

EXCURSION

The Matlock Gorge

Leaders: Lynn Willies, assisted by Colin Bagshaw

Sunday 10th October 2009

The aim of the excursion, attended by some 30 members, was to study the geology of the Matlock Gorge and its associated topography and lead mining history. The latter is well documented in *Lead Mining in the Peak District*, edited by Trevor Ford and Jim Rieuwerts and published by the Peak District Mines Historical Society in 2000. The rock exposures encountered are all within the upper part of the Carboniferous Limestone sequence and may be summarised as in Figure 1. Most of the excursion area is covered on both the BGS Chesterfield One-inch map (Sheet 112) and the Matlock geological map at 1:25,000.

The excursion began in the public car park adjacent to the Sainsbury's store, alongside the new stretch of the A6, which by-passes the old road bridge in the centre of Matlock. From here can be seen, looking south beyond the supermarket, an old quarry face that displays a series of limestones dipping gently southwards. These belong to what is referred to as the Cawdor Limestones on the BGS Sheet 112, but now have been renamed as the Eyam Limestone.

After walking west to a point about 200 m along the new road (Cawdor Way), the party viewed the exposure just to the west of the old railway line. These rocks are lower in the sequence and belong to the Matlock Group, now renamed the Monsal Dale Limestone; they tend to be more massively bedded than the Eyam Limestone, and are somewhat paler in colour. At the base of this section is the amygdaloidal basalt of the Matlock Upper Lava. Do not be deceived by the fine black mesh of the safety netting that is holding back the badly decomposed clay wayboard at the top of the lava. The lava has weathered to a rather pale colour and from a distance has a similar appearance to the limestone.

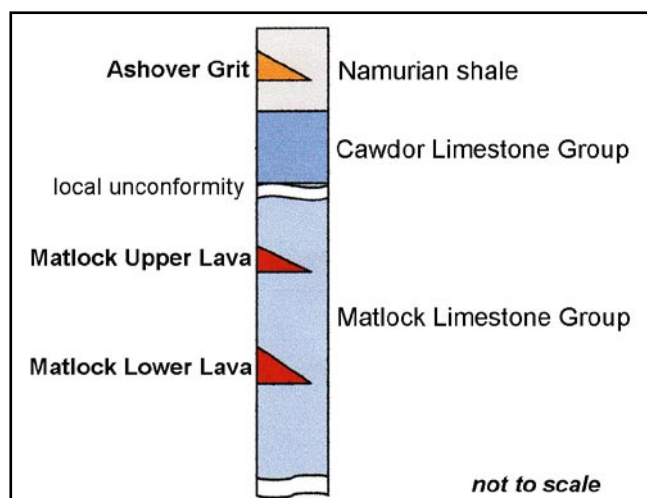


Figure 1. The geological succession in the Matlock Gorge.

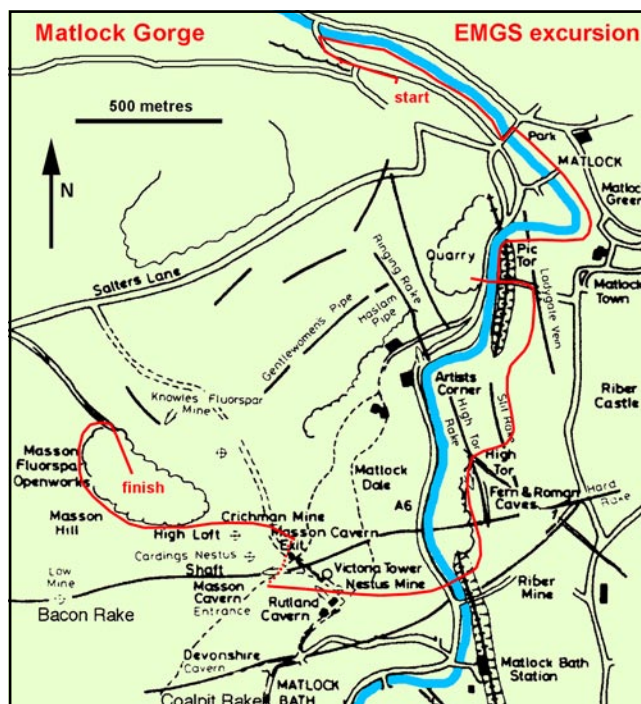


Figure 2. The excursion route (adapted from Ford and Rieuwerts, 2000).

The route continued a further 100 m to the northwest before turning sharp right along the path leading southeast along the right bank of the River Derwent. Beyond the end of a high retaining wall, the river bank widens out to reveal poorly preserved remains (including a low wall and disturbed ground) of old lead mine workings of at least 200 years ago. This area and the bank opposite are riddled with such workings, as well as underground passages and drainage levels (soughs). Some of their exits can be seen on the far bank, including one where iron oxides are being precipitated when anoxic ferrous solutions come into contact with the oxygen of the atmosphere.

The path continues to the southwest end of the old A6 road bridge (Fig. 2). Cross the bridge, and enter the recreational park situated on the floodplain at the confluence of the Derwent and streams draining from high ground to the northeast. By the entrance to this park is a memorial about 2 m high, constructed of local gritstone that demonstrates a variety of textures typical of the local rock.

The path alongside the river was followed to posts at the end of a bridge, which recorded the staggering water levels that flooded the town in the 1960s. Continue to just beyond a children's play area and take the path to the right signed Pic Tor, crossing a stream that was partly responsible for the town flooding, and turn right again past the flood defence structure. Just beyond, by the side of the path, well-bedded, fossiliferous, cherty limestones dip to the east and rise westwards to drape the massively bedded 'reef' or 'mud mound' of Pic Tor. Such structures are common in the Cawdor Limestone, and the reef has been incised by the river to produce a spectacular vertical face (Fig. 3).



Figure 3. *The vertical face at the foot of Pic Tor, viewed from the northwest.*

Further west the Tor is cut by the Ladygate Vein, which was worked for lead ore in the 18th and 19th centuries. An information board explains how the mine was powered initially by a water wheel, on the far bank of the Derwent, which was connected to the mine by wooden rods. Later, it had the first steam engine to be installed in the Peak District. Alas, only small amounts of ore were ever recovered.

On the way south, a small detour was made across the Derwent to view the face of Harveydale Quarry where

beds can be seen dipping steeply southeast towards the river. South of the bridge, rapids are formed where the river crosses the outcrop of the Matlock Upper Lava. The party returned eastwards to the Pic Tor road and began the ascent of High Tor. The road is followed as far as the first houses, where a sharp right turn leads into the High Tor Grounds, which were originally developed by a grandson of Richard Arkwright as a pleasure area for visiting dignitaries.

Soon there are views of the more level ground of Namurian shales to the east (left), beyond which is the Ashover Grit ridge on which Ribber Castle stands. Various stops were made on the ascent to admire the views, particularly the face of Harveydale quarry which displays the unconformity between the Matlock Limestone and the slightly undulating Cawdor Limestone above.

Close to the summit, old workings in High Tor Rake were examined; and from a nearby viewpoint could be seen the steeply dipping limestones on the opposite (i.e. western) side of the valley. It was explained how these were responsible for the uniclinal shift of the valley and for major landslips along bedding planes. One such slip occurred in the 1960s and blocked the A6 for several weeks. To the southeast, the extensive landslip in the Namurian shales near Starkholmes was also pointed out, as was the Ashover Grit scarp of Black Rocks in the distance to the south.

The morning concluded with the descent to the cable car station adjacent to Coalpit Rake. The more intrepid members of the party took the path signposted Giddy Edge along the near vertical face of High Tor, while others descended more sedately. It is with some relief that we report that all arrived safely at the cable



Figure 4. *The eastern face, about 15 m high, of the Masson Hill open pit; the Matlock Upper Lava is at the top right corner of the face.*

car, and were able to enjoy the spectacular views along the valley on the journey up to the Heights of Abraham, where lunch was taken at the various tourist facilities.

The afternoon began with an underground tour of the Great Masson Cavern, which is part of the extensive old lead mining complex that honeycombs Masson Hill. Lynn Willies, led the group along the tourist route pointing out many features of interest. The party was also taken into the workings of the Black Ox Mine, not normally open to visitors; these were developed to exploit minerals such as galena, fluorite, calcite and baryte deposited in partially dolomitised limestone along the Great Rake, also known as Bacon Rake.

The geology of the mineralisation is complex. Some minerals were in primary deposits within fractures, but the country rock has undergone extensive solution, mainly in Pleistocene times. The resulting caves then became sites for deposition of mineral grains washed in from elsewhere. For information on this, a good starting point is *Lead Mining in the Peak District*, cited above, or a visit to the Mining Museum in Matlock Bath.

The view from the mine exit was east across the valley to some of the morning's localities, particularly the 'reef' of High Tor and the extension of the Great Rake that forms a vertical feature within it. The party followed the track east and, where it turned right down the hill, left its path and ascended diagonally towards the northwest. An outcrop of Matlock Upper Lava with amygdaloidal texture was examined.

The walk continued to the very large Masson open pit (Fig. 4), which was a source of fluorite until about 1980. This working was in an ore flat between the Upper and Lower Matlock Lavas, which here are about 15 m apart, as these relatively impermeable rocks controlled the movement of mineralising fluids. The Upper Lava is the highest rock exposed in the quarry and the Lower Lava forms the floor, while the rich mineral deposit was sandwiched between them. The quarry may be entered from its northern end, near which are loose blocks containing the fluorite-rich mineralisation.

The party then retraced its steps to the cable car, making sure not to miss the last descent, and returned along the valley to the starting point after a packed and exhilarating day. Our leader was thanked for his excellent work in preparing and leading the excursion and for sharing his expertise with members.