

# Llywernog Mine and Museum Dyfed, Wales.

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Talybont.

The ancient Llywernog Lead Mine lies in the foothills of Plynlimon some twelve miles from the coastal resort of Aberystwyth in mid Wales (SN 677 828). The name Llywernog has been hypothesised as being "The places of foxes", suggested by the meaning of its more common early form 'Llawerneg'.

Today, it is one of the best known mines in Wales on account of it having operated as a museum since 1974 by the Mid Wales Mining Museum Ltd.

Llywernog was an ancient mine according to Lewis Morris, who was associated with the Cardiganshire mines in the mid eighteenth century. He noted several lead bearing veins near the hamlet of Llywernog near Ponterwyd, whilst undertaking a brief survey of the works in 1745-1747 (National Library of Wales [NLW] papers 603E and 6684E) for part of his *Account of Lead & Silver Mines in Cwmmwd y Perveth*. William, his son, compiled further notes until 1790.

Working on these veins were shown to Morris by a miner named Jenkin sometime about 1745 when a lode was being exploited in the bed of the diverted stream to the northeast of the "new trials" that were to become Powell's Mine (NLW 603E and 6684E).

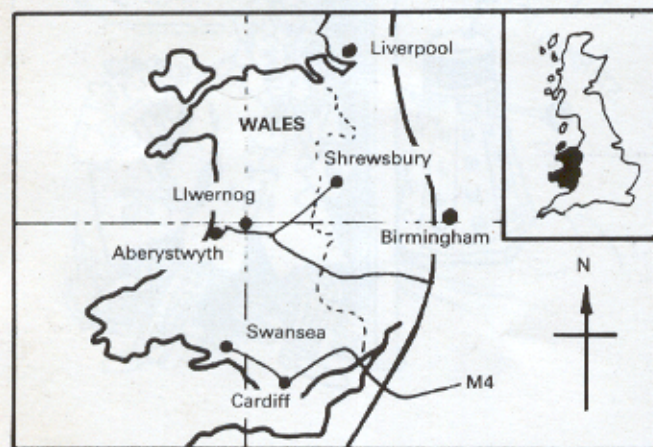


Figure 1. Location Map.

In his main text on Llywernog, the eighteenth century works are described thus:-

*"The lead mine of Llawerneg was first discovered on the Common of the manor of Perveth, which is claimed by Mr Pryse of Gogerthan as his manor of Nant yr Arian.*

*This mine was discovered by the ancients in the bottom of the river, but was never persued, to the purpose, either into the freehold of one side, nor the Common on the other side.*

*Some poor miners opened it of late years, by a bargain under Mr Pryse of Gogerthan, and had shafts at A & B and an opencast between them.*

*In the bottom at A which is the west end, they found two or three inches of solid ore in a rib, and sometimes in a spar vein, all along the bottom, which is but 20 yards in length, and but three yards deep at B and four yards deep at A. From hence to the east is a long range of ground, and a situation that looks well for a good mine work.*

*There is here a good stream of water, even in the summer, and several places to collect it, and a water engine may be cheaply erected at A which would drain a very large work.*

*The vein on the surface is about three feet wide, inter-mixed with spots of ore. The soil of the vein is kind and free and the country stone so soft that it may be wrought without gunpowder.*

*The ore is a free, fusible, Potters Ore, clear from sulphur and black jet, but not rich in silver" (NLW 6684E).*

In 1749 Lewis Morris took the lease on Llywernog from D. Jones for 21 years at a royalty of 1/12th of the produce - supposedly a foliated variety of galena known as potters ore. This was used to produce the traditional green glaze which was particularly popular amongst Medieval and Tudor potters. Boynes suggests that the first lease was granted in 1756 but re-examination of the note shows that the lease was in force in 1756 and therefore must pre date the account (Boynes, 1976). From the state of Morris' affairs at the time of his death in 1765 it can be seen that he made a considerable loss and it must be presumed that he did little at the mine (Hughes, 1990).

No lease of Llywernog can be found despite his suggestion that he was a lessee at 1/12th royalty. His lease of the neighbouring Cwmbwrwyo Mine executed in August 1762 is preserved in the Gogerddan Estate papers at the National Library of Wales in Aberystwyth (Gogerddan Estate Records). The records of this period are difficult to interpret as there were two mines called Llywernog at this time. Only one of the sites had been developed whilst the other lay neglected. The latter can only refer to the neighbouring Powell's Mine, so called as it lay on the Nanteos Estate, the property of the Powell family. This does not appear to have been developed until after 1780 when the 1740s trial was resuscitated, probably by Bonsall.

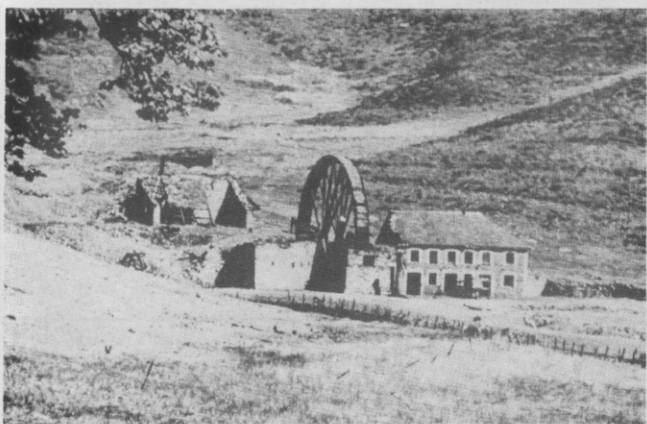
The only remnants of mining which may be attributed to this era at Llywernog are a narrow and winding trench cut upon the outcrop of the lode in the woods to the west of Llywernog and, possibly, the small prospecting shaft south-east of the Engine Shaft sunk to about 35 feet on a badly pinched part of the lode.

On October 1st, 1789 the widow of John Pryse of Gogerddan leased for 21 years all lead and other mines under Cwmbwrwyo, Nant yr Arian and Llywerneg to John Pierce of Lodge Park, William Poole of Gogerddan and John Jones of Machynlleth. Nothing is known of Jones; John Pierce was the Gogerddan Estate mineral agent whilst William Poole appears to have been the

late John Pryse's nephew or cousin and was involved with Llywernog until at least 1808. He is named in an unexecuted lease of the Cwmsymlog Mine in 1810 and is described as a gentleman - therefore of independent means (Boynes, 1976).



**Figure 2.** A close up view of the 50 foot waterwheel taken by Mr D.L. Dixon in 1932. In the launder, the trap door to discharge the water is visible with control wires still affixed but the chute below the launder, into the shaft, has rotted away. The large gear fixed to the axle, engaged onto a pinion on the 16 HP. steam engine housed on the first floor, above the boiler. The sweep rod is also particularly apparent. This was connected to a bogie which ran on rails fixed to the masonry pier, now demolished as it was in danger of falling into the cafn shaft which was located behind it. The hamlet of Llywernog is visible in the background.



**Figure 3.** View of the buildings and waterwheel taken from the main road in the late 1930s or early 1940s. Note that the launder visible in *figure 2* has now collapsed. To the left of the wheel can be seen the iron framework of the old jigger wheel. To the right of the 50 footer can be seen the king post of the balance bob whilst the tee bob can be seen behind the partly roofed ore sorting shed. The pit for the 20 foot winding wheel can be seen to the right of the tee bob. The rugged mountainside has now been agriculturally upgraded, or afforested, and foxes do not abound as they used to.

By 1791 there were 60 miners employed at the Llewernog Mine (Hughes, 1990). This development was the start of the mine as we know it today, the activity continued until the summer of 1795 when work all but ceased because of a scarcity of water (Gogerddan Estate records). During the recent renovation of the old offices a groat of 1797 was discovered in the wall. Spargo (1870)

notes a phase of activity at about this time which was financed by Rothschild's and also that there was a level named after them, if being the general practice to number levels and name adits. It seems probable that the stopes being worked lay at a shallow depth between the Whim Shaft and the Engine shaft where the lode had formed a localised swelling of up to about five feet in places and contained about 20% sulphides to 80% gangue (Meyrick, 1810).

For a number of years the mine was too wet to work in the winter and little better in summer. Although the greater part of Rothchild's adit has been squared up since being driven, on examination some of the walls can be seen in their original condition, the earlier driveage may have been as small as 6' x 3' and relatively crooked. There can be little doubt that its purpose was primarily for drainage rather than access (Boynes, 1976).

In 1810 the mine was said by Sir Samuel Rush Meyrick in his *History of Cardiganshire* to be in the possession of William Poole whom he describes as the "tenant of Gogerddan" but in reality Poole appears to have been married to one of his heiresses of the Estate (Meyrick, 1810).

The 1789 lease should have been renewed in 1810 but there is no record of a transaction in the Estate records. After this period the mine is sometimes called Poole's which should not be confused with the nearby Powell's Mine.

Meyrick states that an engine, and a waterwheel, kept the water out of the workings. In 1815 this is confirmed by Walter Davies who states that the mine had been recently opened by the Gogerddan lessees and that a waterwheel had been erected five years previously in order to drain the mine (Davies, 1815).

A draft lease was prepared by the Estate for Williams Brothers of Gwennap in 1825 but later modifications suggest that due to the falling price of lead they were only interested in high grade deposits. Boynes suggests that their lease was probably executed on the 10th of August 1825. Twenty six months later the price of lead had fallen from £25 to £18 per ton and the Williams Brothers asked the Estate to rescind their lease. The 28/- per ton that they had agreed to pay on all lead ore was reasonable with metallic lead at £25 per ton but the grade of the ore was so marginal as to render the mine a liability at £18/ton, the royalty payment effectively rising from 11½% to 15½% (Boynes, 1810). By 1836 the price of lead had risen rapidly to over £24 per ton and prompted renewed interest, the Lisburne Mines paid some exceptional dividends and Goginan Mine did particularly well. The interest in Llywernog therefore was not surprising at such elevated prices (Francis, 1989).

In January 1840, it is recorded that William Lewis had possession of the mine and was trying to sell it to Robert Dunkin, a smelter from Llanelli, for £500, along with the Powell Mine and all the tools and equipment necessary to run the mines. Matthew Francis, John Taylor's agent for the Cardiganshire mines, advised Dunkin on the matter and it was decided to consolidate the Llywernog mine within the Rheidol United Mines. The Llywernog mine was under different management within the company and they issued 100 five pound shares. Dunkin and J.H. Shears each held 20 shares with Matthew Francis and William Lewis 10 each. William Lewis was also appointed as treasurer to the company whilst various uncles and cousins of Matthew Francis

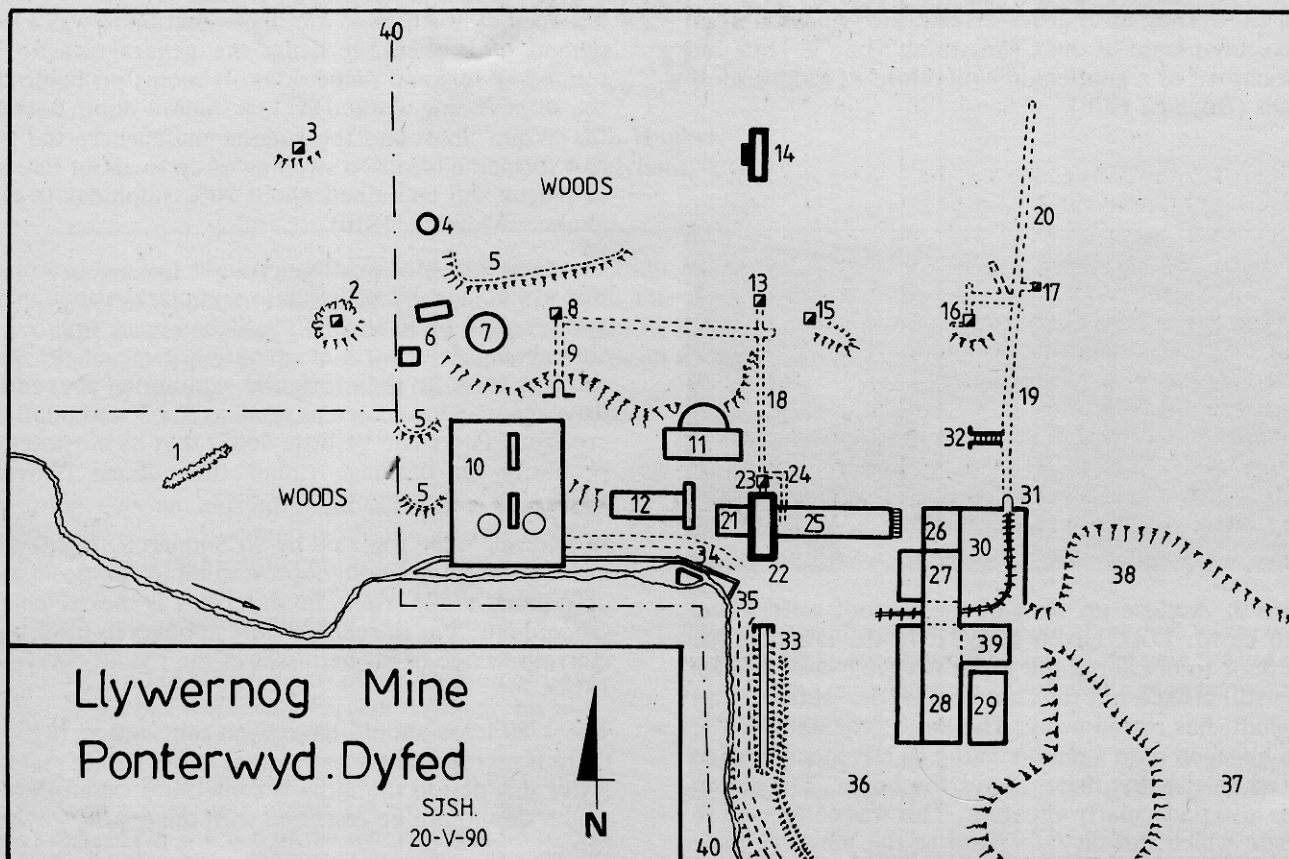


Figure 4. Surface plan, Llywernog Mine.

KEY TO MAP NUMBERS

- |    |  |    |  |    |                                   |
|----|--|----|--|----|-----------------------------------|
| 1  | 1745 open stope.                                     | 15 | Trial Shaft c.1760.                    | 28 | Engine House.                     |
| 2  | Site of New Engine Shaft c.1910.                     | 16 | Air Shaft.                             | 29 | Concentrate Store.                |
| 3  | Evan's Trial Shaft of 1872, to 24 feet.              | 17 | Whinze below Balcombe's Level.         | 30 | New Dressing Floors.              |
| 4  | Powder Magazine.                                     | 18 | Rothschild's Drainage Adit.            | 31 | New Portal to Balcombe's Adit.    |
| 5  | Reservoirs.  | 19 | Prospecting Adit c.1790.               | 32 | Steps down to Adit.               |
| 6  | Old Offices pre 1800.                                | 20 | Extension by Balcombe.                 | 33 | Tailrace from 50 foot Waterwheel. |
| 7  | Horse Whim.  | 21 | Crusher House.                         | 34 | Undershot Waterwheel.             |
| 8  | Whim Shaft.  | 22 | 50 foot Wheelpit.                      | 35 | Tom & Jerry Pump.                 |
| 9  | Incline into Whim Shaft.                             | 23 | Cafn Shaft.                            | 36 | Car & Coach Park.                 |
| 10 | Cwmystwyth Mill, covering existing wheels & buddles. | 24 | Proposed access ramp.                  | 37 | Picnic Site.                      |
| 11 | Ore Slide & Sorting Floor.                           | 25 | Engine House & New Offices of 1869/70. | 38 | Playground.                       |
| 12 | Jigger Shed & Wheel.                                 | 26 | Cart House.                            | 39 | Cafe.                             |
| 13 | Hanson's Shaft to 72 Fm. level.                      | 27 | Compressor House.                      | 40 | Boundary.                         |
| 14 | 20 foot Wheelpit.                                    |    |  |    |                                   |

were allocated positions. Shears and Dunkin fell into disagreement in 1843, Shears buying Dunkin's shares but by 1845 he had to relinquish all the properties at Llywernog and the Rheidol Valley (Pritchard, 1985).

The Gogerddan records show that the next lessee was Joseph Holdsworth Esq, formerly of Leicester, but now of Aberystwyth and that on the 31st of March 1852 he was granted a 21 year lease of lead and other mines within this sett (Gogerddan Estate records). The previous year Holdsworth had held a tack note to prospect and presumably he felt that further work was justified. Nothing further is known about the company and it would appear that no ore was sold by them (Burt, 1985).

In July 1858 the Mining Journal announced that a new company had been formed to work the Llywernog, Bog and Ponterwyd Mines and as no record of the lease exists it may be presumed that the new Llywernog United Mining Co. obtained their lease from Holdsworth. In charge of the operations was Captain John Hughes of Talybont and as the owners are listed as Jones, Hughes & Co., it must be presumed that Captain Hughes therefore had a vested interest in promoting the mine.

The company fared very poorly and the 20 foot waterwheel was unable to dewater the workings which were now 36 fathoms below adit with another ten to the surface at the outcrop of the main lode. It is unlikely that any work was done in 1860 and part of 1861.

In the October of 1861 the Llywernog Mine was taken over for the sum of £200 by John Barton Balcombe who employed Captain James Lester as his manager until March 1866. It would appear that Balcombe & Co had acquired the neighbouring Clara Mine some months previous to October 1861. In an attempt to beat the water problem the 40 foot wheel at Bodcoll was moved to Llywernog but did no work, initially due to frost and too much rain, and in May 1862 it was discovered that the pumping gear was inadequate. This was attended to during the summer months but it was December by the time preparations had been made to carry the Engine Shaft below the 36 fathom level. By the autumn of 1863, the shaft was only down to 40 fathoms. Matters grew worse over the winter months and all of the mines of the area ground to a halt with the onset of a long period of particularly hard frosts. During the summer of 1864

the Engine Shaft was sunk sufficiently to allow the driving of a new level at 50 fathoms below the adit. At this time the old 20 foot winding wheel at the neighbouring Clara Mine was dismantled and moved to Llywernog to wind the kibbles in the Engine Shaft (P.L. Harvey, *priv. comm.*)

Captain John Davies took over the management of the Llywernog Mine in the March of 1866 and commenced his tenure with great gusto. In May he directed that the pumps be recovered from the main shaft of the Clara Mine and installed in the Engine Shaft at Llywernog. This proved a success and by June the water was within 10 feet of the floor of the 50 fathom level. The stopes started coming back into production towards the end of the year and Davies implemented the sinking of a series of winzes to improve the ventilation and access to the deeper levels. Seventy eight tons of concentrate were produced before the mine came to a standstill, once again, on account of severe frosts towards the end of 1866. This severe weather continued into 1867 and by the end of March the water level had almost risen to the 30 fathom level.

The 26 miners were idle for many months during the summer of 1867, the rain in early September allowed work to continue for a while. In February 1868 the Llywernog Mining Co. was formed for the purpose of raising more capital, the reality of the matter was that J.B. Balcombe sold the mine to himself and some partners. No ore was produced in 1868 and it must be presumed that extensive repairs were attempted after the company had raised more capital. Davies had undertaken new development work and laid open a rich shoot of galena which was to be stoped during the following year. The 50 fathom level was well established and the new 62 fathom level was being driven west of the Engine Shaft. By the April of 1869, Captain Davies had two good stopes yielding about 16-20% galena over a mining width of four feet. This was expected to create a boom year but their efforts were thwarted by a prolonged drought. The recently refurbished crusher could not be turned nor the pumps operated, this put the '62' under water for three months and the '50' for two months, if it had not been for some rain at the end of August the '40' would have become unservicable too.

Balcombe and Davies must have been further frustrated knowing that in the same year the neighbouring Powell Mine, dressed 326 tons of lead concentrates from which 7¼ hundredweights of silver were recovered. This was due to Captain Trevethan having installed a 25 HP. twin cylinder - double acting steam engine to carry them through times of drought. Therefore, at Llywernog on the 27 November 1869 work commenced on installing a 16 HP. Barrows & Stewart horizontal steam engine, which was commissioned on Christmas Day 1869 - I can not think of a better way to spend Christmas Day than stoking up a boiler, no doubt helped on by copious quantities of port!

The £300 engine was housed alongside the pit for the elderly 40 foot pumping and crushing wheel and remained here until the early 1930s. The boiler house lay alongside, and was served by a sheet metal chimney. Within six weeks of its installation, the engine was pressed into service when the waterwheels froze but, like all steam engines in mid Wales, it was expensive to run.

The main buildings were erected around the engine and boiler and were completed in March 1870. It was then discovered that a bottleneck in the top of the Engine

Shaft restricted production and the whole shaft had to be straightened from the surface down to the 30 fathom level. The shaft was then timbered, a new ladderway put in from the '30' to the '62' and a new plunger pump installed in the sump. Because of the time taken to complete the refurbishment the mine only raised ore in January, February and December and when dressed this produced 20 tons of 75% concentrates containing some 10 pounds of silver, its value was about £260 whilst the cost of running the mine must have exceeded £3,000. Balcombe appears to have committed the cardinal sin of improving and refurbishing the surface works before Davies had delineated the quantity of ore which was available.

By January 1871 Davies was desperate for ore to feed the mill, and ordered that the old adit be opened up for investigation. A stringer in the wall was followed down to 9 feet in a winze but it remained too poor to pay. The cross-cut was continued for another 100 feet but nothing was cut. It is presumed that the 80 tons of concentrates sold in that year must have derived from the ground between the 50 and 62 fathom levels. By December their dilemma was obvious and another meeting was held in London to raise yet more capital, this was done and a new company formed but Captain John Davies left in the March of 1872 and was replaced by John Evans with J B Balcombe continuing as managing director. Evans' immediate problem was that the mine was now so deep that the old waterwheels were not providing sufficient power. The usual number of employees at Llywernog varied between 25 and 30 men but this was cut back to ten in January 1872 and then reduced to 6 men working on a cross cut on the 72 fathom level after March. Captain Evans wanted to sink the shaft to allow an 82 fathom level to be driven but had to be content with being allowed to sink a trial shaft to 28 feet on the course of a minor string, although this had to be abandoned in June after a cloudburst. With fresh capital, the number of employees was increased to 24 in June. Sixty tons of concentrate were produced during the year but this provided no salvation. The winter of 1872/73 was particularly atrocious with the end of the storms not coming until March. The leats were filled with sand and the launders toppled by high winds. The last report to appear in the *Mining Journal* is dated the 19th of March 1873 and showed that the grades were between 20 and 25 hundredweights per fathom. In modern terms this is about 9% galena over the four foot vein width — mediocre even by Cardiganshire standards.

Balcombe continued at the mine until about 1875 and, with his usual optimism, purchased and erected a new 50 foot waterwheel so that the mine could be sunk deeper to where he believed richer grades would be found. He also came to an agreement with Captain Trevethan of Powell's mine to jointly fund the cutting of a new 6½ mile long leat for the benefit of the Powell and Llywernog Mines as it would considerably reduce their coal costs.

Due to financial recklessness, J.B. Balcombe was barred from the board of the Bronfloyd Mine in 1875 and resorted to dipping into the till of a Cardiff docks company until he was caught and imprisoned for embezzlement (Boynes, 1976). Captain Trevethan appears to have run the mine during Balcombe's absence from the County. Llywernog thus became an annexe of the Powell Mine and there was a suggestion that the two mines be connected by a long drift on the 20 fathom level. This was never completed. There is some

# Section of Llywernog Mine

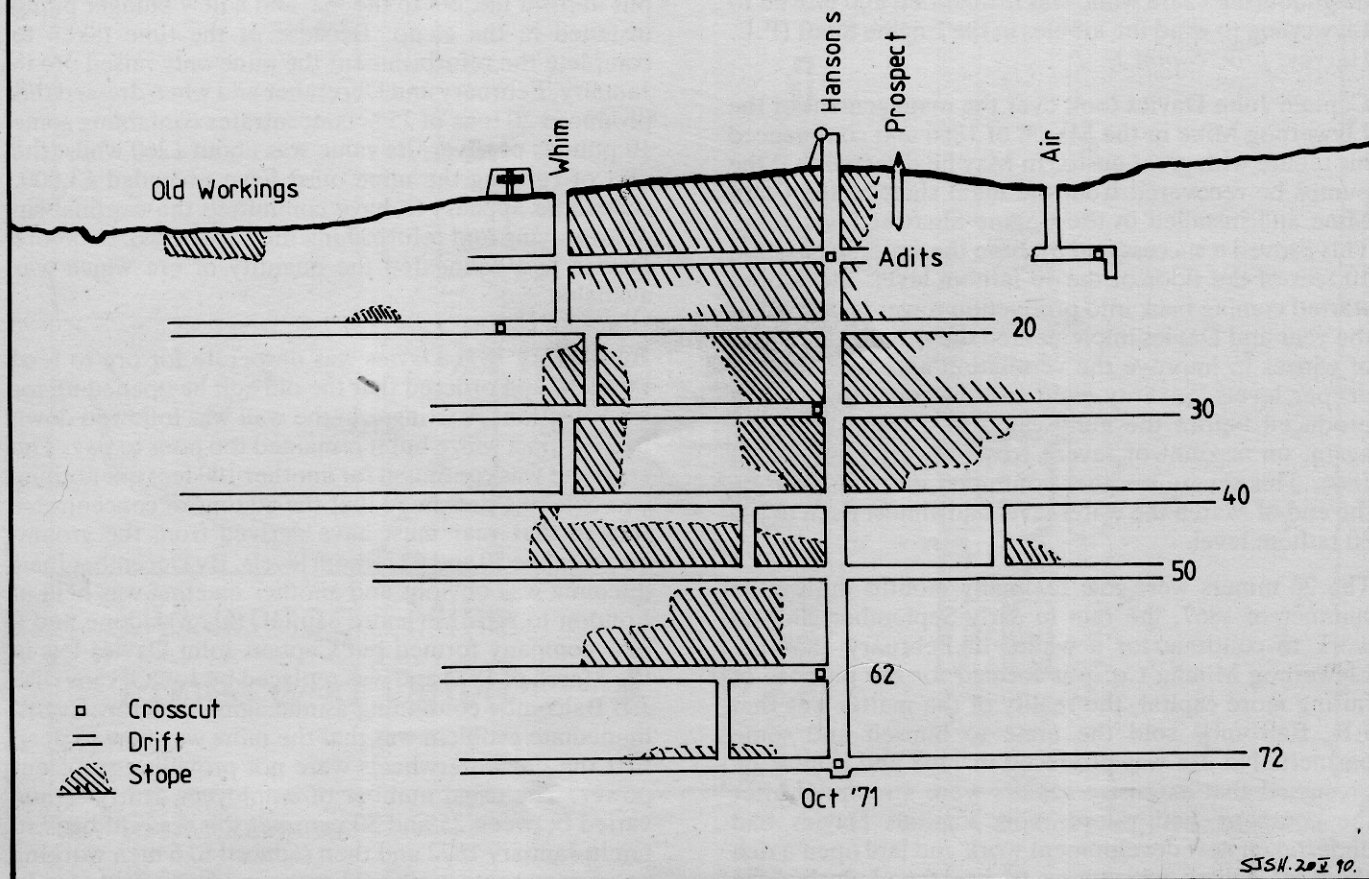


Figure 5. Section of Llywernog Mine.

confusion regarding Trevethan:- according to Spargo, he died prior to 1870 but a Captain Trevethan was still sending intelligence on the mine to the *Mining Journal* in 1875.

In 1877 the official management of the mines was transferred to Captain Nicholas Bray. He had been involved with the Powell Mine since at least 1876 and reformed this company in 1880 for the purpose of raising more capital. In this he was successful but he did not have entitlement to work the Llywernog Mine as the Balcombe lease was still valid. Of the new found capital some £3,000 was spent on development and machinery at Llywernog. Funds were also allocated for the construction of a new reservoir at the head of the valley which is still known as Bray's Pool (Boynes, 1976).

Although by 1879 Llywernog appears to have been virtually abandoned, this may be due to the dominant role of the Powell Mine with Bray and his co-director, Evan Hanson, illicitly working the mine and selling the ore with that of the Powell Mine. This came to the notice of Sir Pryse, the mineral owner of Llywernog, and he sent his mineral agent, Ernest Butler, to investigate.

A deal was quickly struck for Bray to pay £16 per annum rental for the remaining nine years of the lease. At the time of his visit Butler could not get below the '40' as it was flooded but he managed to confirm that despite a long drift having been driven east from Powell's to the Gogerddan/Nanteos Boundary it did not communicate with Llywernog (Gogerddan Estate records).

The mine continued to work under Bray and Hanson until their lease expired in 1891. They appear to have done comparatively little in these years and it hardly seems fitting that they should have renamed the old

straightened Engine Shaft as Hanson's Shaft. The exceptionally low lead prices of 1891 forced many mines into closure, many never to re-open, Llywernog being one of the few exceptions (Francis, 1989).

In 1907, The Scottish Cardigan Mines Ltd., more usually associated with the Bwlchglas Mine (Hughes, 1989), took a lease on Llywernog as they believed that it held potential as a zinc producer.

Under the guidance of Captain Thomas Hardy the workings were pumped out to the bottom of the mine and the whole of Hanson's Shaft was re-timbered. The old 50 foot wheel continued to operate the pumps but it has not been ascertained if the steam engine was in service at this date. A new leat was cut from below Bray's Pool to feed the 50 footer and preparations were made for the sinking of a New Engine Shaft about 130 metres west of Hanson's Shaft. Their enthusiasm for the mine waned by 1911 as the price of lead and zinc was still too low to justify stopping the grades encountered and the mine was placed on a care and maintenance basis.

The refurbishment of Llywernog was costly and must have run to several thousands of pounds during their tenure. It is curious that the Company chose Llywernog as their alternative development at a time when apparently better prospects stood idle (P.L. Harvey, *priv. comm.*).

The last man to work at Llywernog was Thomas Jenkins who fossicked through the dumps for a while in 1914. By January 1953, the 50 foot wheel had fallen into a dangerous state of neglect and was demolished by Mr David Mason of Ystumtuen. *The Welsh Gazette* commented:-

"This famous landmark will not only be missed by the local inhabitants, but also by the thousands of visitors who travel this road to Aberystwyth during the summer months."

In 1958-59 the valley echoed to the sound of hard rock mining once again as the Dinas Tunnel was being driven some 200 feet under what is now the museum car park, a short cross cut communicating with the Llywernog access shaft. At about the same time, the council having difficulty in disposing of the domestic refuse collected in the Devils Bridge and Ponterwyd district resorted to dumping it into the shafts and hollows at Llywernog. I first visited the site in 1967 when dumping had just ceased.

All that remained, which was of any interest, was the circular powder magazine, the broken remains of the bearing blocks on a much damaged wheelpit, the ruinous remains of the crusher house, and the sorting shed with its oreslide. Balcombe's offices and enginehouse were in decay but with sufficient slates on the roof to give some degree of protection from the weather. The Cafn Shaft, behind the wheel pit, was a tangle of old bicycle frames, corrugated iron and dead sheep which held back about five feet of ochreous water. This was so uninviting that none of us dared to immerse ourselves and we dismissed it from our exploration programme. However, it was an interesting site and in a better state of preservation than many of the other mines.

#### THE MUSEUM

Peter Lloyd Harvey, a mining historian from Aberaeron, considered it possible to create a commercially viable museum of mining history in mid Wales and in the August of 1973 formed the Mid Wales Mining Museum Ltd. for this purpose. His father, the late Dr S. H. Harvey, and Bob Griffin, now of Aberystwyth, were co-directors in the Company. Having considered several sites the choice was narrowed down to either Castell or Llywernog Mine, both alongside the A44 (T). During October 1973, a lease was granted to the Mid Wales Mining Museum Ltd. to develop the Llywernog site and work commenced in January 1974 (P.L. Harvey, *priv. comm.*).

#### 1974 To The Present

January 1974 was a clear and crisp month during which an accumulation of half a century of sheep dung was barrowed out of J.B. Balcombe's stylish buildings. There was surprisingly little structural repair required but the roof, floors, windows and doors all had to be replaced. It was nothing short of miraculous that the museum first opened its doors to the public in the August of 1974 with the rest of the site still in an awful condition.

The restoration of the main building was quickly followed by the conversion of the old sorting shed, by the ore slides, to a shop. The roll crusher from Llaur y Cwm Bach Mine, near Bontgoch, was offered to the museum during the completion of the shop and it was a logical move to install it in the crusher house immediately west of the wheelpit in 1975. Two waterwheels were installed during the summer of 1975, at the same time that the top pond was dredged and rebuilt.

In the spring of 1975 the Company commenced the landscaping of the area around Hanson's Shaft and this exposed an oval of flagstones at the collar. Steve Coley, Harry Hughes and I then dug out ten feet of broken

bottles, ash and bed irons to expose the collar. Shortly afterwards the wooden headframe, with a three foot sheave from Snailbeach Mine, was erected over the shaft and sinking was resumed by the Conservation Corps down to about 30 feet. The bottom of the collar was found to be hanging in mid air so greenheart lintels had to be placed underneath and the voids filled with concrete before the work could continue. The prospecting adit, last reopened by J.B. Balcombe, was dug out with a JCB in the hope that it connected with other workings. When the ochreous water in the flooded adit had drained sufficiently to allow access it was found to be a straight 150 foot drivage with a flooded winze about midway. For many years it was thought that this may have connected to lower workings and in about 1986 Peter and I dug out 20 tons of rock only to find the sump at nine feet below the floor of the adit.

The Elenith Mining Co. of Esgairmwyn donated a jigger from Williams's Foundry at Aberystwyth in 1976 which precipitated the construction of the jigger house alongside the 14 foot Eagle Foundry waterwheel, by the crusher house.

Also in 1976, a horse whim was constructed in the position where we believe one had stood until the 20 foot winding wheel was moved there from the Clara Mine in 1859/60. According to the plans, the shaft lay to the west of the whim, however, after a particularly severe deluge some months later, a large subsidence crater appeared to the east of the whim and identified the location of the shaft. Hanson's Shaft had been mucked out to about 50 foot below the collar and the top of the cross cut drainage adit was just visible. Protruding through the muck was a section of one and a half inch iron pumping rod. It was also obvious that the fill had caught fire at some time and must have burned like a furnace as much of the glass had re-vitrified with the ash and the walls of the shaft had scaled very badly in the intense heat.

Balcombe's Level continued to be the only part of the mine into which the public were permitted. Lighting was rather poor as the 12 volt system being used had only a very limited wattage. It was only possible to illuminate half the tunnel and the flooded winze and there was no room to turn around. In 1977 it was decided to drive a short drift east of the cross cut along the south wall of the lode. After difficulties with an external contraction Dave Ely and I continued the heading but problems with noise and vibration (we were working 6.00 p.m. until midnight) caused the heading to be suspended after 30 ft of drivage. It was nevertheless quite an improvement and there was appreciably more space available.

The Trevithick Society offered the loan of a 50 foot waterwheel which was of a similar type and vintage to that destroyed in 1953. The segments were moved from Cornwall to Llywernog in 1977. The 10 foot undershot wheel was designed in 1979 and fabricated by Peter Watkins of Dolybont. It is scheduled to be fitted with elevator buckets to raise water into a launder to run a Tom & Jerry pump later this year.

Throughout the early 1980s more attention had to be given to the routine maintenance, upgrading exhibits and improvement of the site. The shop had been moved from the sorting shed to a new cabin built alongside the 50 foot wheelpit, the sorting shed then converted into what is now the audio - visual room. The site was starting to fall quite naturally into three distinct areas showing early mid and late nineteenth century mining techniques and technology.

A surprise find with a JCB was that a prospect shaft had been sunk on the lode to the east of Hanson's Shaft, which is presumed to date from Lewis Morris's tenancy circa 1760. Like all newly discovered workings, we all had great faith that it would connect to the top of the old stopes above the drainage adit. In September 1983, Dave Harrison, my brother Toby and I put up wooden shear legs and used a scaffold hoist with a kibble to clear out the attle. As the dimensions seldom exceeded two feet by four along strike, there was precious little room to work but we were able to make remarkable progress - 35 feet in three days. As we had finished the job with ten days to spare, the operation was moved to Hanson's Shaft. Here the level of the rubbish now stood at about ten feet above the floor of the cross cut and it was just a question of dragging the kibble into the adit and using it like a dragline. Within a short time we had cleared the cross cut and found a turf and clay wall standing about two feet high with an open launder on the top. This was the discharge chute from the rising main and the wall was built to prevent the flow from entering the shaft. Beyond the wall we found good solid pitch pine timbers with a play just below water level. Lying on top of the plat was a mass of steel hawser and corrugated iron sheets which came down the shaft before the fire, the plat appears to be intact and the shaft in a salvagable condition but flooded. We thought that we could see the pumping column and a ladderway through the murky water but there are no plans in the foreseeable future to draw the water.

The next underground programme started in 1985. The floor of the western drift, excavated in 1977, was ripped out to below water level and the tramway re-laid. A cross cut was driven south for about five feet and the drift continued west for another ten feet. On the surface a JCB excavated the collar for an air shaft, but after sinking to about 18 feet the water became a problem and the job was continued as a rise from the end of the new cross cut. The development rock was partly stowed in the continuation of the drift and the remainder filled the rob pit. Communication was made on 10th March 1985 and the airflow considerably improved. Paul Bird and I then set about driving a new cross cut north from the western drift for thirty feet as part of the plan to connect this adit to the main workings.

During 1986-'87 considerable assistance was provided by an MSC programme on the site. Their first task was to rebuild the 50 foot wheelpit followed by the 20 foot winding wheel pit, the ore slides, the old offices, and a pond for the undershot wheel. A particularly good job was done in replacing the timber-lagged portal of Balcombe's Adit with a stone arched construction faced with yellow bricks in the same style as the main building.

A major phase of building was commenced in April 1988 when the concrete base of the new compressor house was poured. The 1928 Ingersoll Rand compressor and electric motor from Crugion Quarry was installed before the rest of the building was erected. This installation is based loosely on a compressor house at South Crofty. The wooden parts of the building were salvaged from the old Tonfanau Army Camp at Tywyn near Aberdyfi. When this was completed a similar construction was built to the south to house a 12 + 6 x 36" double expansion horizontal mill engine from the reject pile at Shugborough Hall Museum in Staffordshire. The same building will also house the new shop and a cafe when completed.

The new shop, cafe, compressor and engine house will have taken about 27 months to commission but pave the way into a programme of five years of intensive development. The next item on the agenda is the completion of a Tom & Jerry pump which is to a design by David Bick. Some years ago the museum purchased a double acting, twin cylinder (8" x 12"), single drum winding engine and also a Hawthorne Davey vertical boiler in servicable condition. Later this year it is hoped to bring both exhibits together but the location has not been settled as yet. This may be in steam for the summer of 1991 if everything progresses according to plan. The extent of the open stope between Hanson's and the Whim Shaft has now been determined and later this year the fill should be excavated, the stope capped and the route to the Whim Shaft reopened. By the cutting of two ramps a second underground tour will be created where people enter the main building to find the portal of a ramp to the drainage adit by the Cafn Shaft. The stope will be cleared and this cross cut will lead towards Hanson's Shaft. Just before the shaft it will be possible to walk through the stopes to the Whim Shaft where another ramp will lead to surface.

It is proposed that the Cwmystwyth Mill be re-erected commencing in 1991. Despite suffering considerable damage in its last years sufficient remains to build it about 5/7ths of the original size, which fits in remarkably well with the existing topography. This has been a rather controversial move with many critics but there is no doubt that if it had remained at Cwmystwyth very little of it would still be standing today.

Both the upper and lower waterwheels will remain where they are at present but the new mill will cover the area. The level of the ore bins matches that of the tramway from Hanson's Shaft and it should prove possible to build a trestle bridge to form a direct rail link from the shaft.

Hopefully, a start on erecting the fifty foot wheel can be made in 1992 and finished off in the following year. The flat rods and two pumping bobs can then be replaced. However, without the leats and reservoirs being rebuilt there is little hope of turning the wheel for any length of time. It may be possible to supplement the small stream by Hanson's Shaft with pumping from below adit to fill a reservoir, however, the economics and physics of pumping would mean that this would have to be done electrically. This construction will be the largest overshot waterwheel on the British mainland.

Further work will involve cutting a chamber to accommodate a 12 or 14 foot waterwheel to operate a small pump. This may very well happen near the abortive prospect shaft as water could easily be ducted down this and out of the adit. Also, it is en route to connecting the drainage adit with Balcombe's Adit. The distance to drive stands at 250 feet and without great mechanisation this would take about four months of non stop work. Sometime after 1995 maybe....

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