lead, although minor amounts of zinc and copper were locally exploited. More recently (in the last 70 years) some of the mines were reopened and fluorspar extracted. None are being mined at present, although the occasional reworking of the dumps and tailings heaps has taken place. The dumps are the best source of mineral samples.

### Excursion details

#### Locality 1 [SD 988 999]

Before beginning the walk up the valley of Old Gang Beck, note the ruins of the Surrender Smelt Mill on the north side of the stream. The ruins of the present mill date from 1839 though two earlier mills, the remains of which are now difficult to discern, occupied the site. Ore for smelting here was brought from numerous mines in the area owned by the A.D. Company. The remains of the peat fuel store can be seen to the east of the mill ruins. The building is unusual in being very symmetrical in plan. The 457 m long horizontal flue — the course of which is clearly visible running northwest from the mill — ended in a small chimney. Smelting here ceased in 1880.

From the north side of Surrender Bridge take the gated cart track which leads west-northwest along the northern side of Hard Level Gill. The lower slopes of the valley are mantled by till, though the Main Limestone and overlying chert beds may be seen forming scars on the hillside at Barras Top.

### **Locality 2 [NY 9820 0014]**

Under the scar of Smith Hill is the small pile of rubble which is all that remains of High or Raygill Mill. Smelting is known to have been carried out here in the 17th and 18th centuries. Continue up the track for a further 0.8 km to the remains of the Old Gang Mill complex.

### **Locality 3 [NY 9744 0052]**

The Old Gang Smelt Mill, together with its associated buildings and dumps, is one of the most impressive and best-preserved mining sites in Swaledale. The buildings were erected in about 1890. From the furnace house, the horizontal flue was carried over an arch and ran straight up the hillside for 0.8 km to a chimney on Healaugh Crag Edge. The prominent rock outcrops behind the mill are exposures of the Main Limestone, the lowest unit of the local Namurian sequence. Standing on a bench-like hilltop above the limestone crags about 270 m north-northwest of the smelt mill are the remains of the peat store, one of the most famous relics of the lead industry still to be seen in Swaledale. Lead ore was smelted at Old Gang using both coal and peat as fuel. A year's supply of peat, cut from the surrounding moors during the summer, was stored in the open-sided thatched-roofed peat store, which was some 120 m long and 6.5 m wide. Only the pillars and gables now remain.

Immediately to the west of the peat store the Main Limestone outcrop is cut by a series of prominent gullies which mark the site of opencast trials on minor lead-bearing veins known as the Knott's Veins. No mineralization is exposed here today. The Spence Level was driven from the trackside at the foot of the hillside to explore these veins but little of value was found.

Continue along the track up Hard Level Gill for a further 270 m to the entrance to Hard Level.

### **Locality 4 [NY 9712 0068]**

The partly collapsed entrance to Hard Level lies a few metres south of the track. The relatively modest appearance of this mine entrance belies its importance as the entrance to one of the most extensive sets of underground workings in the Yorkshire Pennines. Driving of the level began in 1785 in the beds beneath the Underset Limestone. The level was driven northwest beneath the valley to reach the group of strong veins, including Old Rake, North Rake and Friarfold Rake, beneath the head of the valley. Considerable lengths of rich lead-bearing veins were worked from this level which was eventually connected with the workings of the Bunton Level in Gunnerside Gill. Adjacent to the entrance of Hard Level, the remains of the old dressing floors and water-wheel pits may be seen. For a time during the 19th century, dressed ore from the Gunnerside Gill workings was transported to the Old Gang Smelt Mill underground via the Bunton and Hard Levels.

Immediately above the adit mouth is an excellent exposure of a thin coal seam overlying a ganister-like sandstone with abundant rootlet traces.

The extensive workings from Hard Level have produced a very large spoil heap on the south bank of the gill. This is a good locality at which to see a number of minerals. Small amounts of galena, the ore mineral worked, are relatively common, with a little brown sphalerite in places. Baryte is common in rather coral-like masses of white, chisel-shaped crystals, a form characteristic of this mineral when it has developed by alteration from a barium carbonate mineral such as witherite. Pale yellowish-cream witherite may also be found and good examples of white radiating crystalline masses of strontianite are occasionally found. Colourless fluorite is also present but is rather rare.

The extensive flat, terraced area between the Hard Level entrance and the large dumps is the site of the dressing floors where the lead ore was separated from the waste minerals or gangue.

Continue up the track to where a tributary stream, known as Ashpot Gutter joins the gill from the south.

### **Locality 5 [NY 9665 0064]**

A short detour leads to the large spoil heap adjacent to Ashpot Gutter at the entrance of Victoria Level, a prospecting level begun in 1860 to test the Watersykes Veins. These veins carried calcite, baryte and galena which can be found on the dumps. An intergrowth of witherite and strontianite known locally as 'water spar' was also found here, though specimens are very difficult to find today.

Return to the main Hard Level Gill track and continue upstream.

### **Locality 6 [NY 9678 0090]**

Immediately upstream from the junction with Ashpot Gutter, the valley floor contains a flat area of barren silt. This is the settling pond from a small mineral separating plant which during the 1980s was separating barytes (the commercial product consisting of the mineral baryte) from spoil heap material from higher up the valley.

A short distance further up the valley the track bifurcates at Level House Bridge, near which are the ruins of Level House. If time permits it is worth continuing further up the valley to Localities 7 and 8 before returning to this point and following the track westwards over Level House Bridge to Locality 9.

### **Locality 7 [NY 9640 0140]**

Northwest of Level House Bridge the stream is known as Flincher Gill. Between the bridge and Level House it runs on a flat rock bed formed of the Main Chert. Immediately upstream from Level House the valley is crossed by Old Rake Vein, one of the area's main east-northeast–west-southwest trending veins. The course of this is marked particularly in the west by an enormous opencast hush. Hushes are characteristic features of the northern Pennine orefields. They are large opencast workings in part excavated by using torrents of water released from specially constructed reservoirs high on the hillsides. Dumps from levels driven eastwards into Old Rake, and a little further along the track into North Rake, contain a little galena and sphalerite with much baryte. Pale brown 'dry bone' smithsonite is present locally. Continue up the track to a ford beyond which there are large dumps derived from the Brandy Bottle Incline.

### **Locality 8 [NY 9600 0190]**

The entrances of the Brandy Bottle inclined adits are now collapsed and difficult to locate. They were driven in the early 1800s to work the Friarfold Vein, a major east-northeast–west-southwest vein, the outcrop of which, a short distance up the valley from these dumps, is marked by an almost continuous line of old spoil heaps and small shafts.

Excellent specimens of several minerals may be collected from the Brandy Bottle dumps. Baryte occurs here in the chisel-shaped crystal form noted earlier, as well as in the characteristic 'cockscomb' variety. Colourless or yellowish-white fluorite may also be found. White radiating crystalline strontianite and yellowish-white compact or radiating crystalline witherite are also present. Some blocks of rather cavernous baryte contain small sprays of colourless hemimorphite crystals. Rarer minerals which have also been found here include cinnabar, as vivid vermilion-red earthy patches, and beautiful turquoise-blue aurichalcite.

Return to Level House Bridge and follow the track westwards.

### **Locality 9 [NY 9520 0140]**

The track follows the extensive spreads of spoil from old workings on Old Rake and North Rake. Specimens of all the minerals so far mentioned may be found in these heaps. In addition, a little bright green pyromorphite, a rather uncommon mineral in North Yorkshire, may be found locally.

Continue uphill to where the track begins its descent into Gunnerside Gill.

## **Locality 10 [NY 9440 0135]**

The steep eastern side of Gunnerside Gill is here scarred by several elongated gullies or hushes which mark the course of Friarfold, Old Rake, Watersykes and several other veins in beds from the Ten Fathom Grit at the hilltop down through the Main and Richmond Cherts, and the Main Limestone. Good exposures of all these may be seen in the steep sides of the hushes. Examples of all the area's main minerals are abundant in the spoil from the hushes and from the large dumps from the Bunton and Sir George levels driven eastwards into this richly mineralized ground. Across the valley the veins may be followed in the conspicuous hushes which mark their course at the Lownathwaite Mines.

If time permits, the walk may be continued by following the hushes down into Gunnerside Gill and following the path downstream to Gunnerside village via the Sir Francis Level mine.

## **Locality 11 [NY 9399 0001]**

The Sir Francis Level was driven northwards, beginning in the sandstone beneath the Five Yard Limestone, to intersect the Friarfold vein system at depth. Driving was begun in 1864 and the Friarfold Vein was cut in 1877. From this level a shaft 79 m deep was sunk to test the veins in the lower beds. Pumping and hoisting were carried out by a hydraulic engine installed in the level. Ore from the Sir Francis Level mine was processed at two dressing plants a little further down the valley. Good specimens of baryte, calcite and sphalerite, accompanied locally by a little strontianite may be found on the dumps. Barytocalcite has been recorded here but is very rare.

The footpath can be followed down Gunnerside Gill to Gunnerside village.

## **[Bibliography](#)**