

## **BIRCH ALLER MINE**

To the West of Bridford Consols, at Birch Aller, another well-financed attempt to find the northern end of the Valley's 'great lead lode' drove down over 300 ft (taking it nearly below sea level) but this investment also failed to prove exploitable quantities of lead or silver.

In contrast to the later well-documented activities at Bridford Barytes, there are few references to trace the history of Birch Aller. Even its name is uncertain, being variously described as 'Birch Aller', 'Birch Ellers' or simply 'Birch'. All variations however must be drawn from the dense growth of Birch and Alder trees that thrive along the small stream below the mine. No original records of the venture are known to exist, nor have any plans of the underground workings survived. In consequence, what little is known of its short-lived operations is largely derived from brief contemporary reports in the *Mining Journal* and from notes compiled by Col. Ramsden, manager, from 1927, of the neighbouring Bridford Barytes Mine, supplemented by what can be inferred from the remains of the engine house and stack, the location of the spoil tips and a final 'obituary' notice in the Exeter Flying Post.

Reports from the Mining Journal suggest that operations commenced at Birch Aller during 1850 and a notice of sale in the Exeter Flying Post on 1<sup>st</sup> June 1855 recorded its closure.

A definitive work by H G Dines, a geologist working for the Institute of Geological Sciences on Metalliferous Mining in the South West of England, supplemented by a study of The Teign Valley Silver Lead Mines by C J Schmitz agree the probable layout of the workings. Most of the principal features above ground can still be seen, as can the position of the two main shafts. The underground workings however must remain speculative. Dines writes as follows –

**Birch** -  $\frac{3}{4}$  miles E.N.E. of Bridford.

Opened for lead, and known to have been active between 1850 and 1855, this mine has two shafts, Old Engine Shaft, 700yds west of Venn Farm, and Pyes (or Whim) shaft, 148 yds S.S.W. (*this is an error, it must be S.S.E.*) of the other, sunk on one of the Teign Valley lead lodes, which here courses N.W. – S.E.. There are no plans, but from contemporary notes published in the *Mining Journal* it appears that the Old Engine Shaft (collar 400 ft. O.D.) is sunk to the 40-fm level (below surface) and Pye's Shaft to the 50-fm level. Levels apparently connect the shafts at 15-fms (adit), 30-fms and 40 fms, and block out the ground for about 35-fms North and 40-fms South of the two shafts; the 50-fm Level at the bottom of Pye's shaft is short. The lode is said to have been 3  $\frac{1}{2}$  ft wide at the 40-fm Level and to contain galena, blende and barite; some fluorspar is reported in and South of Pye's shaft. The 30-fm Level between the shafts is believed to have been in lead ore. Pye's shaft below the 40-fm Level, the 40-fm Level South of this shaft and the 50-fm Level in barite bearing ground. There are no records of production but some lead ore is known to have been raised. The dumps of shale and chert contain fragments of blende, apparently brecciated and recemented by pyrite, barite with radial structure and traces of galena in joints and partings in cherts.

**Galena** – the principal ore of lead : lead sulphide (PbS), occurring in lead-grey crystals,

usually cubes and cleavable masses.

**Blende** – zinc sulphide

**Barite** - barium sulphate ( $\text{BaSO}_4$ ), occurring in ground referred to as barytes.

**Fluorspar** – calcium fluoride crystals.

**Chert** - a rock containing crystalline quartz..

**Pyrite** - iron sulphide.

**Adit** - a horizontal passage entry to a mine.

also drainage adit for discharging water at a level below surface workings.

Although heavily overgrown, the main features and surface layout can be seen today. The most prominent buildings are the engine house and stack. An interpretation of the remains by Kenneth Brown is shown opposite. The steps through the engine house are not part of the original structure which would simply have housed the 30” steam engine. There is a depression in the lawn in front of the bob wall which marks where the pumping rods would have centred over the Engine Shaft, the actual entrance or portal to the shaft being a few yards away. A granite lintel in the flowerbed to the rear probably shows the start of the underground flue to the stack. The long flue and tall chimney was used to draw the fire - the convection of the flue drawing more air through the fire which might have been built in a tube through the centre of the boiler. Today’s gardening activities regularly unearth clinker and coal which probably date from this time.

Every part of an engine house was built to protect the engine rather than the workers. The method of construction was to build the stonework, the bob and side walls, install the beam - they put that through the door and then by a combination of balance, labour and luck mounted the beam in the trunnions, then put the roof on. This was because the beam was elevated at substantial angle while being mounted. Then the cylinder came in, the mechanics were connected up, then the steam connections came from the boiler house built alongside. First steamings were usually accompanied by some sort of party.

Writing some years earlier Michael Faraday (the scientist, self-taught by observation and credited with releasing electricity from the confines of a chemical battery by deducing electrical induction), when assistant to Humphrey Davey, the inventor of the miners’ safety lamp, described a visit to a mine and the pumping operation he found there -

*... We had now reached the well of the mine situated at its lowest point nearby. Here all the waters that run from the earth into the excavation are collected together to be pumped up. There was a large quantity in a sort of tank boarded over and containing much copper in solution. The waters it appears had risen a little and they were very particular about them just now because close at hand they were deepening the mine and working at a level below that of the well...*

*... After a little further progress we came to the pump shaft, an aperture cut down from the surface to this spot. It was 360 ft. deep and we could see no daylight up it. Below it was a small well connected with the large one before mentioned and into this were inserted pumps. The first was a lifting pump and raised the water a few feet. Then a forcing pump took it and*

*made it ascend up pipes far away out of sight. The pumps were worked by the steam engine we had seen above being connected with it by beams of wood descending in the shaft and continually rattling up and down in it. In the small part of the shaft left vacant by the pistons pipes and beams were fixed ladders which ascending from stage to stage conducting to the top and up. There we had to go bathed in the shower of water which was shaken off from all parts of the pump works. After long climbing we came to a part of the shaft where the first forcing pump delivered its water into a little cistern and then another pump of the same construction threw it up to the surface. Still proceeding we at last got a glimpse of daylight above and were soon able to see the pump rods by it. Now the danger of the ascent appeared far greater than before for the more extensive light showing in the well above and something of the depth below made us conscious of our real situation whereas before we only thought of the small spot illuminated by our candles. The agitation of the pump rods was more visible too and appeared greater from being seen over a larger space and their rattling and thumping was quite in accordance with appearances. But in spite of all things we gained the surface in high glee and came up into the world above at the engine after a residence of about two hours in the queer place below...*

Mining technology had changed very little and the miners at Birch Aller would undoubtedly been very familiar with this account.

The house called Many Waters, although incorporating a small granite structure built into the bank at the rear, was not connected with the mine and dates from the early 1900's. However, all granite stone on site must have been brought in, probably down Neadon Lane from Blackenstone Quarry, and therefore any structural use almost certainly dates back to the mine. It is possible therefore that this small building may have been the Counting House whose fittings are referred to in the 1855 Sale particulars. Today, apart from the granite used in the 'water feature' near the house, the considerable quantities of stone incorporated into flower beds and terraces undoubtedly come from the structure of the engine and boiler houses, giving a hint of their original size.

The site is on a steep gradient and the flat area on which the house is built is the spoil tip from Engine House shaft which was presumably left for 50 years to compact. The dimensions of the tip are most obvious when viewing the site from the field to the North. The spoil tip on the Eastern boundary, to the left of the footpath to Shippen, marks the location of Pye's or Whim shaft, and is most prominent in winter, as is the small tip below the trial shaft on the lawn beneath the house. Pye's shaft is undoubtedly a reference to a Mr George Pye, one of the Birch Aller 'adventurers' and also recorded as Purser to the Hennock mine. Whim (or Whimsey) is a Cornish word meaning any device to hoist men and ore up a mine shaft, being a capstan worked by horses, water or steam power.

The entrance to the portal to the main shaft on the bank above the house is not conspicuous but like other areas of excavation, supports little vegetation. Other surface features include a small quarry behind the building thought to have been the smithy and a depression (now flooded) in the woods below the Engine House spoil tip which is the most likely location for the water wheel detailed in the sale notice.

Undoubtedly there was a water wheel, as a 30 ft wheel is specifically mentioned in the sale notice, but its purpose and location can only be guessed. The small stream that now runs into the pond is the only source of running water in the area and the flow reduces considerably in prolonged dry periods. However it is shown as quite a conspicuous feature on Greenwood's 1827 map and it may have been more reliable 150 years ago. Nevertheless the powerful 30" steam engine would have been capable of providing any primary power necessary for pumping or winding and this would imply that the wheel was intended for some separate purpose away from the main engine. Based on other documented use of such a wheel, the most likely application would be to drive a line of crank operated hammers for stamping (crushing ) the ore. Also the Sale Particulars refer to 'launders' which are used for washing and grading the excavated ore.

This process would obviously require a large flat area with space to store, and from which to transport, the crushed ore. The only suitable location is in the wood below the house, where there is an excavated hole (now flooded) of appropriate dimensions to take a recessed over-fed wheel of this size. This hole is fed by a constructed ditch from below the sluice of the main pond, diverting a flow away from the stream into this hole, and there is also a drainage outlet (now blocked) from the hole which drains into a constructed tunnel which in turn exits under a small waterfall where the stream leaves the wood. The small scale 1827 map does not appear to show the hole although it is clearly marked on the 1890 6" County Series ; however the pond itself is not shown and may have silted up or may be perhaps a later feature. Nevertheless it would seem reasonable that the pond was a storage pond fed both by the stream and by water pumped from the shafts by the steam engine. If it was then fed by a leat over the wheel and away from the site through the tunnel back into the stream, the wheel would have provided a useful and reliable source of power. There is no evidence of a dressing pavement or any crushed rock in the area but the ground is very soft and after 150 years any remains could well have sunk without trace or been covered by a depth of leaf mould. Alternatively, it might never have been commissioned and in keeping with the substantial granite buildings, it might simply have represented a level of misguided optimism and the need for a crushing plant was assumed before the deposits had been proved. O'Shea in his 1981 thesis on the Upper Teign Valley 1801-51 refers to the mine being heavily capitalised with steam-driven pumping, winding and crushing engines and water-powered ore stamps. They must have been sited somewhere.

Hamilton-Jenkin, writing in *Mines of Devon: North and East Dartmoor*, noted that work was started (or restarted ?) in 1851 by a Mr Pye and a small group of Exeter adventurers. By July 1853 a shaft had been sunk and a 30" engine erected, working costs being estimated at £315 per month. Negotiations were then in hand for constructing a tramway to the mine. (*was this the same optimism expressed at the same time at the Teign House dinner celebrating the installation of the steam engine at Bridford Consols, half a mile to the East ?*). During the second quarter of 1854 25 ½ tons of lead were sold for £370 and in 1855 the Engine shaft reached its maximum depth of 46-fm and Pye's shaft 50-fm. The two shafts were connected at 15, 30 and 40-fm levels. The lode is said to have been 3 ½ ft wide at the 40-fm level where it consisted of galena, blende and fluorspar.

In an analysis of Official Mineral Statistics, Burte Waite and Burnley ascertained production of lead and silver as

	Ore (tons)	Lead (tons)	Silver (ozs)
1854	13.50	9.00	126.00
1855	12.00	7.00	

This confirms that production had ceased by 1855, although Murchison in his ‘British Mines considered as a means of Investment’ published in 1855 perpetuated the optimism by reporting that ‘the 50-fm level is only driven a few fathoms, but the lode presents a more favourable appearance than it did above’. He also recorded that there were 1,500 shares issued ; £6.18s (£6.90p) on the Cost Book system. The latter presumably represents the net investment to date per the last accounts and calculates to £10,350.

At that time the Crimean war was reducing imports of lead, stimulating a buoyant domestic and export demand. As a result the price had been rising steadily from £15.19.0 per ton in 1849 to £17.15.0 in 1852 , £23.08.0 in 1853, and to a peak of £24 by 1856. But even at record prices, sales of 14 tons per month were required to cover the monthly operating costs. The total net investment in the mine of over £10,000 was therefore the equivalent of sales of 442 tons of lead, which would require an output far beyond anything achieved to date. The silver price was steady at 5/-s (25p) an ounce meaning that the 1854 sales of 126 ounces would have only contributed £31.05.0 to revenues. The search for the lead lode had driven down over 300ft and with Bridford Consols also out of luck the early optimism must have waned.

A comparison with the June 2000 lead price of about £300 per ton indicates an investment in today’s terms of £150,000, although a single commodity price is probably not a valid measure of inflation. What is perhaps a better indicator is that Schmitz records that in June 1852 a Captain Martyn, also Mine Captain of Wheal Adams and Exmouth mines down the Valley, was appointed agent of Bridford Consols at two guineas (£2.10p) per month, or £25 a year. A skilled worker might earn 2/6d - 3/-d per day (12p/15p) and an unskilled labourer as perhaps 8d/10d (3p/4p). This would appear to make £10,000 in 1853 a very large sum indeed.

Although the lack of success in locating exploitable deposits was self-evidently the reason for the mine’s failure, one can also blame location, and possibly commercial management. On the assumption that the Pye of Pye’s shaft was the same George Pye, as the Hennock Purser, the records of Sir Lawrence Palk’s Exeter solicitor, Mark Kennaway of Kennaway and Buckingham, shed a little light on these matters.

Firstly, on the subject of location, there is a letter from Kennaway to Pye in 1853 concerning the sampling of lead ore from the Hennock mine by the canal at Kingsteignton. From this it can be deduced that the ore was carted by horse wagon down the valley to the canal port near Newton Abbot where it would be sampled by agents of the South Wales smelting companies. From there it would be shipped in small sailing vessels down the Teign and round Land’s End to the Bristol Channel ports of Swansea or Llanelli. Likewise, any

machinery or materials not available locally would have been brought in the same way, and shipment to or from Bridford would have added considerably to Birch Aller's costs and put this northern mine at a considerable disadvantage.

A further letter from Kennaway to Pye on 18<sup>th</sup> August 1854 berates him at some length for the state of the workings at Hennock which were on Palk's land. 'I assure you I never saw such unnecessary injury created in any case of mining in which I have been concerned' wrote Kennaway. Birch Aller had collapsed the previous year, but if it had shared the same control as the badly supervised Hennock mine, perhaps its failure owed something to poor management as well as unlucky geology. Birch Aller's agent was a Captain George Odgers of Cambourne, who must have drawn on his well documented and extensive knowledge of Cornish mines, but like today's Consultant perhaps his experience was only able to contribute the theory, not the practice or the luck. The adventurers were confident the lead lode, proven just to the south and trending north, was beneath their feet; they invested heavily in all the right buildings and equipment; they dug their mine. The lead was not there. The Exeter Flying Post published the obituary on 1<sup>st</sup> June 1855.

It is not known how many men worked at Birch Aller, or Bridford Consols which closed around the same time. Again, there were close financial and management connections throughout the Valley mines and the demise of Birch Aller may have had as much to do with the failure of its immediate neighbour, Bridford Consols, as the Hennock mine at the other end. Indeed there are suggestions that the two mines were linked, Schmitz's diagrammatic reconstructed cross-section showing an arrow at the 15 fathom level at Pye's shaft pointing 1800 ft to Portal. This implies the tunnel passed under Shippen and emerged at Bridford Consols. Unlikely as this may seem, a Mr Surrige stated in 1935 that he had heard an Adit was driven South Westwards from the Old Shaft, under field O.S.No.596 and had 'cut lead'. The 'South West' direction is a bit doubtful as the direction to Shippen from Birch Aller is more South Easterly, but field no.596 is on the right course. Also, Mr Gove (referred to under Bridford Consols) confirmed this in 1937 and backed it up with a report that a team of plough horses at work in Field O.S.593 had fallen into this Adit when the roof collapsed. The 1940 map of the Bridford mine marks an 'air shaft' and also an area of 'subsidence', although the O.S field numbers do not correspond exactly. None of this proves a planned connection between the two mines but there are certainly indications that works extended a substantial distance in the right direction.

However, to return to the closure, regardless of a physical connection, with the close association of the mines and miners in the community it is unlikely that the redundant miners of Birch Aller were out of work for long. The other Valley mines flourished and the predominantly agricultural area urgently needed the new skills of experienced mine workers, both underground and for surface work., as well as general labouring. Many families moved into the area from West Devon and Cornwall and by the early 1860's the population of most parishes in the Valley had roughly doubled since the beginning of the century. As already mentioned Bridford peaked at 609 in 1857 and in 1861 Christow and Hennock had populations of 941 and 1,004 respectively.

From the 1861 Census for Bridford it is interesting to note that out of a population of about 600, there were 65 souls living in households largely dependent on mining, not including the greater number of surface workers who would probably have described themselves as labourers. It is also significant that six years after the last Bridford mine closed they still describe themselves, not only as Miners, but as Lead Miners; presumably a breed apart, and proud of their skills

At first glance this seems a contrast with the dark vision sketched by Michael Faraday's daunting description of his short visit to the lower depths of a similar mine. A damp, forbidding, dangerous place where foul air and rock falls must have been an ever-present terror. Why would men choose to work in such depths when green open fields were waiting above? The accepted practice of miners actually having to pay for their own candles and blasting powder by deduction from their wage, only adds to an impression of rapacious employers and exploited workers. But how true might this be? Oppressed and exploited miners and militant unionism have stereotyped an indelible scar in our Country's industrial, social and political history through to modern times. The simple word 'mine' invokes reflex images of soul-less monochrome communities, dole queues and picket lines. Was this the Teign valley too?

Undoubtedly the work was hard and not without its hazards; men must have walked to and from work, and toiled at the mine in all weathers; facilities would have been primitive and 'health and safety' more a matter of self-preservation by the miners and financial expediency by the mine owners. Yet, even with other work available, men were attracted to work in the mines and Cornishmen chose to bring their skills and settle in Devon. Life was stern, but was it unusual for the times and area? The census details reveal men living in households with families, wives, children, parents and lodgers, very much as might be recorded today. Their houses still stand and bear the same names; many are now highly desirable residences with values that would be beyond the belief of their 1860 occupants.