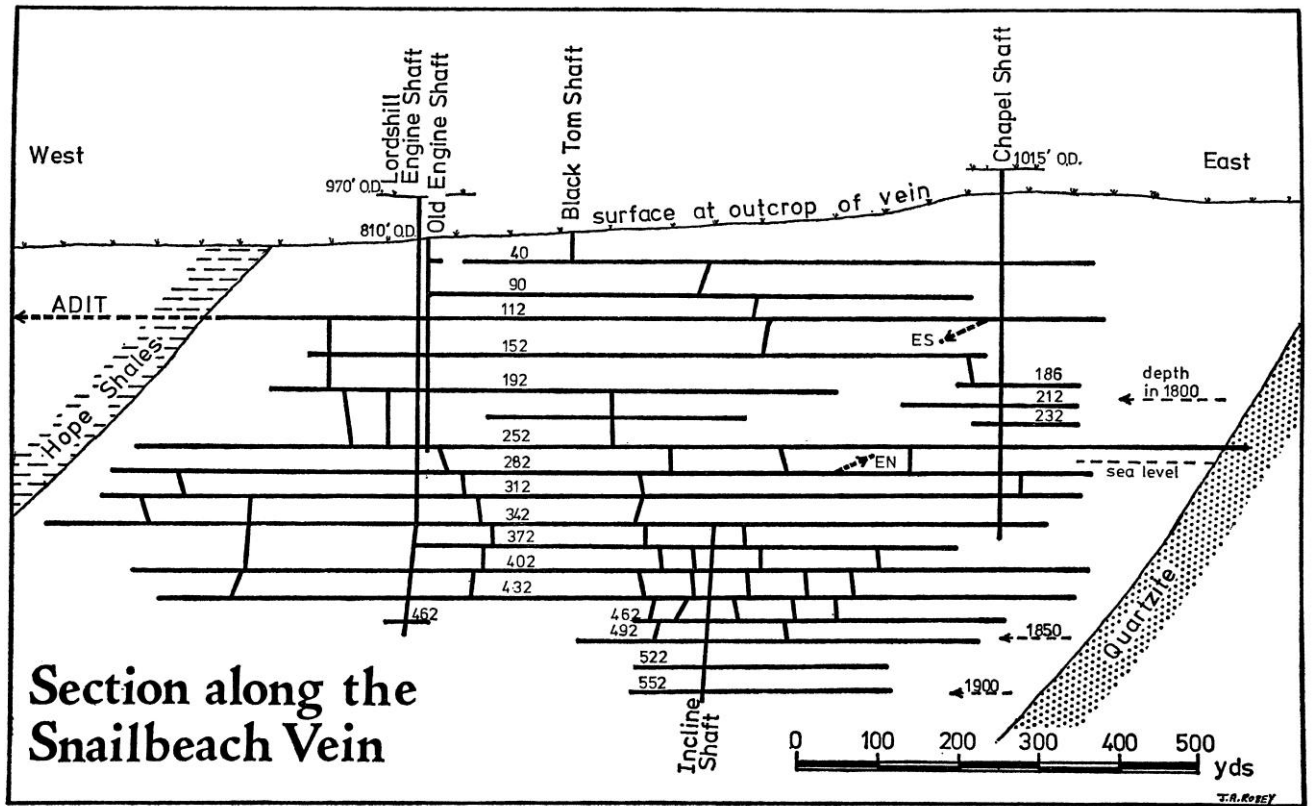
4 M Underground Plan

The Section Diagram is repeated here, and it will be helpful to do the exercise about this before studying the Underground Plan.

It is difficult to imagine from the surface what a mine is like underground. The section diagram of the mine gives the impression that the workings were neat and regular. The mine shafts appear as vertical lines, because the easiest way to extract minerals is to lift them to the surface with something like a bucket on the end of a rope. The levels, as the name implies, are horizontal passages. Rail tracks are put in these to convey materials to the shaft. One important level at Snailbeach was the one which drained water from the mine through the Adit which comes to the surface at Wagbeach. The depth of each level, working from the top of the Old Engine Shaft (George's Shaft), was measured in yards. A yard is almost a metre. In most of the mine the safe and efficient way of working was to have levels thirty yards apart, which is roughly 91 metres.



Section 1

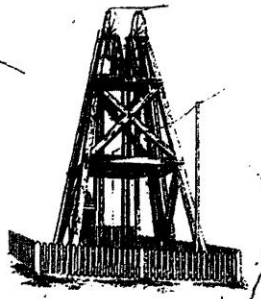
The underground plan gives a very different impression. The mineral vein which the miners worked does not follow a straight line. As the miners extended each level their passage would bend as they followed the mineral vein. There was no point in making a straight tunnel through unproductive rock. They had to keep following the vein wherever it led. It would have outcropped at the surface north of the mine reservoir and in the area now covered by waste material from the mine. As it was followed to greater depth the vein dipped steeply to the south.

There is no indication of where the lead vein would outcrop at the surface. Mine waste now covers much of the area, but it could probably be traced north of the Mine Reservoir. The Romans and other early miners would have removed all the lead close to the surface.

SNAILBEACH MINE

UNDERGROUND PLAN

As drawn by mining engineer Percy Blight circa 1920
from the collection deposited in Oswestry Borough Library
and retraced by the late T.E. Vaughan M.I.C.E. circa1963
From S.M.C. Account No 10 page 20, published July 1972



George's Shaft Headgear 1895
by the late Malcolm Newton

Reproduced on base map by
DAVID ADAMS
Cartographer / Founder Member S.C.M.C.

with some detail added from explorations down to the 112 yd level by the S.C.M.C. 1970 to date

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Engine Shaft on incline below 282 yd level
1,386ft plus sump

Deepest reached 1,656 feet (505 metres) prior to closure in 1910
All depths measured from the collar of George's Shaft.

To work with the plan it may be helpful to print it to A3 size.

George's Shaft (Old Engine Shaft)

Find George's Shaft on the plan. George's Shaft meets the 90 Yard Level underground. Just to the south of this is the 112 Yard Level. This is the lowest point from which water can be drained from the mine by gravity, via the Adit leading to the valley at Wagbeach. This was made in 1783 and represents the start of modern mine working under the guidance of James Lovett. From this time the levels are made at regular depths, first 40 yards apart and then 30.

We know that by 1800 the mine had reached the 212 Yard Level. Why did they have to go so deep? The answer must be that most of the lead closer to the surface had already been mined, chiefly by the Romans. Clearly a tremendous quantity of lead was mined by Lovett, though we have no complete figures about how much was extracted. At the same time water from the bottom of the mine would have to be raised 100 yards from the 212 Yard Level to discharge by gravity along the 112 Yard Level. This was a significant engineering feat and was done with a water wheel at Wagbeach moving a set of rods which extended over a kilometre on the Level, and then 30 metres vertically down the shaft.

Black Tom Shaft

Find Black Tom Shaft on the plan. This vertical shaft, started in 1820, connects with the 40 yard level. The Shaft is lower on the hillside than George's Shaft, so it isn't very deep. The 40 Yard Level winds much more than the levels deeper in the mine. It gives the impression that the miners weren't sure whether they had found the richest part of the vein, and they were hunting to find it. Some of the deeper levels are much straighter, and clearly the miners knew that they were finding lead ore. Black Tom Shaft continued to be used, for mining Barytes, after lead mining stopped at Snailbeach and the lowest parts of the mine were flooded.

Engine Shaft

Find Engine Shaft. As mining goes deeper it becomes clear that the bottom of George's Shaft will miss the mineral vein. A decision is made to make this new shaft in 1848. By this time it has been proved that lead can be found at much greater depths. The problem at the surface is the steep valley side at Snailbeach on the side of Resting Hill. The new shaft will need to be higher up the hillside, and access will be difficult. Day Level is constructed to meet this shaft underground, so that lead ore can be brought out of the mine very close to the top of George's Shaft, which is where the ore dressing machinery is located.

282 Yard Level

This level is 282 yards below the top of George's Shaft. Engine Shaft is 160 feet (about 50 metres) higher on the hillside, so the total depth of the straight shaft is now over 1,000 feet or 300 metres. Clearly a decision has to be made about what to do next.

Crosscuts

A number of Levels are marked on the plan which are perfectly straight. Apart from the Wagbeach Level (and we know this was cut to drain the mine) most run roughly North-South. The other levels, following the Snailbeach mineral vein, run approximately East- West. The Crosscuts were made at different times and at different levels. They were made to try to find more lead veins. The miners hoped to cut across a new lead vein, hence the name 'Crosscut'. All these straight levels appear to have been unsuccessful, because no East – West passages are made along them.

The lead vein at Snailbeach was very rich, but there were no others like it.

After 1857

In 1857 Stephen Eddy and his son James Ray Eddy, experienced mining engineers from Yorkshire, came to continue the life of the mine. They realised that more lead could be found, but they would have to go deeper. They knew that the ore disappeared to the West, in the direction of the Wagbeach Adit. They also suspected that the ore could not be found to the East, where quartzite rock appeared at the surface. This was confirmed when in 1861 they took over Chapel Shaft, which was on the Earl of Tankerville's land.

Find Chapel Shaft on the plan and notice that very few levels go further East. Only the 252 Yard Level extends a long way East, and this must have been an unsuccessful experiment to see whether the lead could be found in that direction. The Best lead bearing rock is only found to the West of Chapel Shaft. Linking the mines together would have the effect of improving the ventilation of the mine, but beyond this, having Chapel Shaft was probably not helpful.

James Eddy needed to extend the mine, and the only way to do this was to go deeper. A new shaft could be made, but this would be a great risk. It would have to be started on the highest ground, where the name 'Resting Hill' is printed on the map. But

- New mine buildings, with pumps and winding engines would have to be assembled on Resting Hill.
- The hillside is very steep, and construction would be difficult.
- A road or an inclined tramway would be needed to take coal up the hill for the steam powered machinery.
- Water would need to be taken to the top of the hill for the boilers of steam engines.
- The shaft would need to be about 500 metres deep before it reached the vein.
- When it was done, would there be any lead at this depth?

The Yorkshireman was known to spend his money carefully. What is more, his salary depended on finding lead, not drilling shafts. So he decided to extend the mine by extending Engine Shaft downwards at an angle, following the line of the vein. In that way he could be sure that he wasn't wasting money on digging where there was no lead. An inclined shaft was more difficult to operate than a vertical one, but Eddy knew how to do it.

It is from this time that we see the mine extending downwards in a very methodical way, with levels every 30 yards. Operating the inclined shaft clearly worked well, and a second inclined shaft was made. Presumably this was constructed in the place where the ore deposits appeared to be richest.

1870 Henry Dennis takes over

We know that by 1872 the 462 Yard Level was the deepest part of the mine. Only a short level was made at the foot of Engine Shaft. Possibly no lead was found, or it may have been difficult to extend the shaft further. Further East a new inclined shaft which has no direct connection with the surface was being made from the 342 Yard Level. We have no direct evidence of how this was worked, and can't investigate the flooded part of the mine. The Compressor which Dennis built provided compressed air to drive underground machinery for raising lead ore up this inclined shaft. Miners travelled up and down this incline in a skip powered by compressed air to the deepest part of the mine.

It is very impressive that with the price of lead falling so low that every other mine in Shropshire closed, Snailbeach was still profitable, and the mine was still being worked after 1900. This continued in spite of all the problems of working so far down, and having such a difficult journey for the ore to make to the surface. But the new levels are shorter than they were in earlier years, and the map shows the dates on which extending the levels ceased. After that pumping stopped, and the entire mine filled with water up to the level of the Adit.

Questions about the Underground Plan

1. Mark the 112 Yard Level (Wagbeach Level). This is the lowest level which can be explored today. (North is at the top)
2. Colour the plan to show the different stages of mining at Snailbeach

- Roman mining and other early mining
- Area mined by Lovett
- Area mined by the Eddys
- Area mined by Dennis

3. Imagine you are one of the men in charge of mining: Lovett in 1785, Eddy in 1860, or Dennis in 1870. Describe the way you want to develop the mine. It may be a help to read the Tale told by each of these men.
4. Imagine you are a miner who has just come to Snailbeach after the mine has been enlarged in 1783. Describe your work.
    - Your job is to dig the ADIT to drain the mine at Wagbeach
    - The tunnel will be over a kilometre long.
    - This tunnel is perfectly straight, but the other levels have lots of bends.
    - How many people will work with you?
    - How will you keep the tunnel straight?
    - How will you keep it level?
    - You can only dig the tunnel from one end, because if you start at both ends the tunnels are sure to miss each other.
    - Which end will you start? Why have you chosen to dig this way?
    - How will you take the waste rock away?
    - How wide and how high will the tunnel be?
    - Why have you chosen this size?
5. 'Hand drilling would get you three metres a month and cost £14 a metre'. How long would it have taken to make the 1100 metre long Wagbeach Adit, and what would it have cost?
6. The Marquis of Bath, the owner of the land, ordered the Snailbeach Company to make the Crosscuts. Why did he do this? Do you think he was successful in what he was trying to do?
7. It is 1901 and you are one of the miners working to extend the 552 Yard Level Westwards from the deepest part of the inclined shaft. Describe your work, with a rock drill driven by compressed air. Then describe your journey to the surface after you have finished work.
    - How long does it take?
    - Are there any dangers on the way?
    - Which way do you go?
    - How will you travel?
    - Could you get lost?