

# Bwlchglas Mine

Dyfed, Wales

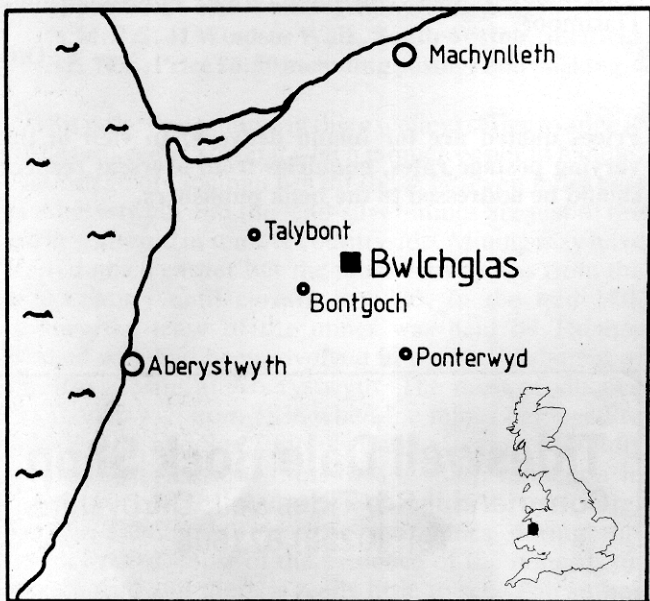
S.J.S. Hughes

Mining Services, Talybont, Dyfed, Wales

---

**Bwlchglas Mine, although of little economic consequence, has come to the notice of mineralogists through the quality of pyromorphite specimens collected there in the late 1970s and early 1980s. This article gives a historical perspective on the mine from the early workings in the seventeenth century to its closure in 1923.**

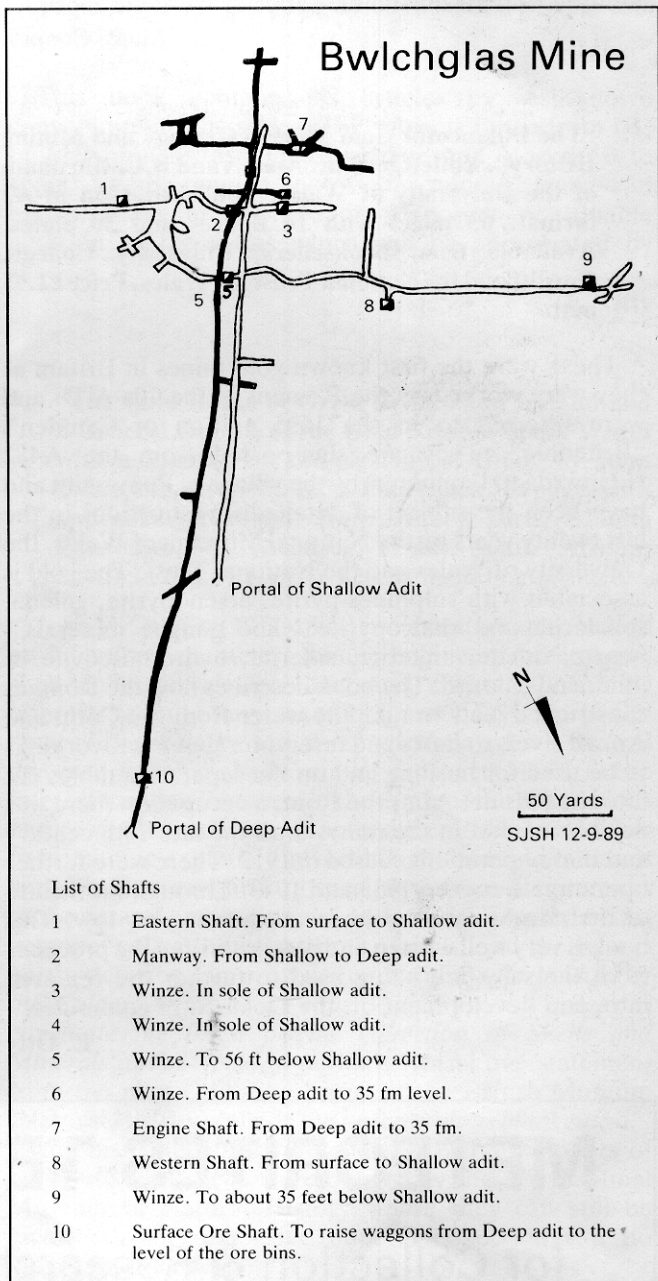
---



**Figure 1.** Location Map

In a secluded valley between Talybont and the Nant Y Moch Reservoir lie the recent remains of the Bwlchglas Mine (SN 710 884). The ruins date from the early part of the present century and are reminiscent of an abandoned military barracks. The neighbouring Hafan Mine lies on the same lode and was being actively exploited during the 17th century. It is therefore possible that some prospecting took place in the vicinity of Bwlchglas at that time or slightly later, although by 1815, very little had been done as Walter Davies notes:- "Bwlchglas - A vein with some lead ore but not yet explored".

Surprisingly, the site lay dormant through the 1840s when there was intense mining activity elsewhere in northern Cardiganshire. Between 1860 and 1868, to the east of the present Bwlchglas Mines, Messrs Punchard and Edwards drove a long cross-cut south to cut the Hafan Lode. The trial came to nothing as the lode was barren, but, had sufficient capital been available to extend drifts to the east and west it is possible that reserves could have been found to establish a viable operation. From the available data it must be concluded that Punchard and Edwards were far from reputable. They were also involved with Thomas Spargo and Matthew Francis in the dubious promotion of the Great Cwmsymlog Mine, (Hughes, in press). Affairs became so disagreeable in the spring of 1868 that the Gogerddan Estate revoked their leases. (Gogerddan estate records) Work was resumed under a tack note, an early form of prospecting licence (Burt, 1984) from the Gogerddan Estate some time prior to 1882 when a small parcel of ore is reputed to have been sold. The scale of these



**Figure 2.** Bwlchglas Mine plan.

works was so slight that it failed to be included in any of the contemporary guides which was rather surprising as the site was known to Spargo and Francis.

A second batch of ore was apparently sold in 1887 (Jones, 1922), a local entrepreneur, Edward Evans of Lery Stores, Talybont, acquiring the rights to prospect on the land to the south-west of the previous operation in the vicinity of Bwlch Glas Farm. On the 13th of January, 1888, William Watkin was engaged to

commence trenching at half a crown per day. Within a week he was joined by Thomas Davies and on the following day they raised some good stones of ore from a recently discovered lode lying to the south of the main lode. Further lumps of ore were blasted out of the lode during the following fortnight and news of this success soon spread through the mining community. Evans contacted Captain Absalom Francis of Goginan, an old friend, in an attempt to arouse interest in the prospect, and further negotiations were instigated with the Reverend Richard Roberts, part-owner of the mineral rights, for an extension to the duration of the lease. In March, 1888, further discoveries of ore were made by Watkin and Davies, and later in the year another friend of Edward Evans, Captain John Hughes of Talybont, was brought in to help manage and report on the operation.

As well as trying to promote the site through Absalom Francis, Evans also made contact with Messrs Taylor & Son and George Green, the ironfounder, to ascertain if they were interested in developing the mine. However, they were not sufficiently interested to finance the venture and the costs of about £6 per month were borne entirely by Evans. In November, 1888, probably at the instigation of Captain Hughes, Watkin and Davies continued the driving of the Punched adit at the contract price of £4 per fathom.

In 1889, after failing to get a sample assayed in Liverpool and being swindled out of the two guinea fee, Evans decided to get a full report on the operation from a mining consultancy run by Edmund Spargo the younger brother of Thomas Spargo. Born in 1840, Edmund appears to have been a more honest practitioner than his brother. It is worth noting that he was a founder member of the Institution of Mining and Metallurgy and was a member from 1892 until 1921. Edmund Spargo arrived at Lery Stores for breakfast on the 7th March 1889 and spent the day viewing the property with Evans before returning home in the late afternoon. His report, completed on the 23rd March and containing three pages of text, one page of plans and sections is, of some interest and therefore reproduced in full at the end of this article.

It must be presumed that this report was instrumental in the founding of the Bwlchglas Mining Company in 1892 by Lawrence Hasluck and Neville Roberts.

Immediately after the publication of the Spargo report Evans was so impressed that he ordered copies of Captain John Hughes's earlier report to be printed but none appear to have survived to my knowledge. Following circulation of the reports many famous mine captains came to view the works and even Le Neve Foster performed a brief inspection in his official capacity as Inspector of Mines.

By mid April, 1889, Hasluck was sufficiently interested to send two agents to view the mine on his behalf, Captain Prout and Mr Pearson. Their report was sufficiently interesting for Hasluck and a colleague, Rothwell, to travel from his London office on June 1st 1889 to the mine, walking the last 5 miles having mistakenly disembarked at Glendyfi station. Evans was a strict observer of the Sabbath and refused to leave his house to take Hasluck and Rothwell to the mine so instead they took a carriage to the seaside at Aberystwyth. On the Monday morning the mine was visited by Hasluck, Rothwell, Evans and Captain John Hughes and the inspection was favourable. (Evans E. (MS))

The outcome of this meeting was the formation of the Bwlchglas Prospecting Syndicate which subsequently became the Bwlchglas Mining Company with a share capital of £10,000. Lawrence Hasluck and Neville Roberts were Directors and Edmund Grundy Company Secretary. The share certificates give a date of formation of 1890 although the date recorded in the Mineral Statistics was 1892. (Burt, 1985)

Evans only employed two persons in 1888 whilst under the Syndicate the number, according to Le Neve Foster, increased to six. This is not borne out in Evans's detailed day book and possibly Le Neve Foster included Evans and Hughes as staff. Under Hasluck's Bwlchglas Mining Company 17 men were employed underground in 1890, the following year 20 men worked on further developing the mine with another two men on the surface - presumably an overseer and a blacksmith. In 1892 10 men were employed on the surface and 16 underground but this was reduced to 7 miners and 13 surface workers in 1893. It then appears that the Company ran out of money or decided to go into voluntary liquidation. A considerable sum must have been spent on development between 1890 and 1893, the wages bill being probably in excess of £2,500 and materials adding a further £1,000 to the costs. For all this expenditure the only income was £144 obtained for 23 tons of lead ore sold in 1892.

In 1894 the ownership of the property was transferred to P.S. Boulton who may have been the official liquidator. 12 miners and 4 dressers worked at the mine but no ore was raised and they were laid off in 1895.

Just as Spargo's and Hughes reports had given great impetus to the works after March 1889, the sett's potential was enhanced in 1896 by the implementation of a scheme to lay a narrow gauge railway through the mine according to a plan formulated in 1890 by Thomas Molyneux of Liverpool who owned several mines in the vicinity. The main purpose of the tramway was not to effect an economy in the carriage of ore to the railhead at Llandre but to enable stone to be extracted from the sett's quarry some three miles beyond Bwlchglas. Molyneux anticipated that ore could be shipped by this route giving a considerable saving and he proposed that this scheme be postponed until a second phase extended the tracks to Bryn yr Afr and Esgair Fraith. Although the scheme was proposed as early as 1890 construction did not commence until 11th January 1896. (Wade, 1976)

By May, 1897, the line had been completed and the first locomotive was delivered. The Plynlimon & Hafan Company Ltd. papers do not show that they acquired the mine from Boulton in 1896 though the Minerals Statistics acknowledge this. It was obviously a good idea to have control over the land used by the railway and whilst the greater part of the land used by the railway and quarry lay in the ownership of Sir Pryse Pryse of Gogerddan, the Bwlchglas sett was owned by the Reverends Richards and Neville Roberts of London.

Between 4 and 14 men were working at Bwlchglas between 1896 and 1898, employed by the Plynlimon & Hafan Company. In 1897 four dressers were also employed producing 50 tons of rather poor ore which sold for five pounds and ten shillings per ton. Though it would have been possible to carry this ore away by train this does not appear to have been the case according to the Gogerddan estate records. With losses of £700 over less than 3 years the company relinquished the mining rights which reverted to the Reverend Richard Roberts between 1899 and 1904. The railway also ceased work in the summer of 1899 and the track was lifted shortly afterwards. (Wade, 1976)

The extent of the work carried out to date was the driving of the shallow adit to intersect the lode with a shaft to surface. Some good ore appears to have been taken from this piece of ground. Below the adit, a winze had been sunk to 56 feet but did not cut anything of value. To the west of the adit a shaft had been sunk on the outcrop of the lode, with a pumping column installed to draw the water, the power supplied by rods fixed to a waterwheel about a quarter of a mile down the valley. A smithy had been built alongside the access track and the recently abandoned railway ran just above the road.

Richard Roberts did little with the site but retained F.M. Simms as the mine agent until 1904. In 1908 the Scottish Cardigan Lead Mines Ltd. of Glasgow took the lease and employed Thomas Hardy to supervise 12 miners and 3 surface workers. The men were principally engaged in opening out the ground and the driving of the deep adit. Originally this was drilled by hand but a compressed air "widow maker" was later used and the Company employed sub-contractors who were able to earn considerable sums for the hard work and long hours involved. The son of one of the drillers told me that the machines ran for 24 hours a day. The men took turns at the work and then slept in the dusty heading. They regularly earned as much as £18 per week for the work, 70 times the agricultural wage at that time. Both drillers died prematurely as a consequence of the dust - possibly the only two cases ever to happen in the district (W. Roberts, U. Evans *priv. comm.*).

In 1909 the labour force was increased to 32 miners and 23 surface workers engaged in opening ground and erecting a new dressing mill, the Scottish Cardigan Company having decided that the mine was a viable proposition. They raised £70,000 for the project. The new mill site lay above the mouth of the deep adit and an elevator was designed to lift the wagons from the adit to a level where they could roll down a trestle bridge to the ore bins, but apparently the plans were blueprinted in reverse and the full wagons required pushing to the bin but rolled back down grade when empty. By this date the shallow adit appears to have holed through to the Western Shaft and rendered the waterwheel unnecessary. The motive force for the new mill was a pair of Fielding & Platt gas engines rated at about 150 B.H.P. each, with the fuel supplied from a small plant located in front of the engine house. Originally, the mill was to be a simple affair with basic classification products being treated on tables or jigs but the company was persuaded to use a most elaborate system of mills of the Hardinge type to finely grind the ore after the primary crusher. Dorr rake classifiers were used to size the product which was then either jigged, tabled, buddled, or put through froth flotation cells (S.C.C. records).

The principle of froth flotation had been discovered by Frank and Stanley Elmore a few years previously and with the skills of William Green a model plant was erected. Considerable interest was taken by the mining industry and there was never a shortage of eminent engineers eager to view the plant.

In 1909 the mine produced 87 tons of lead concentrate for which they were paid £709 and in 1910 the amount increased to 208 tons of lead and 36 tons of zinc concentrates with a total value of £1787. (Burt, 1985) The labour force had grown to 304 persons of whom 135 worked underground under the firm supervision of the Scot, Captain McKendrick. The wages bill for 1910 amounted to about £20,000 and the boost to the local economy was very significant, the population of the neighbouring village of Bontgoch rose by 16% and

Talybont became subject to immigration after years of depopulation. The new company brought their own Scottish foremen from Glasgow most of whom integrated fairly rapidly with the local community. They also brought with them the traditional Scottish "lard oil" lamps which were very cheap to produce and run and until the early 1960s could still be found for sale at Lery Stores in Talybont. The miners felt that they had been cheated to a certain degree as these lamps would continue burning in an atmosphere sufficiently foul to extinguish a candle yet they were still expected to work under these extremely bad conditions. (F. Roberts *priv. comm.*) By 1911 it was becoming obvious that the company was starting to run into financial difficulty, the Mineral Statistics suggest that the Scottish Cardigan Company ceased to function at this time but the company records differ and show that the company continued until 1914. In 1912, only 70 persons were employed but they failed to produce any concentrates. In 1913, 82 employees raised and dressed 31 tons of lead and zinc concentrate valued at £294 and the company paid in the region of £6,000 wages during these years.

The mine had now been laid out with levels at 10, 20, and 35 fathoms below adit but the length of the orebody had diminished to some 10 fathoms with zinc blende predominating over the galena that they sought. Zinc at this time was of little commercial value and the concentrate sold for two pounds eighteen shillings to three pounds per ton which was less than their production costs. Apparently a large quantity of zinc ore was left standing though no records of reserves exist (Jones, 1922). The blende appears to have been of reasonable quality with the concentrate grading at about 30% zinc but with a negligible silver content. The lead concentrates carried 72.4% lead and between 4 and 6 ounces of silver per ton (130-220 ppm.), a lower value than had been predicted by Norman Tate.

Underground, the mine was well equipped; electricity and compressed air being carried into the mine for lighting and power driving six rock drills and two air hoists. At the bottom of the Engine Shaft a 12" x 7" x 10" Worthington Duplex pump worked hard to keep the workings dry. The miners loathed their turn at attending the pump, the air was sufficiently bad to extinguish the "lard oil" lamps below the 20 fathom level and the only certain means of illumination was a petrol-soaked rag wrapped round a stick (F. Roberts *priv. comm.*). The atmosphere probably contained less than 15% oxygen and in excess of 2% carbon dioxide. It was also a notoriously wet mine, evidently one of the worst in the district and the men had no "dry" in which to change their clothes.

The engine and headframe were located in a stope some 300 yards up the deep adit and serviced a four compartment shaft, two compartments being fitted with guides on which the cages ran. There was also a manway in order to comply with the terms of the Mine's Act. The remaining compartment was used as a service duct. Access to the winding engine chamber was either up the deep adit or by a manway to an intermediate level with another manway to the shallow adit some 30 fathoms above. Below adit, the Engine Shaft had stations at the 10 and 35 fathom levels. A 20 fathom level was driven west from a winze that also linked the adit with the 10 and 35 fathom levels. The station at the collar of this winze was fitted with a small headframe and an air hoist was used to wind a kibble which was manually tipped into the wagons that ran through the deep adit.



*Figure 3.* Surface remains today.

**Photo:** R.H. Bird.

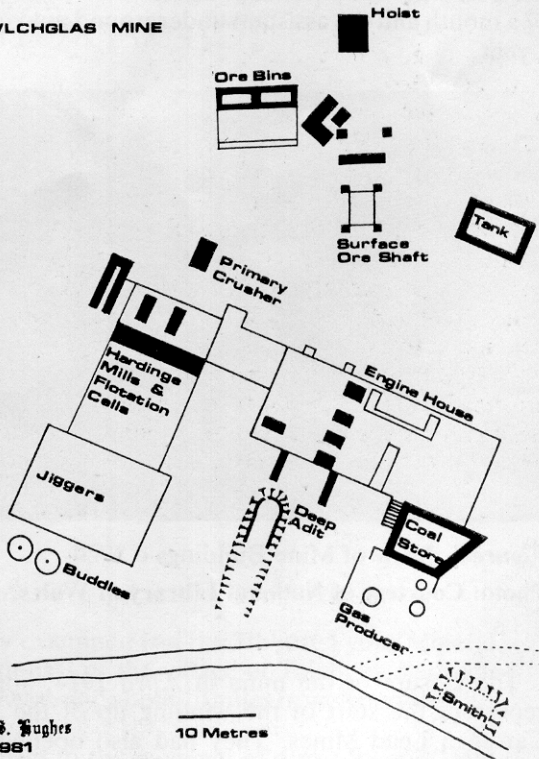




**Figure 4.** Underground headframe in the deep adit.

**Photo: R.H. Bird.**

**BWLCHGLAS MINE**



*Figure 5.* Surface layout.

The most lasting memories of Bwlchglas miners relate to the barracks built about fifty yards east of the mine. Much of the men's spare time was spent here and whilst the numbers are not recorded it seems to have been rather overcrowded and soon became infested with bed bugs. An old miner recalled how he spent many hours chasing bugs across the blankets with a candle trying to trap them in a blob of wax (F. Roberts *priv. comm.*). This was an admirable solution but had the unpleasant effect of rapidly converting the blankets into stiff tarpaulins and the company were loathe to supply new ones. It was generally felt that the company were not good employers and that McKendrick was too heavy-handed and undiplomatic. In one incident the blacksmith was found to have some horseshoe nails in his pocket whilst returning to Talybont and was not only dismissed on the spot but also summoned before the magistrates for theft with his two colleagues, an action that was hardly conducive to good labour relations. (Cambrian news 6.2.1914)

In June 1914 there was a fatality in driving the shallow adit west. Three men had drilled and charged a round, lit the fuses and retired to their place of safety to wait for the blast. Some twenty minutes later the shot had not fired and the older man decided to try and pull the fuses out of the holes despite the pleas of his apprentices to wait a little longer. One of the charges detonated as the fuse was being withdrawn, the man being killed instantly and his comrades badly injured (Cambrian news 2.6.1914). Apparently this was the only serious accident that ever occurred here.

Early in 1914 the working week was reduced from 5½ to 4 days and the number of employees reduced to 21 men. Even working the shorter hours the men were still able to earn an above average wage for the district. The minimum wage was 3 shillings and 4 pence a day and the best rate was twice that figure. The clerk received £7 a month and the assistant underground manager £108 a year.



**Figure 6.** View of Mine Buildings c.1920

**Photo:** Courtesy of National Library of Wales.

The closure of the mine in April 1914, appears to represent the start of the winding up of the Scottish Cardigan Lead Mines. They had also opened up the Llywernog Mine but work here was suspended sometime prior to this date.

During the summer, the Bwlchglas mine was given an extensive refit, despite not having made a profit to date. The old Worthington pump was replaced with an electric pump and the winding engine for the elevator shaft was renewed along with the wooden headframe. When work

resumed in September 1914 it was under the same control but now reformed into the Cardiganshire Mining Co. Ltd.

During 1915 the mine worked well and raised 506 tons of lead concentrates for which they were paid about £5,000. In March 1916, most of the men were laid off with the exception of Sam Leeke acting as foreman to four miners. Sam had performed a number of duties around the mine for several years and was something of a character. When the Scottish Cardigan Company purchased a traction engine to haul coal and concentrates Sam was confident that he could drive it. When the engine arrived by train at Llandre station a large crowd gathered as Sam stoked the boiler confidently but when the time arrived to depart he promptly drove it over the edge of the platform causing considerable damage. It later emerged that Sam had no previous experience. It was soon repaired and Sam drove the engine for some years before it was sold off (C. Evans *priv. comm.*).

The burly miners frequently competed with each other to see who could lift the heaviest barrow and push it a measured distance and Sam frequently adjudicated in these events. On one occasion, about eight hundredweights of galena were loaded into a barrow and pushed for about five yards before the man gave up, an even larger opponent ordered that more be loaded on before he tried whereupon he promptly jerked the barrow to waist level completely detaching both handles.

The last entry in the wages book is dated the week ending 26th March, 1921, and shows that the four men received between ten shillings and four pence and eight shillings and two pence per day. Apparently, Sam Leeke continued at the mine on his own until about 1923 when the site was abandoned. Passers-by tried to close doors to keep the sheep out and even nailed down the loose corrugated iron sheets whilst young lads took delight in starting the engines and raiding the magazine. Ladders, barrows and useful tools were commandeered for agricultural purposes and in 1934 the remains were sold to Thomas Ward's for scrap.

Ward's moved part of the plant to their Lorenden Mine at Penrhyngerwyn which worked until 1939 when it prematurely closed due to a shaft fire.

By 1935, everything of value had been stripped out of Bwlchglas, the remains of the pumping wheel were sold to Lerry Mills and the bosses now lie at Llywernog, the axle in Talybont, although the shroud pieces appear to have been scrapped. Ward's left behind a few rails, the subsurface parts of the elevator frame, and the headframe over the winze with a kibble nearby. The most impressive remains are undoubtedly those of the headframe and cages over the Engine Shaft, the cables being cut in 1935 and the cages left supported by pieces of rail. The whole of the drawing machine and the diesel engine were removed at this time.

Apart from the headframe, Bwlchglas is also well known as a mineral locality since the 1970's. The occurrence of pyromorphite was first noted during the driving of the shallow adit west of the Western Shaft in 1912. Such a substantial quantity was found that McKendrick sent a telegram to Glasgow to enquire what he should do with it - "sell it if possible" was the reply received by return. It does not appear that any "green lead ore" was produced as a concentrate but insufficiently detailed returns exist to be able to totally dismiss the possibility. A pipe of good mineral was left

untouched at the western end of the drift in the back of the adit and supplied many fine samples to collectors for several years before it was stripped out in a matter of a month by a commercial mineral dealer. Maybe 10 tons of samples were extracted from this pipe before the project was abandoned as having been worked out. It is quite difficult to find a collectable sample of pyromorphite at Bwlchglas today, the pipe is very unlikely to be unique but it could be difficult to locate another without great expense.

There is little doubt that the "Pyromorphite Stope" was far more lucrative than the rest of the mine and with the present buoyancy of the zinc market it is possible that there may be sufficient reserves to exploit the zinc blende which was seen to predominate at depth. The geology is favourable for a larger deposit than was delineated and recent work has shown geophysical and geochemical anomalies along the strike of the lodes on either side of the mine.

## REFERENCES

- BURT, R. (1984) *The British Lead Mining Industry*. Dyllanson Truran, Redruth p.57, 62, 87.
- BURT R. (1985) *The Mines of Cardiganshire, Mineral Statistics 1845 - 1913*. Dep of Economic History, University of Exeter.

DAVIES, W. (1815) *The Agriculture of South Wales*.

FRANCIS, A. (1874) *A History of the Cardiganshire Mines*. Published by Author. (Facsimile reprint No 14 (1987) H. Bird).

HUGHES, S.J.S. (*in press*), *The Darren Mines*. Northern Mines Research Society.

JONES, O.T. (1922) Lead and Zinc. The Mining District of North Cardiganshire and West Montgomeryshire. *Memoirs of the Geological Survey of Great Britain*. Vol. 20.

SPARGO, T. (1870) *The Mines of Wales*. Published by author. (Reprinted by Simon Hughes (1975)).

WADE, E.A. (1976) *The Plynlimon and Hafan Tramway*.

## **OTHER SOURCES**

Evans, E. (MS), Diaries of Edward Evans of Lery Stores, Talybont. National Library of Wales, Aberystwyth. MSS. 7866, 7867.

Gogerddan Estate Records, National Library of Wales, Aberystwyth.

S.C.C. Records, Scottish Cardigan Company. National Library of Wales, Aberystwyth.

REPORT  
OF  
MR. EDMUND SPARGO,  
CONSULTING, CIVIL & MINING ENGINEER,  
UPON  
THE BWLCHGLAS LEAD MINES.

---

MINERAL ESTATE OFFICES,

LIVERPOOL, 13th March, 1889.

To

EDWARD EVANS, Esq.

TALYBONT, NORTH WALES.

DEAR SIR,

**Complying with your request** I visited and carefully examined (on the 7th inst.) your Mineral Concession, known as Bwlchglas, situated about four miles south-east of the village of Talybont, between six and seven miles from Llanfihangel Station on the Cambrian Railway, and about 10 miles from Aberystwith.

**The conditions of tenure** are of the usual kind, subject to the payment of a royalty of 1/16th, which is about the average of the more favourable leases now being granted for metalliferous mining purposes in North Wales.

**The concession**, I understand, embraces the mineral rights over 364 acres. This is an unusually large area to be comprised in *one grant*.

**The Lease** is subject to the payment of a minimum rent (merging into royalty) of £50 per annum.



**The property appears** to have been entirely virgin ground previous to the commencement of the explorations lately made by you thereon.

**In order** to make my observations as comprehensive as possible, I have roughed out the annexed plan and sectional sketches, to which I will briefly refer, as I proceed to describe the general merits of this property, and its eligibility as a mining speculation.

**The property** is approached from Talybont over a fairly good road, although the gradients in several parts (as might be expected in such a mountainous district) are rather precipitous; this inconvenience, however, does not apply to the same extent in going from the Mines to the village just mentioned, nor to the Railway Station.

**The Western extremity of this concession** is entered immediately after leaving the *Tynewydd Mine*, and the out-crop of the great or champion lode of the district at once presents itself in a bold projection as per sectional sketch **EF**. This lode is composed of veins of quartzose, calcareous spar, with bands of elvanite and highly metamorphic schist, some of the cavities (Vughs) are most interestingly lined with quartz crystals, many of which have a white translucent lustre, while others are opaque, smokey and horse flesh color, but all occasionally displaying beautiful prisms, terminating in the most minute six-sided pyramids.

**At S** there is a vein of highly ferruginous and more or less friable quartz from 10 to 12 inches wide, in which occasional sprinklings of blende and galena may be seen.

**The general make** up of this lode is very interesting, and constitutes an assemblage of favorable indications so near the surface, such as is but seldom met with in such a large Quartzite lode.

**This great lode**, judging from the numerous outcrops observable in various parts of this sett, I have no doubt pervade its entire length, as delineated in the ground plan, and I think should be considered an element of the first importance in connection with the development of the property. It is, at all events, worthy of a vigorous trial, even if no other lode were known to exist, as I understand it has proved very productive of *lead* and *blende* in many other Mines in this district, but apart from its individual productiveness, it is highly prized on account of the favourable influence it is known to exercise on all veins found in its vicinity, a more striking confirmation of this can hardly be found than in this very property, about three quarters of a mile further east (where what appears to be) a parallel lode has been intersected.

**This latter lode**, so far as the limited and shallow workings and tests have gone to demonstrate, show a similar longitudinal bearing, but an opposite dip or inclination to that of the district main lode just referred to (see plans), which appears to vary in width from 3 to 12 or 15 inches, and on which several test openings have been made.

**At the eastern trail at I** (see section **C to D**) an open cut for a few yards has been made, and a shallow level driven on the course of the lode for 7 or 8 yards further. The lode at this point will, I estimate, yield from 12 to 15 Cwt. of 75% to 80% of lead per lineal fathom. A little lower down the side of the mountain, eastward, an oblique running lode has been intersected, but the trials on it have not sufficiently demonstrated whether this is a distinct lode, or Evans' lode thrown in that direction by a break in the embedding strata. I am, however, inclined to think that it will be found to be a separate lode, if so, the points of junction which must be met with in the longitudinal and vertical development of the lodes already discovered in this part of the sett are likely to yield important deposits of galena, and, with this highly probable fact in view, the locations of these intersections should be carefully ascertained, at all events, as near as possible.

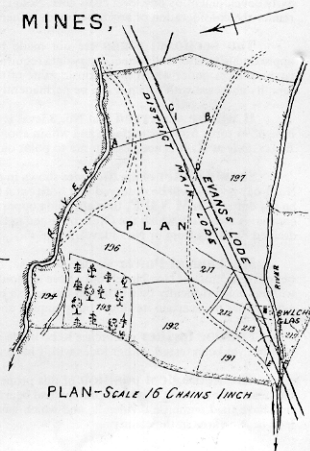
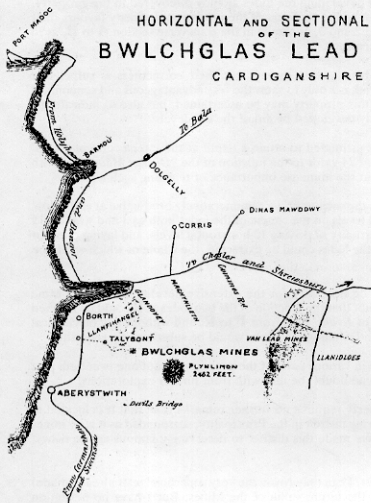
**I should remark** that there are numerous other out-crops of quartz strings (most of which show lead or blende) in this part of the property, all of which looked upon as the Cornish term them as droppers or feeders to the main lodes, have their significance.

**All these out-crops** are observable at the most elevated parts of the property, and their development, at considerable depths, may be easily accomplished by day levels.

**On proceeding westward** from the shallow level **I**, along the course of the lode towards **D**, there is a depression in the ground, which is completely covered with heather and apparently an extra depth of soil, no tests have yet been made along this hollow, nor until the raising ground at **G** is reached at a distance west of **C** of about 160 yards; here, however an open trench commencing at **G** and continued on the back of the lode for about 18 yards to **D** has been made, and all along this trench lead is shown in highly remunerative quantities and in places there are leaders of solid galena from 10 inches to a foot in thickness, and will I estimate turn out from 2 to 3 tons of 75% to 80% Ore per lineal fathom. I broke a sample of lead from the lode here (about 8 lbs. in weight), a portion of which I submitted (for assay) to Mr. Norman Tate, with the highly satisfactory result quoted on the annexed Copy of Certificate.

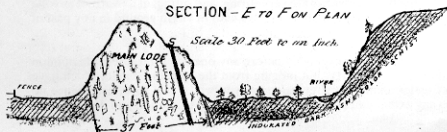
**The more superficial** trials have now been suspended and the No. 1 day level commenced as indicated in the transverse sectional plan **A to B**.

HORIZONTAL AND SECTIONAL PLANS  
OF THE  
**BWLCHGLAS LEAD MINES,**  
CARDIGANSHIRE



PLAN-SCALE 16 CHAINS 1/4 INCH

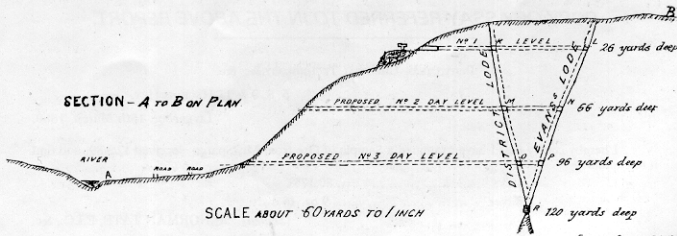
SECTION - E TO F ON PLAN



SECTION - C TO D ON PLAN



SECTION - A TO B ON PLAN



**In regard** to the most desirable mode of developing the lodes already discovered in this property, there can hardly, it seems to me, be two opinions, as the contours of the ground so distinctly favours their early development by day level cross cuts, Nos. 1, 2 and 3, as shown in the transverse section **A** to **B**, as to render the consideration of any other mode unnecessary.

**The sectional plans** are not made from actual survey, but their correctness is sufficiently approximate to afford all the necessary data required, not only to show the very advantageous and economical circumstances under which the intrinsic value of this property may be ascertained, but also to indicate the rapidity and ease with which it can be permanently developed by aid of the day levels.

**It will be observed** that No. 3 level is estimated to attain a depth at the intersection of *Evans'* lode of 96 yards from the surface, and within about 24 yards to the junction of the "District Main lode" with *Evans' lode* at **R**. It is needless for me to point out the immense importance of reaching such a point.

**Should either** of the two lodes shown in the section prove remuneratively productive at and below No. 1 day level, it will be observed that horizontal levels on the course of the lodes both east and west could be put out at **K L M N O P**, thus affording opportunity of driving 12 horizontal levels, and laying open an enormous area from which the Ores contained in the lodes could be extracted, the whole of which would be drained by the bottom or No. 3 level.

**Mechanical Power** would, of course, be necessary for the extensive development of the Mine below the bottom of No. 3 level, but I have no doubt that the junction of the two lodes at **R** could be reached without much difficulty by sinking on the course of *Evans'* lode from **P** to **R**, and without any mechanical aid in order to ascertain its value, but pumping and winding machines would be subsequently requisite.

**I advise further** researches to be made in various parts of the property, as not one twentieth part of it has yet been tested. Other lodes will, I have no doubt, be met with from further explorations.

**The geological position** of this property requires no further remarks than that it is located in the heart of the richest and most prolific lead bearing district in the Principality, surrounded as it is by mines that have paid immense dividends, and which have made this district so deservedly famous as the richest lead bearing area in the county.

**Notwithstanding** the present discoveries, I can only (from the very superficial tests already made) speak prospectively as to their permanency and the future value of the Mines. But I have no hesitation whatever in saying that the assurances for further discoveries are very strong, and sufficient to warrant anyone saying that a more promising mining speculation is not likely to be met with in virgin ground in any part of the Principality.

**About £1500 to £2000** will require to be expended before any one can offer a reliable opinion as to the permanent and intrinsic value of the property, but judging from the splendid results which have been so often obtained in the district under analogous circumstances, you will, I feel sure, experience no difficulty in obtaining co-operation to any extent you may desire in the further exploration and development of the property.

Yours faithfully,

EDMUND SPARGO, C. & M.E.

---

### COPY OF ASSAY REFERRED TO IN THE ABOVE REPORT.

---

INSTITUTE OF CHEMICAL TECHNOLOGY, &c. &c.

5, 8, 9 & 11 HACKINS HEY,

LIVERPOOL. 15th March, 1889.

I hereby certify that I have examined a Sample of Ore from Mr. Spargo, received 12/3/89, and find it to contain —

Lead ... .. 80.12%

Silver ... .. 9 oz. 16 dwts.

(Signed) A. NORMAN TATE, F.I.C., &c.