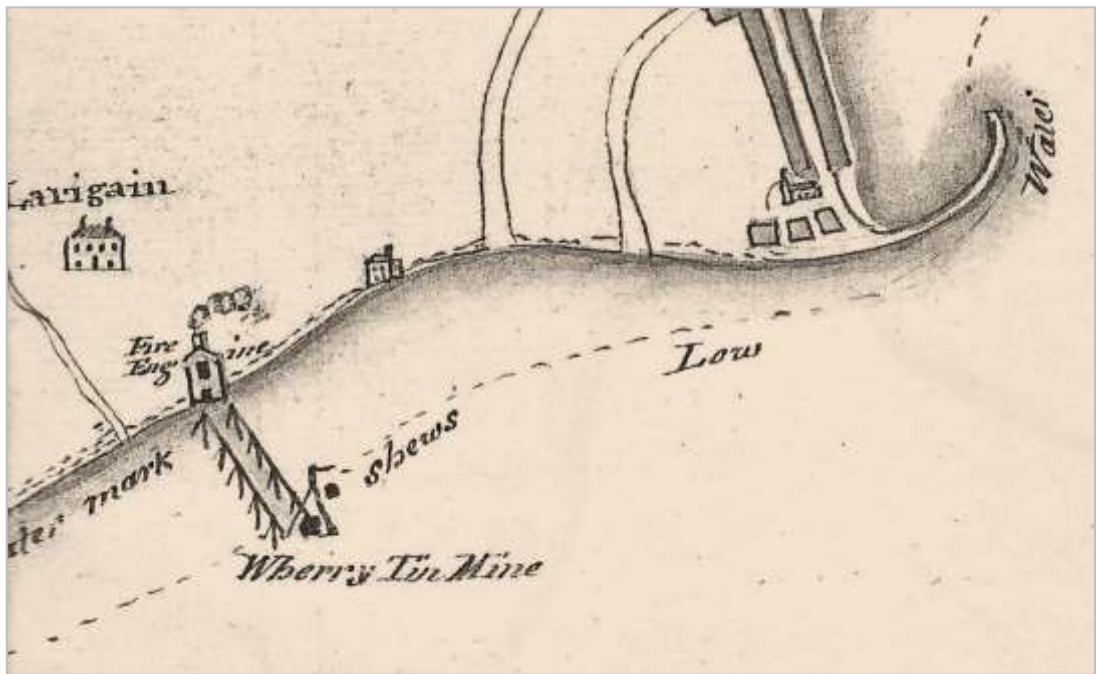


# THE WHERRY MINE

## PENZANCE

Survey 2018-2022



Project Report

Kevin Camidge

# The Wherry Mine Survey

## Project Report

2022

With special thanks to

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The CISMAS Wherry Survey Team

Also thanks to

Ted Mole, Peter Joseph, Bob le Marchant & Brian Spratley

Who gave much valuable advice and encouragement

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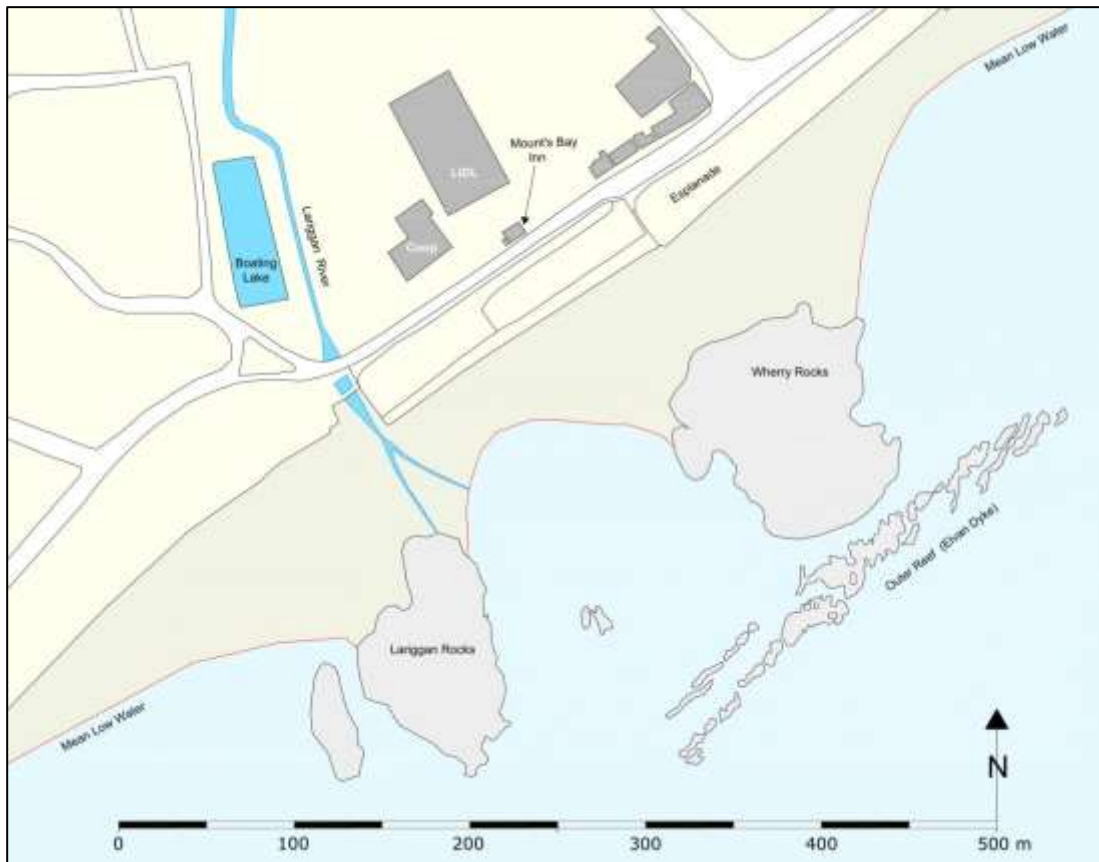


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**Cover:** Detail from an early map of Penzance showing the first Wherry Mine. A photograph of a small part of the map was sent to me by Dr Jo Mattingly – apparently found at the CRO. There is no reference number and despite several searches the map cannot be found at the CRO. A bottle of single malt to anyone who can tell me the whereabouts of this map.

## Wherrytown and the Mine in the Sea



**Fig 1** A map of the Wherrytown district of Penzance (2020)

The Wherry Mine was situated in the intertidal zone at what is now known as Wherrytown, which lies on the western edge of Penzance. Wherrytown itself did not exist until after the Wherry Mine was abandoned, and is said to have been built from some of the old mine buildings. It was at various times home to a public baths, drill hall, steam flour and saw mills, a serpentine works and the Western National bus depot as well as numerous private dwellings. Most of these were demolished after the Ash Wednesday storm of 1962. The sole survivor of the old Wherrytown buildings is the former Mount's Bay Inn which still stands, but is sadly no longer a public house.



**Fig 2**

The only surviving building from the old Wherrytown, the former Mount's Bay Inn – latterly a curry house, which has now been closed for several years

## A Brief History of the Wherry Mine, Penzance



**Fig 3** The Wherry Rocks as seen from the promenade opposite Lidl – the arrows indicate the outer reef

The Wherry Mine was arguably one of the most unusual mines in Cornwall and was certainly an early tourist attraction. The mineshaft was situated in the sea on the western edge of the Wherry Rocks, Penzance. A long rocky reef is exposed at low tide some 200m from the shore (arrowed above), and this is apparently the source of rich tin and other mineral deposits. Local knowledge (including newspaper accounts) often wrongly asserts that the old Wherry Mine was situated on the more prominent Lariggan Rocks; and indeed the two sets of rocks are often confused.

Folklore says that this reef was exploited at low tide from the beginning of the 18<sup>th</sup> century. A number of seemingly man-made pits are apparent in this reef today and probably represent low tide mining activity. We know that bounds for the Wherry Mine existed in 1762 because a part share was used as security of a mortgage in that year. We are told that in 1778 a miner called Thomas Curtis instigated a more determined effort at the Wherry. This involved a shaft sunk on the intertidal reef, protected by a tall chimney-like wooden structure joined to the shaft on the seabed and extending above the high tide level where a winch platform was built above it. Accounts also say that the inside of this caisson was only 2 foot 1 inch square. Miners and visitors were winched down the length of the caisson or chimney into the more capacious rock-cut shaft proper, where descent was by the more normal system of ladders. Once the caisson was in place and sealed, mining could be pursued at all states of the tide – in fact one visitor to the mine informs us that the work continued around the clock in the summer, but did not take place in the winter.

Around 1793 a bridge, apparently over 200m long, was constructed from the shore to the caisson. An engine house and steam engine were built on shore to operate the pumps in the shaft, the power being transmitted by flat rods carried on the bridge. Prior to the steam engine the pumps were operated manually by the miners on the winch platform above the caisson, and access to this was by boat from the shore. The mine was said to be very rich and is reputed to have made large sums of money for its investors. In 1795 there were 90 men employed in the mine, working in shifts day and night. In January 1796 the mine had reached a depth of about 20 fathoms (36m) when a storm destroyed the caisson and flooded the mine. An exceptional storm on 23<sup>rd</sup> January 1796 severely damaged the harbour quay as well as stranding two ships which were 'removed' from the harbour by the storm (Oxford Journal 06.02.1796).

To remedy the situation 'New Shaft' was started about 80m nearer to the shore. The plan, it would seem, was to sink the new shaft to a depth of '24 fathoms' (43m) then to drive a level out to the lode at a point below the old flooded workings (see fig 19). We do not know whether this attempt met with any success; what we do know is that two years later in 1798 the mine ceased working. There are two, quite different tales explaining the closure of the mine. The first and by far the most romantic, is that an American ship broke from its moorings in a storm and collided with the caisson and bridge destroying the mine. A more mundane tale is preserved in a local guide book (Thomas 1820) which tells us that the mine was abandoned in 1798 because of storm damage and the declining state of the lode. A visitor in 1808 tells us that the mine was in ruins, with only the 'skeletons' of the machinery remaining.

In 1823 an advertisement appeared in the *West Briton* newspaper offering shares in the New Wherry Mine. Little seems to have come of this – but interestingly potential investors were to apply to Messrs Curtis & Gundry of Penzance. In 1836 a new company was set up to work the Wherry Mine again. A new engine house, steam engine and bridge were constructed. Once again, a waterproof caisson was constructed in the intertidal zone – possibly on the site of the New Shaft begun in 1796. This mine did not last long and in around 1838 - after £9600 had been 'called up' from the hapless investors - it was once more stopped (Barton 1967, p81). It is worth noting that the £9600 spent by the investors would be worth over one million pounds in today's money. In 1840 the engine house was dismantled and the machinery and pitwork of the mine were auctioned off. We know very little about this reworking of the mine – there are no contemporary eyewitness accounts – and we do not know if any tin was mined at all.

Some tin was apparently recovered from the Wherry in 1859, but this was possibly by working the offshore reef at low water. In 1922 two Trinity House pilots, Mr Adam & Mr Kitchen reported finding timber and steel wire in the sea '*when about half a mile from shore*'. They attributed these remains to the Wherry Mine. However, steel wire was not in use in Cornish mines until after 1860<sup>1</sup> – so if this was in fact steel wire then it was possibly not from the Wherry Mine. The report also states that the remains were '*directly in line with the Larrigan (sic) rocks*', the Lariggan Rocks is not where the original Wherry Mine was situated, although the misconception is widely held.

Finally, in 1967 ARC Ltd erected scaffolding on the beach and undertook diamond drill prospecting on the site. There were apparently scaffolds on the Wherry and Lariggan Rocks, standing about 190m apart. Little is known about the results of this work, and there are even tales of miners from South Crofty sinking a shaft in the old Western National Bus Depot (more recently the site of the old Lidl), which seemingly came to nothing.

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<sup>1</sup> Wire ropes were invented in Germany in 1830. The first known use in Cornwall was at United Mines in 1844, but they were found unsatisfactory. They were adopted in Cornish mines around 1860 (Barton, 1966, p195)

## The Wherry Rocks



**Low Spring Tide**

Water 0.6m above chart datum



**Low Tide**

Water 1m above chart datum



**Quarter Tide Neaps**

Water 1.25m above chart datum



**Toward Mid Tide Neaps**

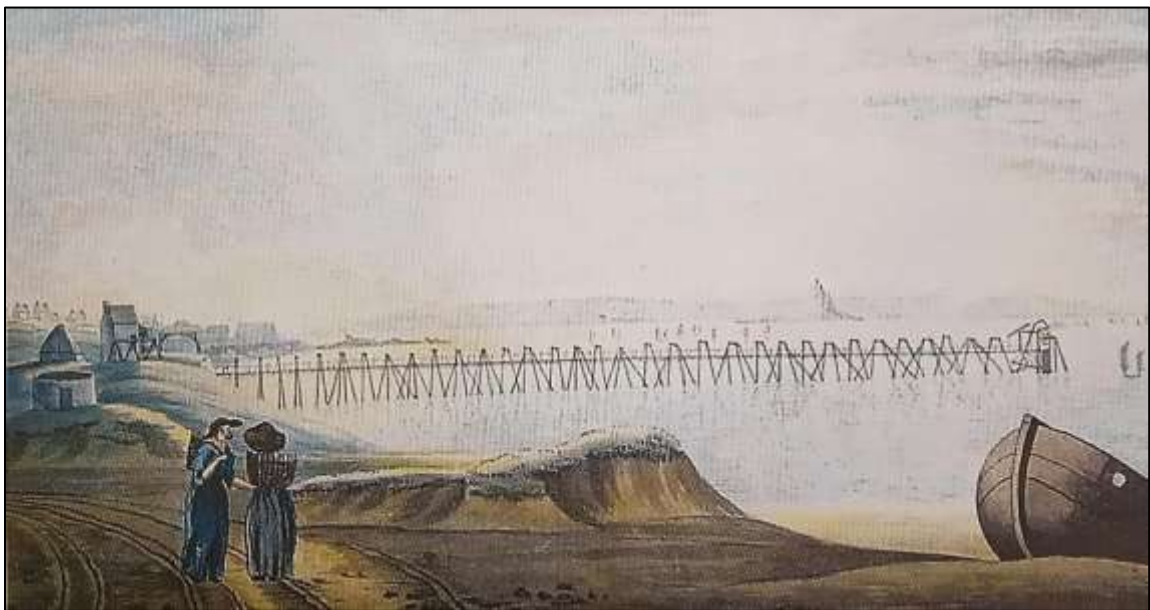
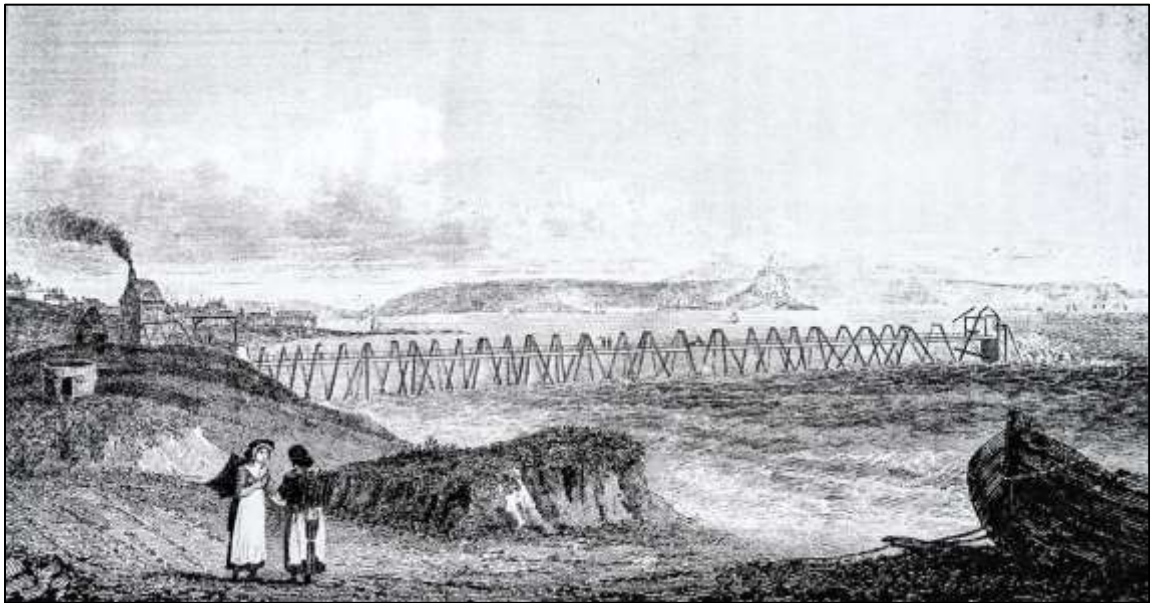
Water 2.1m above chart datum

**Fig 4** The Wherry Rocks at various states of the tide as seen from the promenade (2018)

The modern mean tidal range at Wherrytown is 4.8m (0.8-5.6m) on spring tides and 2.4m (2.0-4.4m) on neap tides. Most of the site is only exposed for about two hours at spring lows and not at all on neap tides. It should be borne in mind that sea level was lower in the 18<sup>th</sup> century: at least 0.35m lower in around 1778 when Old Shaft was sunk on the reef than it is today. A Mr J White writing in 1905 (Cornishman 30.01.1905) tells us that *'At the time of the mine's working there was beautiful sand and gravel on the shore, and the water was not nearly so deep near Wherry mine then as it is now'*.



## Illustrations of the Wherry Mine



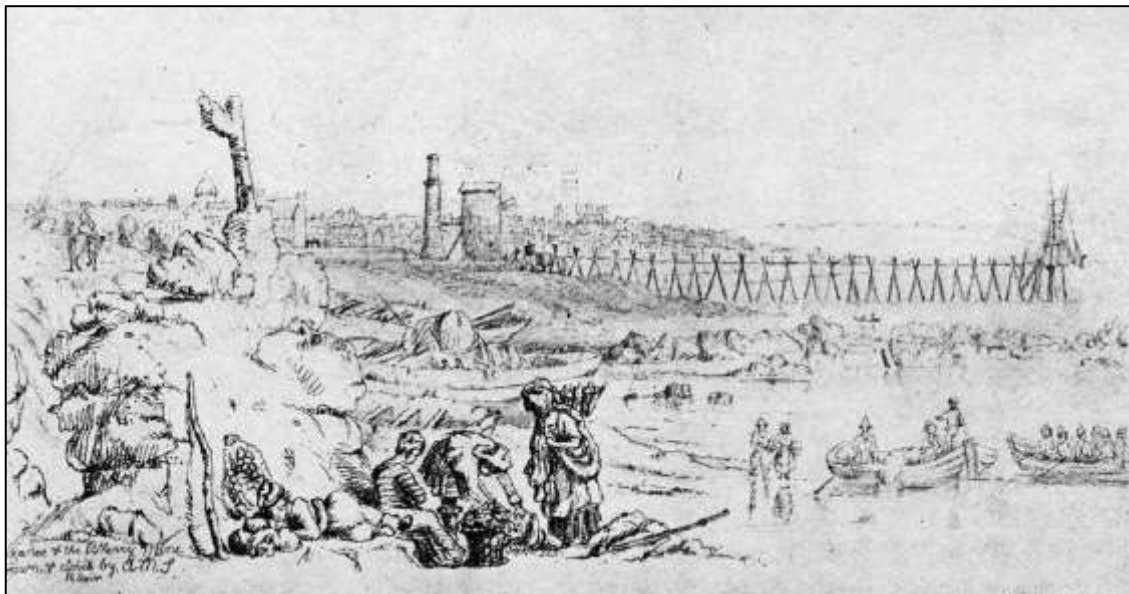
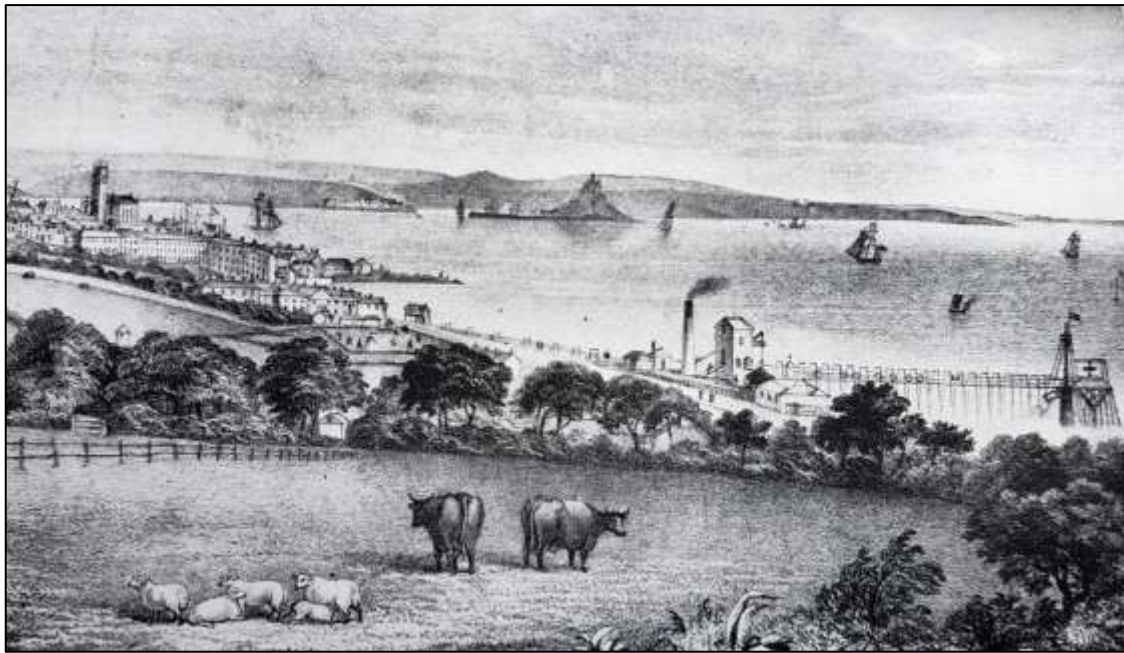
**Fig 5**

Drawings of the original Wherry Mine as it appeared around 1795

Above: A drawing showing the Wherry Mine sometime between 1793 when the first steam engine was installed, and 1796 when Old Shaft was damaged in a storm and abandoned. The engine house appears to be constructed largely of wood (Hawkins, 1818)

Below: A coloured print probably based on the Hawkins 1818 illustration or a common progenitor. There was a brisk trade in local prints in the late 18<sup>th</sup> and 19<sup>th</sup> centuries. There is considerably less detail in this illustration when compared with the Hawkins drawing above (print in private hands)





**Fig 6**

Drawings of the second Wherry Mine 1836-1838

Above: A print of Penzance by James Tonkin, published 'about 1838' according to Courtney (Courtney, 1845, p. 52). The engine house appears to be constructed of stone and has a freestanding chimney. The bridge out to the shaft appears shorter than in the older illustration above. The print is captioned 'The Wherry Mine, Lariggan Rocks, Penzance' (Russell, 1949, p. XXVII)

Below: An etching by Anne Scobell thought to be about 1836-1840. Note that the trestles forming the bridge supports are different from those shown in the Tonkin print and there appears to be no walkway. The rocks shown running left to right in front of the trestles are possibly the Lariggan Rocks. (Russell, 1949, p. XXVIII)

## Some Curious Aspects of the Wherry Mine

We have not attempted to retell the history of the Wherry Mine in detail. This has already been done - a comprehensive account, *So Very Foolish* by Peter Joseph, is available from the Trevithick Society. What follows is a discussion of a few of the more intriguing aspects of the mine's history.

### Thomas Curtis, the Man Who Died Twice

We are told that the first attempts to work the Wherry Mine occurred at the beginning of the 18<sup>th</sup> century. The offshore reef (or elvan dyke) is only exposed at low tide so work could only be undertaken for short periods of time – the workings having to be bailed out before mining could commence.

*How long they persevered in this difficult enterprise, and what were the mechanical aids of which they availed themselves, is not known; but the works after being sunk to the depth of a very few fathoms in the rock, were finally abandoned (Hawkins, 1818, p. 136).*

The earliest surviving eyewitness account of the Wherry Mine was written by John Hawkins who visited in 1790 or 1791. He writes that the mine was restarted by a 'poor miner' from Breage called Thomas Curtis. He apparently protected his workings with a wooden turret extending from the seabed to above the high tide level. This was then made waterproof using various methods including 'fat mortar' and stonework. The impression given by John Hawkins, the sole progenitor of the tale of Thomas Curtis, is that he undertook this task single-handed over the course of three summers.

*About the year 1778, a poor miner of the parish of Breage, whose name was Thomas Curtis, had the boldness to renew the attempt...Three summers were consumed in sinking the pump shaft, a work of mere bodily labour (Hawkins, 1818, p. 137).*

Mr Hawkins further enhances this accomplishment by stressing Thomas Curtis's limited means; not only is he a 'poor miner' but his worldly worth is quantified as 'not worth 50 crowns' or 'not 10 pounds'. The two amounts differ by 10 crowns and are given in articles published by Hawkins in 1807 and 1818 respectively. John Hawkins was a wealthy man so his idea of poor is probably relative – ten pounds in 1790 would be worth in excess of £1800 in today's money.<sup>2</sup>

It is clear that the tale of Thomas Curtis originates solely from the later paper published by Hawkins in 1818 – long after the mine closed in 1798. In his earlier paper, published in 1807, Hawkins does not name Curtis, who is presented as 'a poor miner in the neighbourhood'. He is first named, and his origin from the parish of Breage only appears, in the 1818 version. Interestingly, Curtis is not mentioned by any of the other writers who visited the first mine (UBD and Maton in 1794, Manners in 1795, Hatchett in 1794 and 1796, De Luc in 1806, Warner in 1808 and Stockdale around 1824). The endless repetition of the 'poor miner from Breage' only occurs in accounts written after 1818 when the authors had read the Hawkins account (Watson 1843, Hunt 1884, Newton 1930, Russell 1949 & Shambrook 1982).

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<sup>2</sup> Bank of England Inflation calculator

There is a further interesting discrepancy between the two different Hawkins versions. In 1807, he reported that:

*The extraordinary man who conceived and executed the work...died in the winter of 1791 aged 70 years* (Hawkins, 1807, p. 864).

The later account, in which Curtis is referred to by name, does not mention his death at all. In fact this account includes an alleged conversation between Hawkins and Curtis concerning the Wolf Rock lighthouse. If Thomas Curtis did die in 1791 it would explain why he is not mentioned by any of the subsequent visitors to the mine. We do however know that one 'Thos Courtis' is listed as an adventurer in the Wherry Mine in or after 1791 (Boulton & Watt, c1792) – (this is an undated document but the paper is watermarked 1791). The plot thickens, when in 1823 an advertisement appears in the West Briton newspaper advertising shares in the 'New Wherry Mine', and investors are asked to apply to Messrs Curtis and Gundry in Penzance. This particular project does not seem to have got off the ground, but clearly a Mr Curtis was involved in attempts to restart the Wherry Mine. Finally, we have an obituary notice in the West Briton of 14<sup>th</sup> November 1828:

*Died at Penzance on Tuesday, Mr Thomas Curties, aged 76 years. Several years since, when a labouring miner, he obtained a large sum of money by taking pitches at Wherry mine, which ran under the sea, but the working of which has since been discontinued* (West Briton, 13.9.1828).

Clearly this is not the same Thomas Curtis who died in 1791, unless reports of his demise were greatly exaggerated. A slightly different take on the tale to that related by Hawkins and repeated *ad nauseam* in later accounts is given by Mr John Thomas, a Penzance bookseller and printer, in his guidebook to the area published in 1820:

*The adventurers of this mine were induced to sink a shaft in this place, through the representations of an old miner..., who predicted the acquisition of much riches, which were actually found* (Thomas, 1820, p. 46).

This certainly seems more plausible. The construction of a caisson and winch platform over an inter-tidal shaft would have been a costly enterprise requiring the efforts of a team of miners to handle the substantial timbers and operate the pumps. This would probably have been funded by the usual Cornish practice of raising money from adventurers, and we know that there were 16 of these in 1791 when Boulton & Watt compiled their list of adventurers. It is interesting to speculate whether Curtis was in fact the mine captain as well as being an investor (adventurer) in the mine. In 1922 the editor of the Cornishman newspaper wrote the following:

*The Wherry Mine was worked at the end of the eighteenth century by Capt. Thomas Curtis, a miner, who lived at Buriton-row, Penzance* (Cornishman, 22.11.1922 p. 5).

A letter of 1792 also confirms a Mr Curtis was in a position of authority at the Wherry mine.<sup>3</sup>

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<sup>3</sup> Letter Vivian to Wilson 1.11.1792 (KK AD1583/5/61)

## The Genealogical Evidence

There is a record of a Thomas Curtis being buried at Germoe (near Breage) in 1791 at the age of 66. This is also probably the Thomas Curtis who married Elizabeth Varker at Breage in 1750. They had six children, including Thomas Curtis, who was baptised at Breage in 1753. This is likely to be the same Thomas Courtis who married Catherine Sleep at Breage in 1792 when he was 39 and she was 20. The marriage was witnessed by Joseph Sleep (Catherine's father) and Edmund Simmons (Thomas' brother in law). There are no recorded children of this marriage. Thomas dies at his house in Penzance in 1828 and is also buried at Germoe. His will shows that he was a wealthy man at the time of his death, owning a house in Penzance and two rented-out 'estates' near Breage. The Thomas Curtis who died in 1828 is clearly the same Thomas Curtis featured in the 1828 West Briton obituary, which explicitly connects him with the Wherry Mine and with having made a large sum of money from his labours there. It also seems that the 1791 burial record accords with Hawkins' assertion that Thomas Curtis died in that year. We know there was a Curtis involved with the Wherry in 1792, and this can only be the son. But which of the two was responsible for the starting up of the Wherry Mine around 1778? Curtis senior was 53 that year while Curtis junior would have been 25. So it is plausible that either or both were involved, but after 1791 it can only be Curtis junior at the Wherry.

To summarise, there are several possibilities where Thomas Curtis is concerned:

1. The mine was started in 1778 by Thomas Curtis senior who was buried in Germoe 23.2.1791 aged 66. After his death his son Thomas Curtis junior worked at the Wherry and made a large amount of money 'by taking pitches at the Wherry Mine'.
2. The mine was started by the father and son working together, and continued by Curtis junior after his father's death.
3. The mine was started by Curtis junior in 1778 (he was 25 at the time). Hawkins confused him with his father, perhaps hearing of Curtis senior's death. He later realised his mistake which is why the death of Thomas Curtis senior is not mentioned in Hawkins' later 1818 account.

## The Stuff of Legends – the American Ship

Many of the later accounts of the mine recount the tale of an American ship breaking free from its moorings in Gwavas Lake in a gale, colliding with the caisson and causing the flooding which ended the mine in 1798. No contemporary record of this event has been located. Shipwreck historians and indeed Lloyds of London have all tried in vain to verify this event. However, one source - William Lovett, writing 78 years after the event in 1876 - does put a name to this American vessel:

*Among my earliest recollections was that of being taken in my grandmother's arms to see the illuminations for the short peace of 1803, was that [sic] of seeing a plentiful supply of raisins in the town, occasioned by the wreck of the fig-man — as she was called — the vessel that, I think, knocked down the works of the wherry mine in a storm (Lovett, 1876).*

The difficulty here is that Lovett was not born until 1800, so if the ship struck the mine in 1798 his recollection of raisins five years after the event in around 1803 would seem improbable.

The genesis of the American Ship tale is a little puzzling, De Luc writing in 1811 recounts a tale told to him by Mr Thomson, a clergyman of Penzance, in July 1806 detailing the mine's demise:

*This submarine mine was worked for a long time, and produced a good deal of tin; but some years before I was there, during a violent storm the masts of a vessel, which had been driven from its anchorage, struck the bridge and broke down the exterior edifice. The mine was consequently soon filled with sea-water; but this was not much regretted because ... a vein of cobalt had been met with, and the air of the mine had become unwholesome. (De Luc, 1811, p. 236).*

What is less clear is whether the masts were still attached to the vessel when the incident occurred, and it is also clear that the precise date of the incident was not known, notwithstanding the fact that it had happened – if at all - only a few years previously.

Undoubtedly our old friend John Hawkins - the man who also gave us Thomas Curtis, the 'poor miner from Breage' – is the first to recount the American origin of the ship. Hawkins did not mention any ship in his 1807 account – but recounted the story with relish in his later, 1818 account, possibly having then had chance to read De Luc's piece

*An American vessel broke from its anchorage in Gwavas Lake, and striking against the stage, demolished the machinery, and thus put an end to an adventure, which, both in ingenuity and success, was probably never equalled in any country (Hawkins, 1818, p. 142).*

There is no mention of an American ship earlier than this account. It is also not clear whether the vessel was wrecked or managed to survive the collision. Interestingly, Hawkins does NOT give us the date of the event – which is why I suspect, many later writers are vague about when it happened. Phrases such as 'not many years since' (RCG, 13.9.1834) and 'some years since' (Smith, 1840) are given in lieu of a date. The earliest source I can find for an actual end date for the mine was published in 1809.

*A company of adventurers were induced to sink a shaft in this place, through the representations of an old miner, who foretold the acquisition of great treasure from the richness of the lode, a great quantity of rich tin stuff was found. But the dangerous situation of the shaft, the injurious*

*effects arising from storms and tides, and the partial failure of the lode, induced the adventurers to discontinue their workings in 1798 (Brayley & Britton, 1809, p. 490).*

This is closely paraphrased by John Thomas in his local guidebook of 1820:

*But after some time, the dangerous situation of the shaft, the injuries occasioned by storms and high tides, and the declining state of the lode, induced the adventurers to abandon the workings altogether in 1798 (Thomas, 1820, p. 47).*

The first account which puts the year the mine ended (1798) together with the American Ship is by G.C. Boase, writing in the Cornishman newspaper under the sobriquet 'A Native' in 1884. The first part has clearly been lifted from Hawkins with the date, 1798 nailed onto the end.

*Nor indeed were its treasures exhausted at its close, which was as romantic as its commencement. An American vessel broke from its anchorage in Gwavas lake and, striking against the bridge, demolished the machinery and for a time put an end to the adventure, in the year 1798 (Cornishman, 17.1.1884).*

If all this reads like the stuff of an adventure story, then fact and fiction are indeed combined in the novel 'Deep Down'. Here, R M Ballantyne recounts the whole story of the Wherry Mine and its demise caused by the American Ship – dramatically occurring in a thunder storm, the whole being illuminated by the lightning flashes and witnessed by the local populace from the shore. The only departure from the usual version of the tale is that Ballantyne ends the first mine mundanely, and transfers the American Ship incident to the end of the later 1836-38 mine.

*A storm, the fiercest that had visited them for many years, burst that night on the southern shores of England, and strewed her rocks and sands with wrecks and dead bodies... A vivid flash of lightning revealed the stout timbers of the mine standing bravely in the storm, each beam and chain painted black and sharp against the illuminated sky and the foaming sea... Just then another flash came, and there arose a sharp cry of alarm from the crowd, for a ship was seen driving before the gale close upon the land ... "tis the Yankee ship broken from her anchors in Gwavas Lake" exclaimed a voice. The thunder-peal that followed was succeeded by a crash of rending timber and flying bolts that almost emulated the thunder. Once again the lightning flashed, and for a moment the American vessel was seen driving away before the wind, but no vestige of Wherry Mine remained. The bridge and all connected with it had been completely carried away, and its shattered remnants were engulfed in the foaming sea (Ballantyne, 1869, p. 289).*

This fictional account has led astray more than one subsequent writer. In 1922 the editor of the Cornishman newspaper wrote:

*The mine ceased to be worked about the year 1838, and the structure was eventually destroyed by an American vessel being driven against it during a gale (Cornishman 22.11.1922).*

And just to add to the confusion we have an account first published in 1853 which details the collision of a ship with the mine platform, but seems to imply that this was not the reason the mine was abandoned.



*The Wherry Mine, the shaft ... of which was actually surrounded by the sea at the rising of the tide ... The upper part of the shaft consisted of a caisson, which rose twelve feet above the sea level, and stood in the midst of the mound of rubbish excavated from the mine... A vessel in a storm was once driven against the upper platform, and carried away a portion of it. From great difficulties, and expense of working this singular mine, it was found necessary to abandon it (Besley, 1853, p. 122).*

One possibility worthy of consideration is that the ship incident did not occur at the end of mine in 1798, but during the storm of 1796, when we are told the caisson around the shaft was damaged and the mine flooded. This theory is possibly bolstered by the lack of any precise date for the incident in the earliest accounts. Do we know of any incidents in 1796 involving American ships in the area? We know that an unidentified vessel '*believed to be an American brig*' was wrecked in Mount's Bay near Marazion on the 29<sup>th</sup> January 1796 (Larn & Larn, B, 1995). Sadly, the cargo was salt not raisins, though as the vessel was unidentified she could have been called the 'fig-man', or indeed anything else.

Whilst we cannot be absolutely certain that the end of the Wherry Mine was not occasioned by a collision with an American ship, the evidence against this is compelling. Firstly the event is only recorded in its final form by John Hawkins in 1818, 20 years after the mine closed, and he does not mention it in his earlier (1807) account. Furthermore, the actual date the mine ceased working is only combined with the American Ship story in 1884, when Mr Boase recounts the story of the mine in the local paper. But most compelling of all are perhaps the guide books written by Brayley & Britton in 1809 and later by Thomas in 1820. Thomas was a Penzance bookseller and printer, and his guide makes much of the Wherry Mine – but does not mention the ship. He knows the year the mine was abandoned and gives perfectly credible reasons for this. Such a romantic end would have been known by a Penzance resident, and no doubt featured in his guide book. If the collision occurred at all it probably happened during the storm of January 1796 and as such was not the immediate cause of the mine's closure, which did not take place until more than two years later. So - sadly - we must conclude, in the absence of any contemporary evidence, that the American Ship incident owes more to fiction than fact.

## Fame, Strangers and the Seaside Pier

The Wherry Mine was always a curiosity and source of interest to visitors to the region:

*The peculiar situation of the mine rendered it an object of considerable curiosity, and attracted the attention of all persons who visited this part of the county; but it can now only be contemplated in description, for its shaft is filled up, and the framework nearly annihilated* (Brayley & Britton, 1809, p. 490).

What made the Wherry so different from other Cornish mines was that the entrance to the mine was actually in the sea, connecting to the shore by a wooden bridge or pier. This leaves a large part of the mine's structure situated within the intertidal zone and at considerable risk from storm damage. The inevitable question is why an underground level was not driven out from the shore, especially as the distance involved was fairly small. Other mines, such as Levant and Wheal Cock, operated by tunnelling out under the sea from the shore, so why was the Wherry so different? This had obviously occurred to others at the time. Hawkins reports a letter received from Mr Gilbert sometime after 1792:

*A steam engine is erecting on the green opposite, and they are constructing a wooden bridge from thence to the rock, to serve as a communication till the engine shaft has been sunk sufficiently deep, and a drift worked out to the mine* (Hawkins, 1818, p. 141).

The fact that this never seems to have been completed suggests that driving a level from the shore was rendered impractical by some geological peculiarity, quite probably fissures which allowed water into the level at a rate which could not be dealt with by the pumps.

There are at least a dozen surviving eyewitness accounts of the Wherry Mine, most of which begin with a statement adverting us to the mine's notoriety such as '*the famous Wherry Mine*' (Maton, 1797) and '*the celebrated Wherry Mine*' (Warner, 1809). Several of the visitors headed straight to the mine as soon as they arrived in Penzance – clearly already aware of its existence: '*We were impatient to see the Wherry Mine*' (Maton, 1797) and '*We enquired concerning an extraordinary mine near that place called the Wherry Mine we had heard was under the sea*' (Manners, 1805). But where did this notoriety arise? The first published account of the mine we know of is contained in the Universal British Directory (UBD IV), where the entry for Penzance has a description of the Wherry Mine. The exact publication date of the Penzance section is not clear – the Bodleian Library say volume IV was issued between 1795 and 1798. The mayor listed in UBD for Penzance, John Beard, held the office from November 1794 to November 1795. Consequently, the UBD was not available to any of our first known visitors: Hawkins (1790 or 1791), Maton (1794) or Manners (1795). There was probably an earlier, published account of the Wherry Mine, which was known to these early visitors but sadly it is not known to us. Newspapers are not common at this date so I suspect a piece appeared in some widely circulated magazine such as the Gentleman's Magazine which was published monthly from 1731 to 1922.

We know that at least two of the early visitors to the Wherry paid for the privilege. In 1795 John Henry Manners gave an unspecified amount to the mine captain for his underground visit and Charles Hatchett tells us he paid 2 shillings for his visit in 1796.

While there are numerous eyewitness accounts of the first mine (1778-1798), there do not appear to be any contemporary accounts of the second (1836-1838). The best account of the second mine is that published in the Cornishman newspaper nearly 50 years later by G C Boase:

*About 1836 a company was formed to rework the mine. The mouth of the shaft is situated about a furlong [201m] below high-water mark and consequently, it was necessary to again erect a staging or wooden bridge, to connect the shaft with the engine-house on the shore. The mouth of the shaft was enclosed with a square waterproof boxing, not only to prevent the water entering the mine, but also to permit of the miners going down in all weathers. An engine-house, counting-house, blacksmiths' shop &c were built on the site of the towans as before related. The bridge, about twelve feet wide, ... had on it a horse-tramway for bringing the stone from the pit's mouth ... The connecting rods, working the pumps, ran along the sides of the upright staging. This mine ... became one of the sights of the town, more particularly as permission could be obtained by strangers to walk to the end of the stage to look down the shaft... After some time (and of course much loss of money) she was knacked; I believe in 1838 (Cornishman, 17.1.1884).*

This was printed 46 years after the closing of the second mine and the author G C Boase was seven when the mine restarted, and nine in 1838 when it was 'knacked' – so the measurements quoted are likely to be approximations.

The permission which could be obtained by strangers to walk to the end of the stage was probably not without charge (the term 'strangers' was used for leisure visitors, or tourists as we call them today; even in the middle of the 19<sup>th</sup> century, local guide books still used the term). This is a very early if somewhat unusual example of a seaside pier. The first English seaside pleasure pier was Ryde Pier built in 1814. If the first Wherry Mine pier was similarly used by tourists in the 1790s then could Penzance possibly claim to have had the first seaside pleasure pier?

There is no evidence that any tin was recovered from this second working of the mine, certainly none seems to have been recorded.

*Wherry Mine – First begun about the year 1700. £70,000 worth of ore said to have been raised from here before 1818. A little got in 1859 (Collins, 1912, p. 611).*

Finally, the lure of the site continues down to the present day; on spring low tides the Wherry Rocks often abound with intrepid wellie-clad individuals come to collect mineral samples and investigate the remains of the famous Wherry Mine.

## The CISMAS Survey

CISMAS began survey work at the site of the Wherry Mine in March 2018. Survey is only practical at low spring tides where the tide will fall below 0.8m above chart datum. It is usually possible to undertake survey for about one hour either side of low water – this severely limits what can be achieved, and the survey has already been in progress for two and a half years.

### Old Shaft and the Cast-iron Pipe

A flanged cast-iron pipe stands vertically, partially buried in the seabed on the inshore side of the reef which forms the seaward side of the Wherry Rocks (figs 7 & 9). This pipe spends most of its time underwater, only showing above the surface when the tide is lower than 1m above chart datum. Most writers think this is a rising main and part of the pump column used to drain the original (1778-1796) mine. An iconic picture of the pipe was taken in 1958 with Sir Arthur Russell, who wrote a history of the Wherry Mine published in 1949.



**Fig 7**

Sir Arthur Russell (left) and Dr Claringbull (standing inside the pipe) at the Wherry iron pipe in March 1958 – The photographer would have been standing on the offshore reef (elvan dyke) looking slightly north of west towards Alexandra Terrace (Joseph, 2012)

This was the first relic of the mine we identified on site, in March 2018. It is only exposed at spring low tides, so as it is mostly submerged it is covered in a luxuriant growth of seaweed. Access is made somewhat precarious by the copious, slippery seaweed which covers most of the Wherry Rocks. The pipe is made of cast-iron and was probably manufactured as a 20 inch rising main, in which case it should be 9 feet (2.75m) long; only about 1m is exposed, the rest being buried in the seabed. The upper flange does not have reinforcing fillets – a feature previously noticed on other 18<sup>th</sup> century cast-iron pitwork (for example the Wheel Wreck cargo). Most 19<sup>th</sup> century pitwork has flange reinforcing fillets.



**Fig 8**

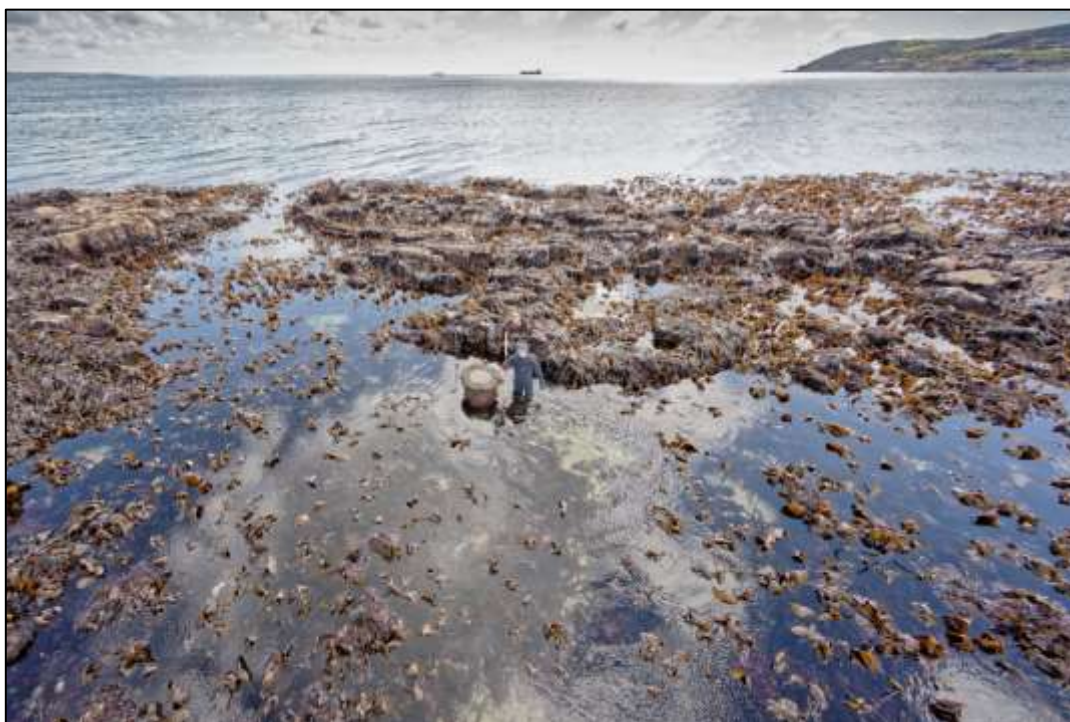
A rising main showing a typical 19<sup>th</sup> century flange with reinforcing fillets (arrowed). This example has been reused as a mooring bollard at Penzance dock

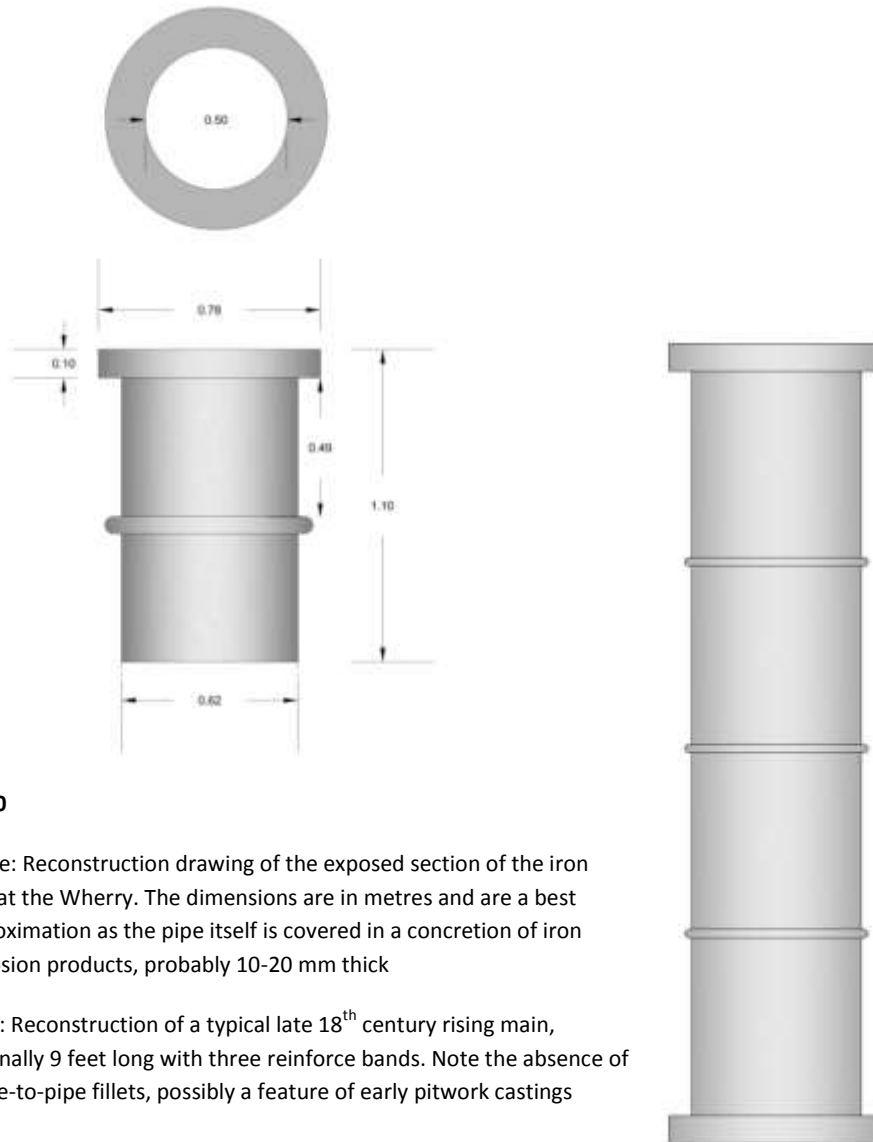


**Fig 9**

Left: The cast-iron pipe, looking towards St Michael's Mount. The flange on the top of the pipe is 0.78m in diameter. This photograph was taken when the tide height was 0.5m above chart datum. Note the band just above the water. This has been identified in the past as a rising main reinforcing band. This photo was taken in January when the seaweed is at its least luxuriant – even so the pipe had to be 'weeded' prior to this photograph

Below: An overhead view showing the iron pipe and behind it, the cut in the rock which may be the site of Old Shaft





**Fig 10**

Above: Reconstruction drawing of the exposed section of the iron pipe at the Wherry. The dimensions are in metres and are a best approximation as the pipe itself is covered in a concretion of iron corrosion products, probably 10-20 mm thick

Right: Reconstruction of a typical late 18<sup>th</sup> century rising main, nominally 9 feet long with three reinforce bands. Note the absence of flange-to-pipe fillets, possibly a feature of early pitwork castings

The 'reinforce' band on the Wherry cast-iron pipe is probably too close to the flange for it to be a typical three-reinforce rising main. The Wherry band also seems a little too thick; it may not be an integral part of the original casting, in which case it could be an attachment. The internal diameter of the pipe is about 0.5m (20 inch), which is one of the largest bores of pump pipe made at the end of the 18<sup>th</sup> century. It may not be part of the pumping system at all – it could instead be one of the eight iron supports reported as supporting the caisson and winch platform. This would also explain why it was not salvaged; it was too firmly embedded in the seabed to remove.

*To support this boarded turret, which was twenty feet high above the rock, and two feet one inch square, against the violence of the surge, eight stout bars of iron were applied in an inclined direction to the sides, four of them below, and four of an extraordinary length and thickness above. A platform of boards was then lashed round the top of the turret, supported by four poles which were firmly connected with these rods. Lastly, upon this platform was fixed a wins for four men (Hawkins, 1818, p. 138).*

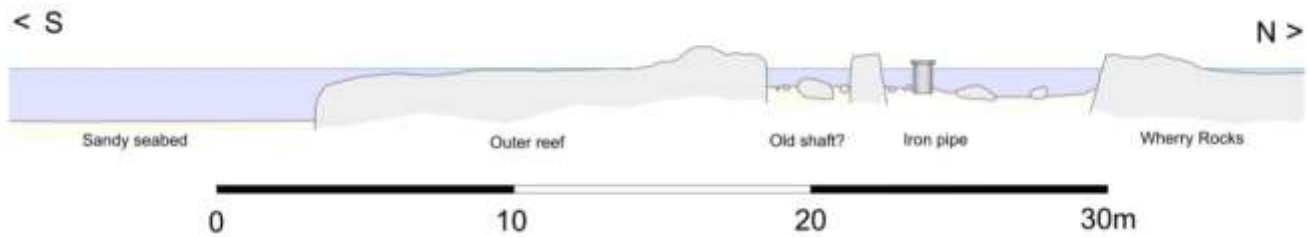




**Fig 11**

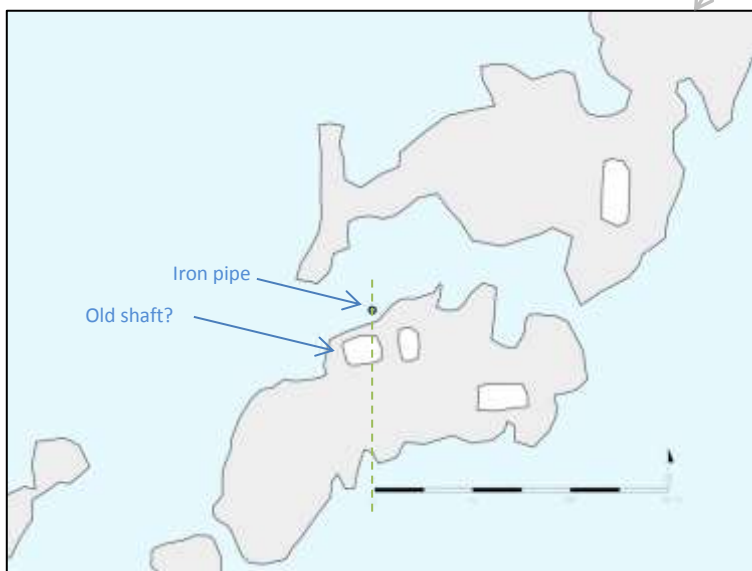
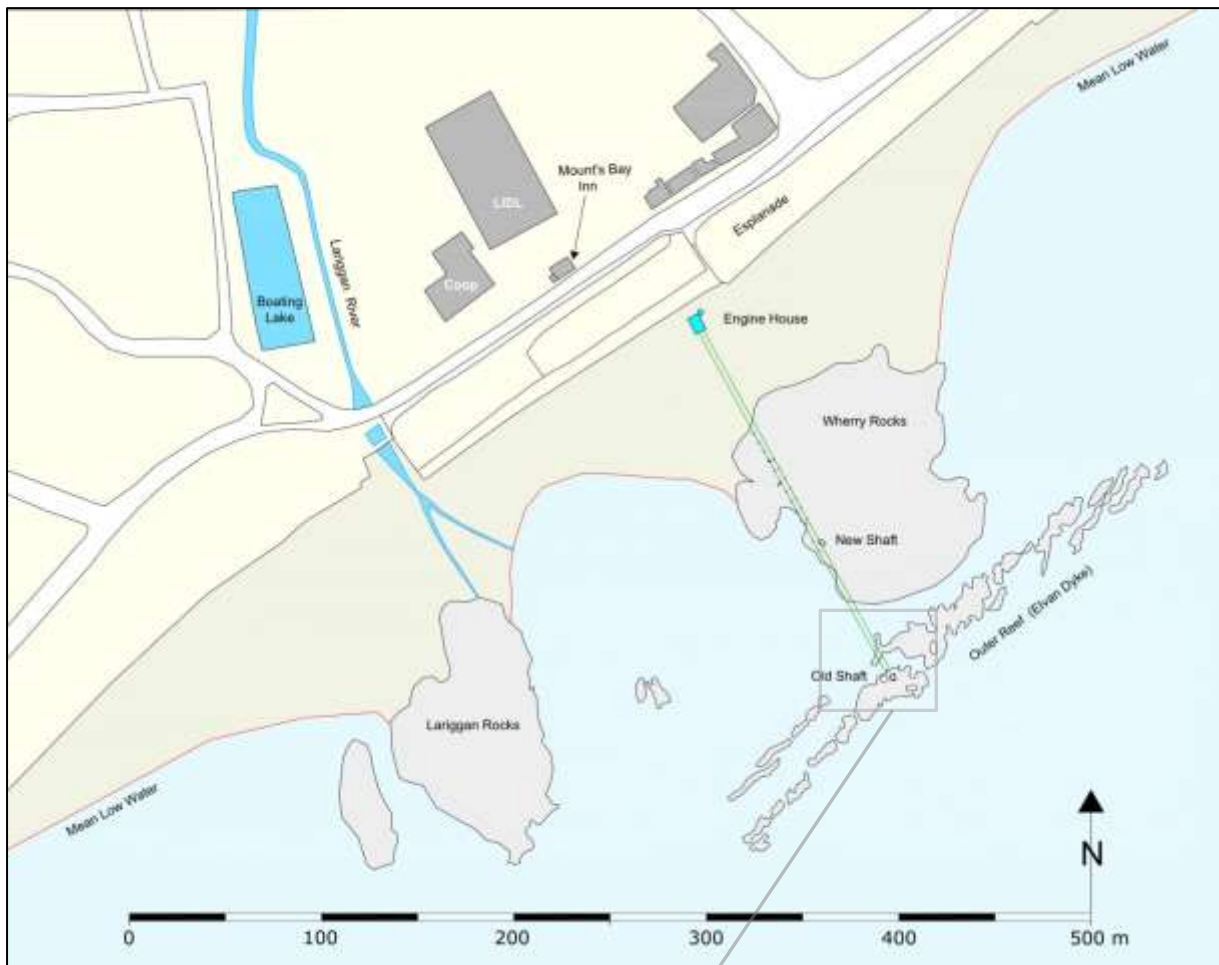
Left: The iron pipe at high tide.

In an attempt to inspect the area around the iron pipe the site was investigated at high water using scuba equipment. Several apparently man-made pits or infilled shafts were noticed on the top of the outer reef in the vicinity of the iron pipe



**Fig 12** A schematic north-south profile across the site of Old Shaft. See fig 13 for the profile location

The above section across Old Shaft was surveyed underwater at high tide; the sea level is shown at 0.9m above chart datum. This is a measured sketch rather than an accurately surveyed section. The rocks are covered with a thick layer of seaweed which makes survey difficult. This whole area is vulnerable to wave action during storms and quite large boulders are moved around by the action of the sea.



**Fig 13**

Detail of the area around the iron pipe. The areas where the reef has been cut into are shown shaded white. The pit immediately to the south of the pipe (arrowed) is possibly where the caisson and shaft were situated. However, the pit to the east of this could also be the shaft. All the cuts are filled with sand and rocks – the whole area is covered in seaweed

The dashed green line indicates the location of the profile drawing (fig 12)

The various sand-filled depressions in the top of the reef are probably pits where minerals have been extracted; the most westerly of these could be the remains of Old Shaft, excavated by Curtis in 1778. Some of them probably represent pre-Curtis low tide exploitation of the reef, while at least one is probably also down to Mr Curtis: *'and in the year 1789 he [Curtis] opened a pit on the shoal near his shaft and from it obtained tin worth £30'* letter from Samuel Milford to John Hawkins Truro March 11 1834 (Russell, 1949, p. 521).

These pits were only properly visible in the limited area where we cut the kelp during our underwater exploration of Old Shaft.



**Fig 14**

Detail from the Hawkins 1818 drawing showing the square sectioned caisson (arrowed) and winch platform at the end of the wooden trestle bridge. The horse or donkey gives an idea of the scale

The whole drawing is shown in fig 5

## New Shaft

44 fathoms (80m) nearer to the shore, New Shaft was started in 1796 after storm damage to the caisson and bridge at Old Shaft. Our main source of information about this New Shaft comes from Charles Hatchett (a chemist and geologist) who visited the mine on 13<sup>th</sup> May 1796:

*The shaft of the mine is in the sea at about 70 fathoms (128m) distance from the house which contains the steam engine, but the old shaft was at the distance of 114 fathoms (208m). The works were nearly destroyed and the mine filled by the sea during the great storm in January 1796. The old shaft has been therefore given up and the present one began. The latter is already made to the depth of 4 fathoms and when completed will be 24 fathoms after which they must drive to about 12 fathoms more before they begin to cut the Vein or Lode. The old shaft was 20 fathoms... the (lode) dip is 6 feet in one fathom (to the north).<sup>4</sup>*

The 1796 storm is mentioned in a number of newspaper accounts and must have been exceptional as it caused damage to the Penzance harbour pier. 'The Pier at Penzance is washed away; and two vessels, a Danish and a Dutch, driven to sea, where it is imagined, both must be lost' (Oxford Journal 6.2.1796) and 'The storm was so severe that the Penzance pier was washed away' (Larn & Larn, B, 1995).



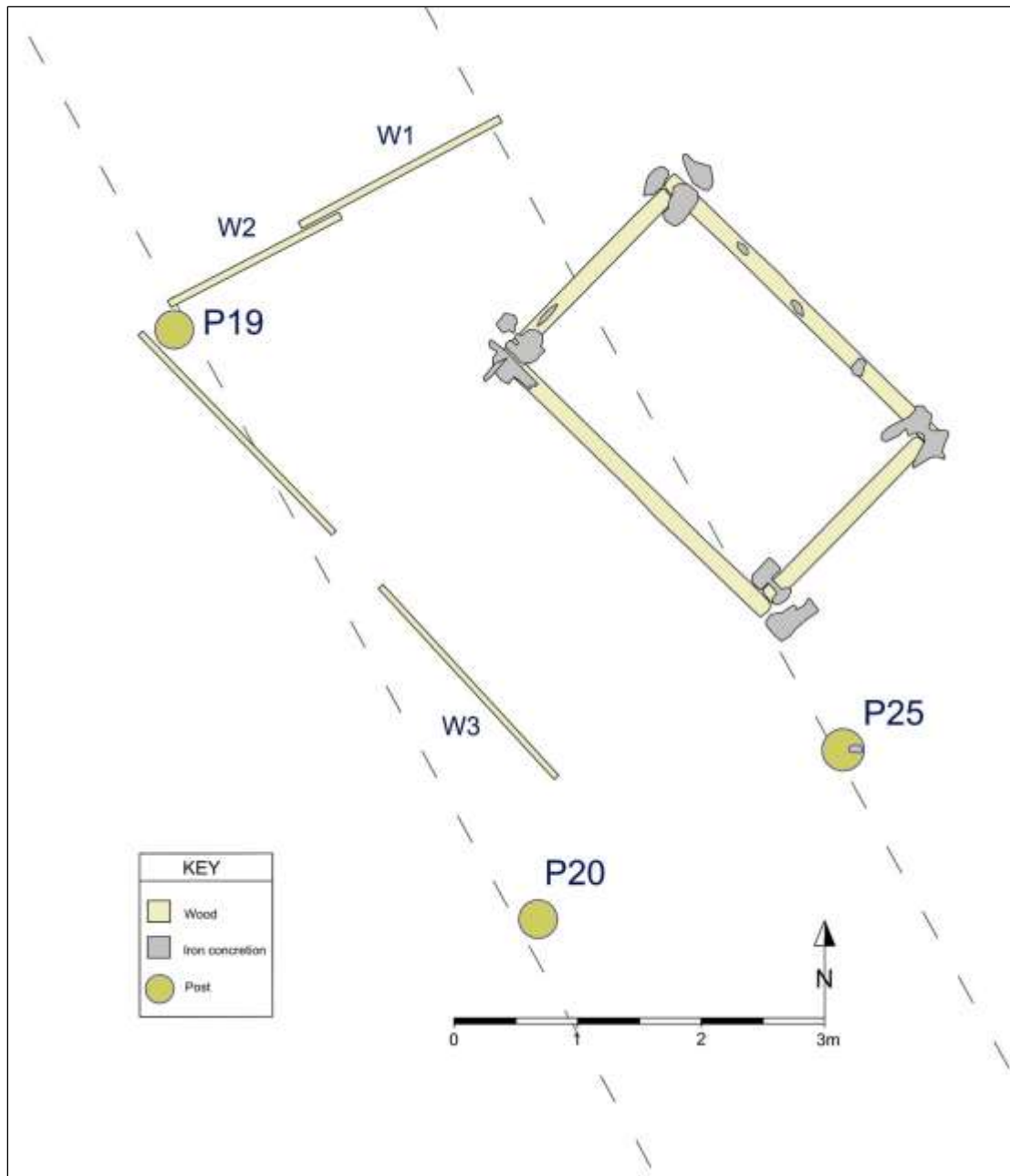
**Fig 15**

An aerial view of the timber-lined New Shaft after weed clearance. This was taken 21<sup>st</sup> February 2019 with a tide height of 0.3m above chart datum. The ranging poles are 2m long

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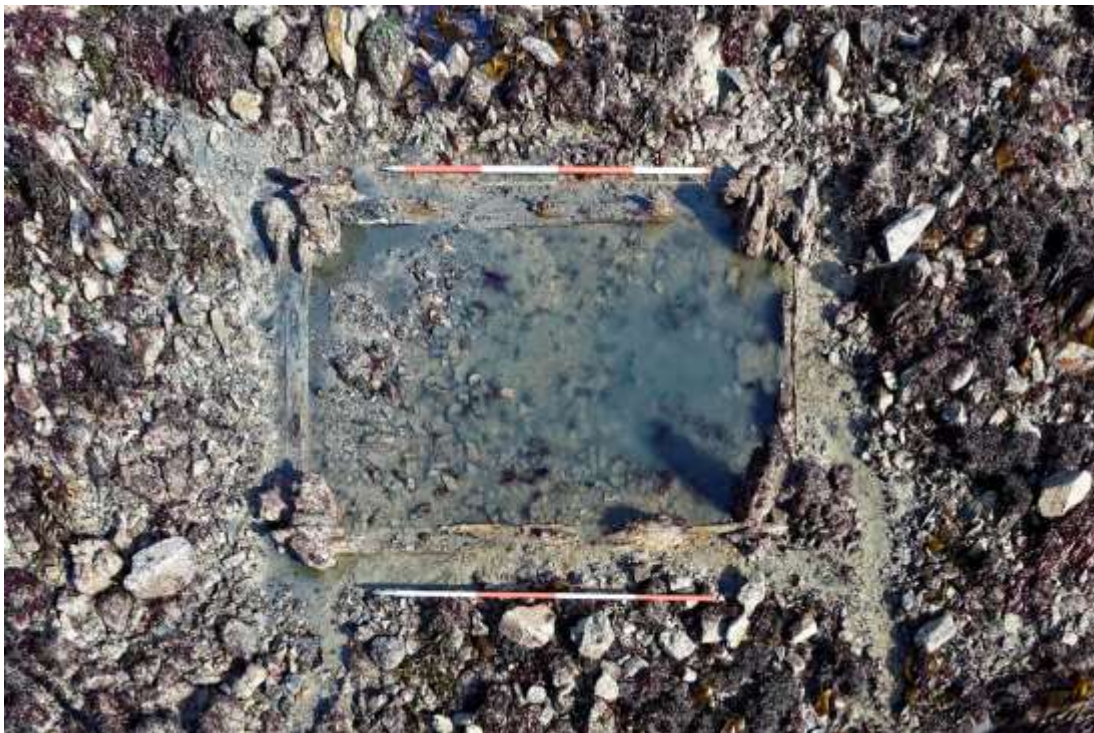
<sup>4</sup> Charles Hatchett's diaries, Hatchette, 1967





**Fig 16:** A plan of the remains of New Shaft (2020). The dashed lines show the alignment of the timber posts of the pier

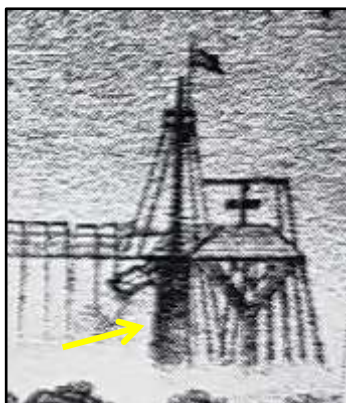
The areas shown on the plan (fig 16) as iron concretion are where the wood has iron corrosion products incorporated. This in practice will often be where iron fastenings were employed. The corner posts were at first thought to be made of iron, but closer inspection and sampling revealed that they are in fact wood heavily impregnated (mineralised) with iron corrosion products. The shaft itself appears to be rectangular, being 3.01m x 2.10m (9ft 10 inch x 6 ft 10 inch). The shaft is lined with horizontal pine planks 0.12m (4.75 inch) thick, retained by substantial corner posts. This timber lining could either be revetting of the shaft or part of the caisson used to keep out the seawater at high tide. A small sample of the planking was taken for species identification and it was found to be *Pinus Sylvestris* (Scots Pine), a durable softwood often used for telegraph poles and pit props.



**Fig 17**

Above: New Shaft seen from above – the ranging poles are 2 metres long

Left: Detail of the western corner of New Shaft showing the remains of the horizontal planking and the corner post



**Fig 18**

Detail of the caisson (arrowed) and winch platform of New Shaft from Tonkin's print of c. 1836-1838. The whole of the print can be seen in fig 6. Note the extensive platform on the seaward side of the caisson



Around the outside of the shaft a number of softwood timbers have been noted (W1, W2 & W3 on fig 16). These three timbers are planks 6cm (2.3 inches) thick, buried edge down in the sediments around New Shaft. These planks are at least 17cm (6.6 inches) wide, but the lower edge of the planks was not exposed. These timbers are considerably less substantial than the 12cm thick planks used to line the shaft, and their position some distance from the shaft might suggest they were used to hold sediment and rubble in place around the timber caisson which was constructed above the shaft. This would provide a measure of protection to the timber caisson from the action of the waves and currents, especially during storms. These planks were only detected on the north and western sides of the shaft, but they are probably also present on the south and eastern sides, although not visible as there is currently a greater depth of stones and sediment on those sides of the shaft.

No dating evidence associated with the remains of New Shaft has been found. We initially assumed that this was the shaft dug in 1796 after Old Shaft was flooded, and abandoned in 1798. Once abandoned the shaft would have been quickly filled with sand and stones by the sea. It was also assumed that New Shaft was probably re excavated when the mine reopened in 1836 – the infill would have been much easier to excavate than virgin ground. However, we have little evidence to support this theory and the possibility that the 1836 shaft was situated somewhere else cannot be discounted. To date no such remains have been identified.

It should be noted that the remains of New Shaft are slightly offset to the east of the line of the surviving bridge support posts (see plan below) and that the alignment of the shaft is slightly rotated relative to the of the bridge timbers. The offset to the east is understandable; the shaft was dug in 1796 when the bridge was already in place, so offsetting the shaft would have allowed the shaft to be dug without demolishing the adjacent part of the bridge. The rotation of the shaft is more difficult to understand; it would not cause any obvious problems, but why not make the shaft parallel to the bridge? Sadly, the Tonkin print (fig 6) does not show enough detail to resolve this matter.

There is only sparse documentary evidence of where the later shaft was situated, G C Boase writing in 1884 says:

*About 1836 a company was formed to rework the mine. The mouth of the shaft is situated about a furlong below high-water mark and consequently, it was necessary to again erect a staging or wooden bridge, to connect the shaft with the engine-house on the shore. The mouth of the mine was enclosed with a square waterproof boxing (Cornishman, 17.1.1884).*

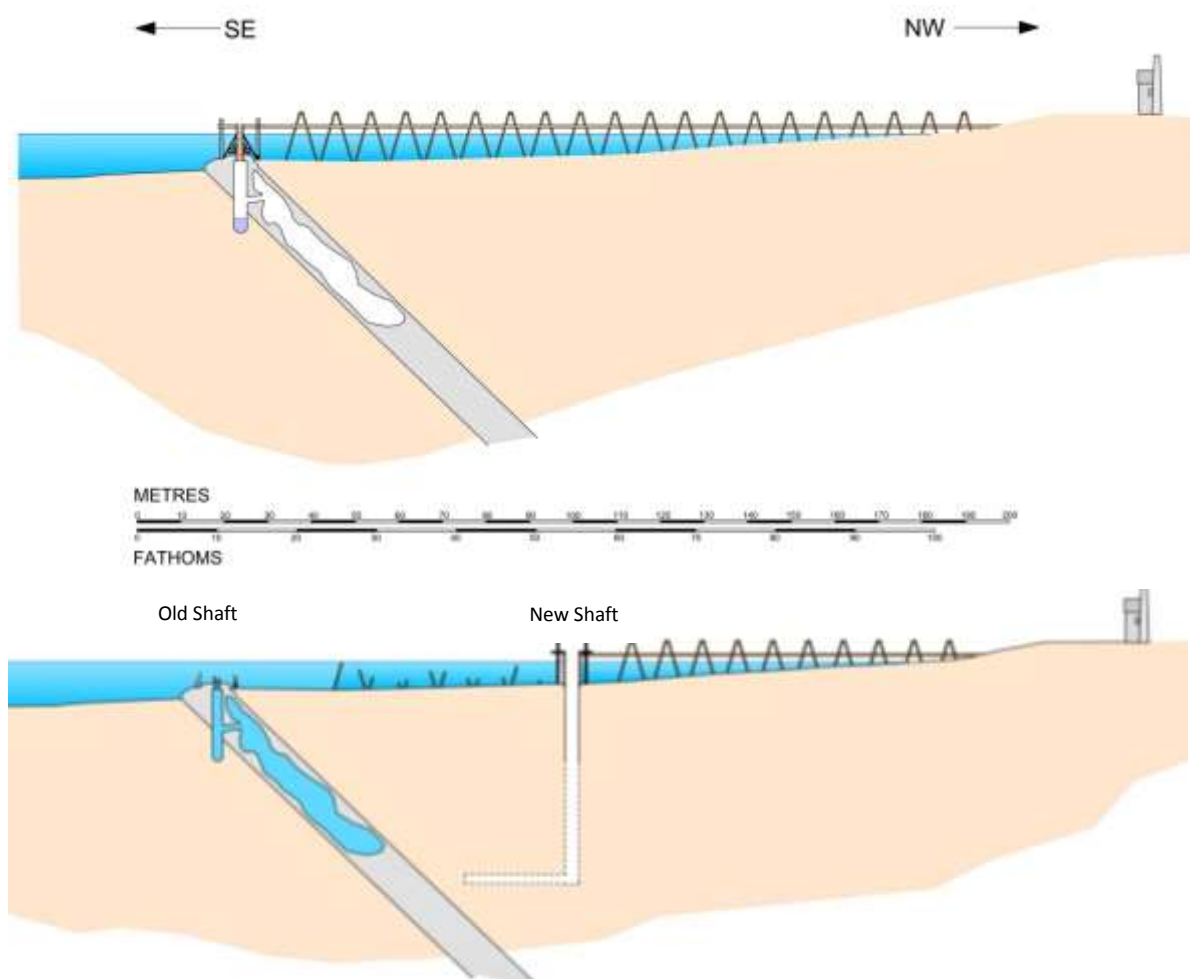
We are only given an approximate distance between this new shaft and the high water mark – ‘about a furlong’ (201m) this does not sound like a measured distance. We cannot be certain where the high water mark was in 1838 – before the building of the Promenade and sea wall, which would certainly have altered the location of the high tide mark. But, if his measurement is at all accurate, then the 1836 New Shaft might be further south than the 1796 New Shaft. This seems unlikely – but needs to be investigated. However, as previously noted G C Boase was writing 46 years after the mine closed and was only nine at the time of its closure. The following from the shareholders meeting in 1837 is also at variance with the ‘furlong’ quoted:

*A new 40-inch engine ... would be ready for work in the course of a fortnight and a bridge or stage built, extending from the engine 80 fathoms (146m ) beyond high water mark into the sea (RCG 5.5.1837).*

It should be noted that 80 fathoms is a suspiciously round number and probably represents an approximation rather than a precise measurement.

The original (1796) new shaft was said by Hatchette to be 70 fathoms from the house – but we do not know whether the two engine houses were built in the same place.

### After the Storm of 1796



**Fig 19** Conjectural reconstructed sections through the Wherry Mine. Above showing the mine around 1795 and below in 1796 after the destruction of Old Shaft in the storm. The dashed lines show the intended workings described by Hatchett. Based on contemporary descriptions by Manners 1805, Hawkins 1818 and Hatchett 1967

The best account of the measures taken to recover the mine after the storm of 1796 is given by Charles Hatchett recounting his visit to the mine in 1796:

*'The shaft of the mine is in the sea at about 70 fathoms (128.01m) distance from the house which contains the steam engine, but the old shaft was at the distance of 114 fathoms (208.48m). The works were nearly destroyed and the mine filled by the sea during the great storm in January 1796. The old shaft has been therefore given up and the present one began. The latter is already made to the depth of 4 fathoms and when completed will be 24 fathoms after which they must drive to about 12 fathoms more before they begin to cut the Vein or Lode. The old shaft was 20 fathoms... the (lode) dip is 6 feet in one fathom (to the north).'* (Hatchett, 1967).

There are a number of ambiguities, but this perhaps illustrates that the intention was to intersect the lode below the level of the old flooded workings. We have no idea what transpired, but two years later the mine had been abandoned, so it is a fair assumption that all did not go entirely to plan.

## The Pier or Bridge

The most obvious evidence of man-made activity on the Wherry Rocks is several rectangular holes cut into the rocks. These are each about 1.4m long and 0.8m wide. Two of these were examined; they were filled with very dark grey sand and silt containing water-smoothed stones. S01 was investigated to a depth of over a metre but no bottom was found before water ingress made further investigation difficult. The second socket investigated, S04, contains a wooden post 0.35m in diameter. The post appeared to be an unworked softwood tree trunk with bark still adhering in places and with at least one iron nail driven into its southern side. The exposed upper surface of the post exhibited a number of tightly spaced small holes – indicative of attack by wood boring molluscs such as the ‘gribble worm’ or ‘ship worm’.



**Fig 20**

Left: Rock cut socket S01

View of the partly emptied socket looking north. The scale rule behind the socket is 1m long

Below: Socket S04 & post P4

The rectangular rock cut socket S04 with the circular wooden post P4 still in place. The post is 0.35m (13.7 inches) in diameter





**Fig 21**

Wooden post P9 showing the damage caused by gribble attack to the post surface. The more deeply buried parts of the post (where the sediment will be largely anoxic) do not exhibit this attack and here the timber is in reasonably good condition

Scale = 0.5m

Further investigation has demonstrated two parallel lines of wooden posts running from the beach, out towards the remains of the two shafts. To date 24 posts have been located and recorded, 14 in the western row and 10 in the eastern row. Although the posts run along a fairly straight line, the alignment curves slightly to the west at the northern end (see fig 22). The distance between the posts is somewhat variable; probably the sockets were dug in roughly the right place, but wherever the fissures of the rock made digging easiest. The posts are spaced between 5.12m and 6.63m (16.8 and 21.8 feet) apart – all measurements are taken centre to centre of the wooden posts. The spacing between the two rows of posts is similarly variable, between 2.55m and 3.17m (8.4 feet and 10.4 feet). The posts are usually covered by 5 to 10 centimetres of sand and small rocks. When searching for the posts, a combination of probing and sand clearance is employed. The variable spacing of the posts makes predictive searching more difficult than anticipated –although it has usually been possible to find a couple of posts during a two-hour survey session at low tide.

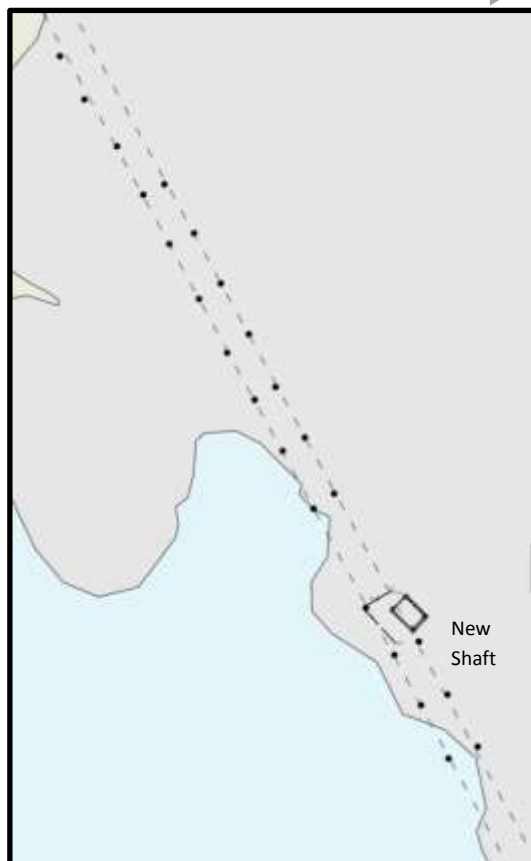
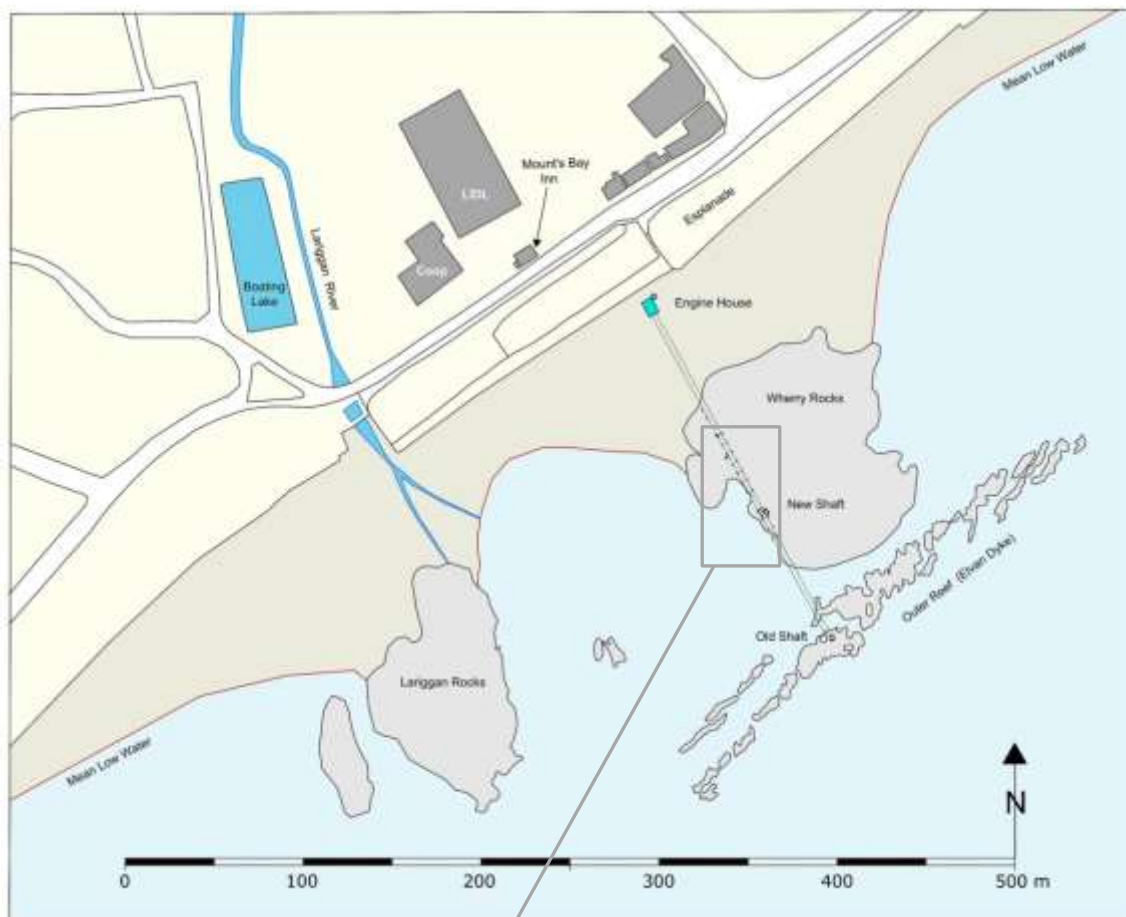
All the posts found to date are circular (unworked tree trunks), but one post (P10) has a smaller square timber associated – possibly a packing piece (see photo P10 below). These remarkable survivals are evidently what remain of the wooden legs of the bridge which ran from the engine house to the caisson. What is not clear is to which mine they belong: 1793 or 1836? The matter may be complicated to unravel, especially if the later bridge reused the earlier sockets. We know that parts of the bridge were still visible in 1809 ‘... and the frame-work [is] nearly annihilated’ (Brayley & Britton, 1809, p. 490). In 1870 the surviving posts were described by a local man:

*‘when rambling on that shore more than 60 years ago, what some then called oak-trees were nothing but stumps of pillars of the old stage, which could be traced in two regular lines along the beach and between the rocks from the site of the old mine to the shore’* (Cornish Telegraph 27.4.1870 p4).

Six posts have been found on the seaward side of the remains of New Shaft. Thus the bridge continues for at least 13.8m (45 feet) beyond New Shaft, suggesting that these posts were part of the original mine. In which case where are the remains of the later (1836-38) bridge?

What is also somewhat odd is the placement of New Shaft relative to the line of bridge posts (see plan below). The shaft is rotated by about 20 degrees from the line of the bridge posts. It is roughly level with the eastern line of posts – perhaps suggesting that it was placed alongside the existing bridge, which formerly ran out to Old Shaft.



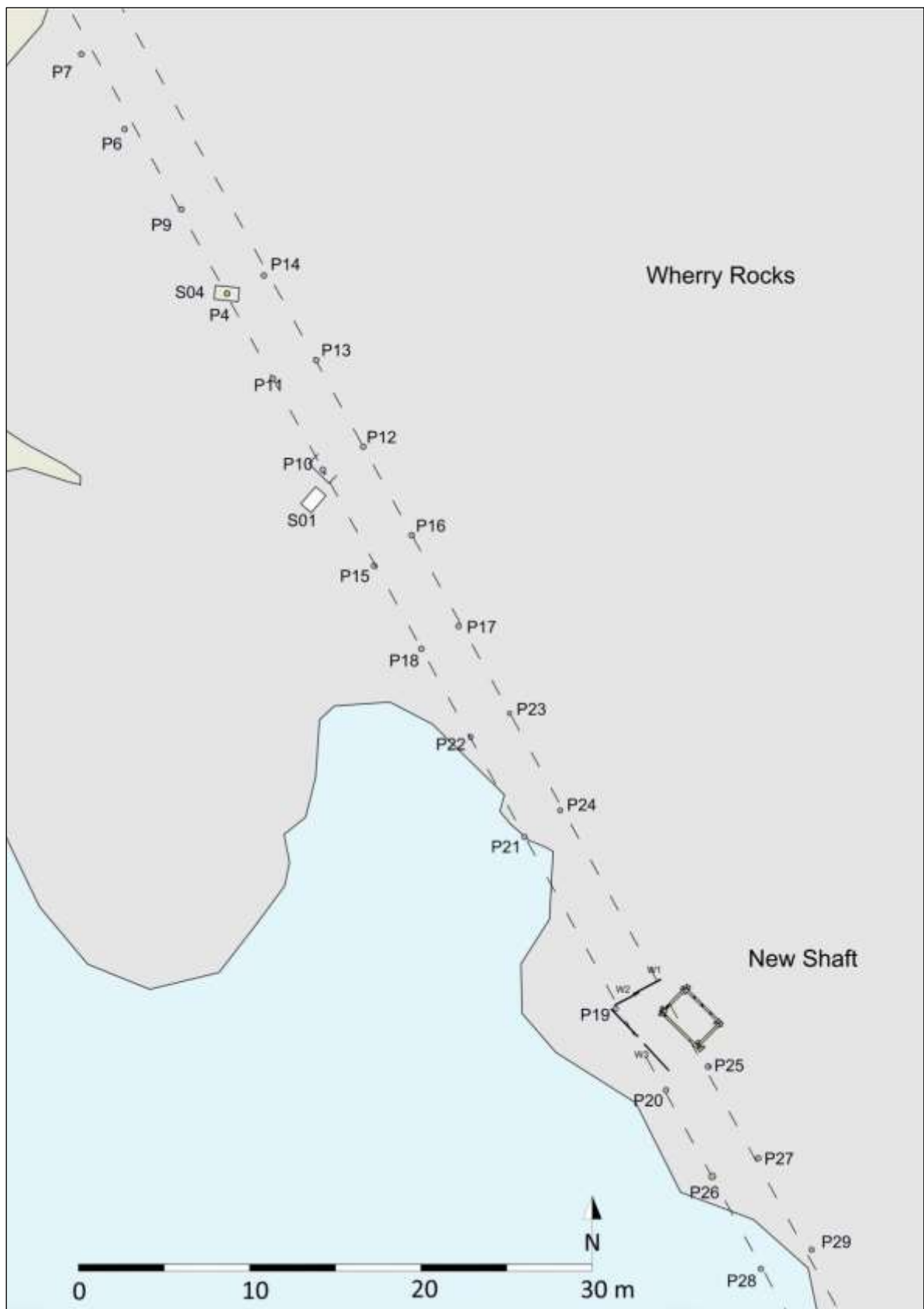


**Fig 22**

Remains of the wooden posts discovered to date. Note that on this plan the posts are shown with slightly larger diameters than found to make them more visible at this scale. The engine house shown is the first one (1794-8). It is shown 128m from New Shaft and 208m from Old Shaft as reported by Hatchett from his visit in 1796. The dashed lines indicate the possible location of the bridge linking Old Shaft to the shore

There appears to be a slight curve to the bridge at the northern end (P6 and P7)





**Fig 23** Plan showing the context numbers of the two lines of timber posts (P7 – P29), and the timbers at New Shaft. Note that the socket S01 is offset from the line of the surviving bridge posts –indicating that it may be part of a different structure. The posts on this plan are shown to scale







The majority of the posts have very flat tops (P6 and P7 are notable exceptions), perhaps suggesting that the posts were sawn off after the bridge went out of use. Some of the posts exhibit what appear to be saw marks, see for example the photograph of P28 below. If this is indeed the case it suggests that the posts are deeply buried, as otherwise they would have been pulled out when the posts were salvaged. None of the pits containing the remains of posts have been excavated – hence we have no idea how deep they are. The empty socket S01 was excavated to a depth of over a metre with no sign of the bottom suggesting that, if this was a post socket, the posts were deeply buried. Otherwise, the posts would have been susceptible to wave damage.







**Fig 24**

Photographs of the wooden posts found on site. The posts form two parallel lines roughly 2.75m apart. The numbers shown in yellow are the context numbers for each post. These context numbers also appear on the plan of the posts (see fig 23)

Table of Post Diameters and Spacing									
		Spacing		Width		Spacing			
Ø	WEST POSTS	M	Ft	M	Ft	Ft	M	EAST POSTS	Ø
0.20	P07							XX	
		5.12	16.8						
0.32	P06							XX	
		5.75	18.9						
0.29	P09							XX	
		5.60	18.4						
0.35	P04			2.60	8.5			P14	0.27
		5.65	18.5			19.4	5.90		
0.27	P11			2.75	9.0			P13	0.31
		6.10	20.0			19.0	5.80		
0.30	P10			2.71	8.9			P12	0.28
		6.40	21.0			19.4	5.90		
0.33	P15			2.80	9.2			P16	0.28
		5.63	18.5			20.2	6.15		
0.30	P18			2.55	8.4			P17	0.24
		5.90	19.3			19.5	5.94		
0.28	P22			2.65	8.6			P23	0.25
		6.63	21.8			21.1	6.42		
0.31	P21			2.60	8.5			P24	0.28
		5.67							
	XX	*						XX	
		5.67							
0.29	P19							XX	
		5.61	18.4						
0.24	P20			2.86	9.4			P25	0.34
		5.74	18.8			20.1	6.13		
0.31	P26			2.90	9.5			P27	0.32
		6.1	20			20.4	6.21		
0.29	P28			3.17	10.4			P29	0.28

**Fig 25**

Table of dimensions and spacing for the 24 timber posts P04 to P29. All dimensions are in metres unless otherwise specified

P01-P03, P05 & P08 were not used

Spacing = the distance between posts north to south

Width = the distance between posts east to west

Ø = diameter of the post in metres

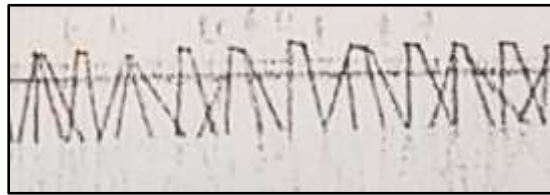
XX = no post found

\* P19 to P21 = 11.34m

Values in blue are estimates



## The First Mine Bridge c.1793



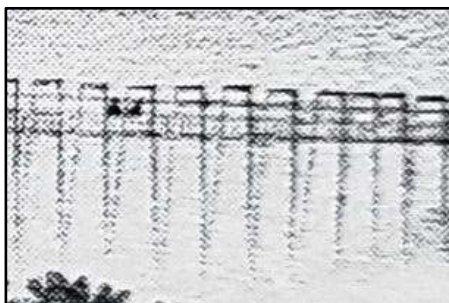
**Fig 26**

Detail of the bridge trestles. Left from (Hawkins, 1818) and above from a hand-coloured print of the mine

The most detailed image of the bridge linking the engine house to Old Shaft is that which accompanied the Hawkins 1818 article on the mine (fig 5 and above). This shows 28 trestles supporting a bridge deck. There appear to be three different types of trestle employed (2, 3 and 4 post trestles – fig 24). However, the three-legged trestles may in fact be four-legged trestles whose fourth leg is not visible in the drawing.

The alternative coloured print (fig 24) is much less detailed than the Hawkins drawing – but shows 33 trestles of two and four post construction – or possibly two-post trestles with diagonal braces. The two drawings seem to be of the same bridge, but as the number of trestles does not match it would seem that at least one of the drawings is not an accurate representation. What both drawings do suggest is that the post spacing on the ground could be irregular due to the mix of trestle types. This does not accord with the fairly regular spacing of the posts found on site to date.

## The Second Mine Bridge c. 1837



**Fig 27** Detail of the bridge used in the second mine: left from the Tonkin print, right from the Scobell print. The complete prints are shown in fig 6



As with the original mine, we have two different drawings to show us what the second mine bridge looked like. The differences in this case are more marked. The Tonkin print shows 24 trestles, each with two posts and a horizontal bar joining the posts above the bridge deck. The Scobell drawing shows 23 trestles with no horizontal bar and the two posts forming an open triangle above a very thin horizontal structure. If the Scobell drawing is accurate then it might be depicting an earlier phase where only the flat rods were carried on the trestles, the whole being remodelled later to include a bridge deck. The two drawings show other differences such as the chimneys on the engine house, which suggest that at least one of them is not an accurate representation. Both drawings seem to show regularly spaced posts – which accords well with the posts found on site (see fig 22). The discrepancies between the drawings, however, warn against relying too heavily on their verisimilitude.

Conversely, though, the width of '*about twelve feet*' reported for the second mine bridge by G C Boase is at variance with the roughly nine foot width found on site (see 1836 in the timeline below). Boase was born in Chapel Street in 1829, so was only seven years old in 1836 when the bridge was built, and only nine when the mine was dismantled two years later. Therefore his 12 feet may not be accurate, and seems unnecessarily wide for the bridge which, apart from the pump rods, only had to accommodate a tramway likely to have been of around two foot gauge. After all, this was not an extensive mine so the amount of material to be transported would have been relatively small (even if the 'deads' did not go straight over the side into the sea). Personally, I would be surprised if the bridge deck was any wider than eight feet.



**Fig 28**

Some of the bridge posts marked with pea-sticks demonstrating the slightly irregular line of the bridge. The arrow near the top of the picture indicates the position of the cast-iron pipe at Old Shaft

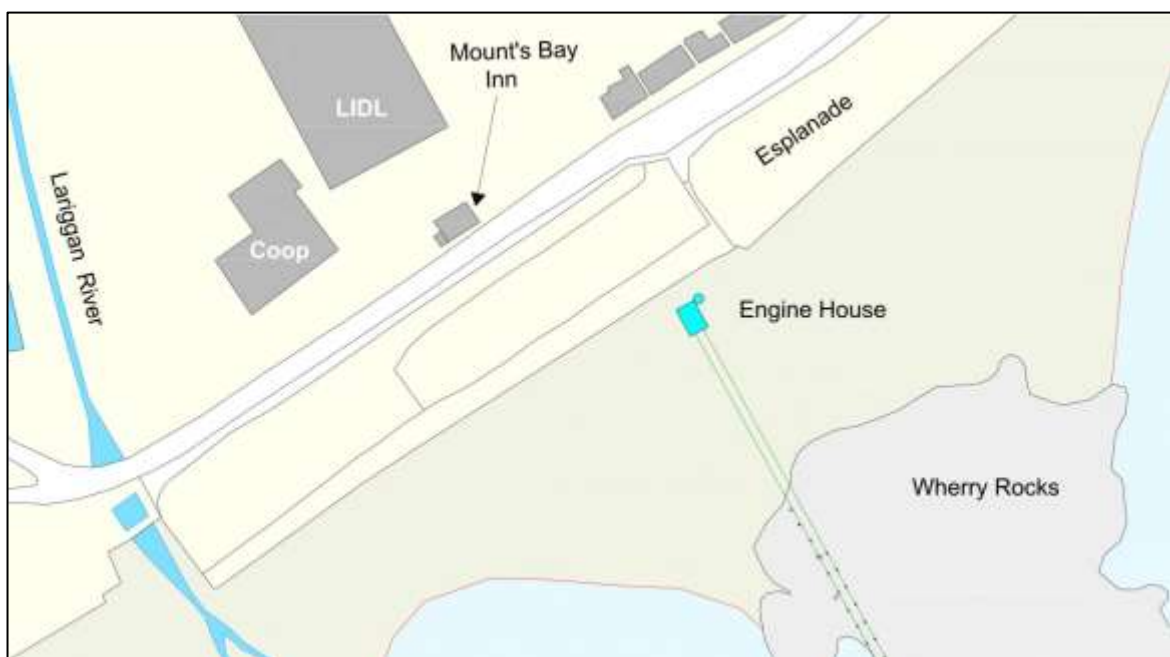
## Engine Houses

### The First Engine House

Thanks to Charles Hatchett's 1796 account of the mine and our survey of the New Shaft remains, we can now say roughly where the engine house for the original mine was situated.

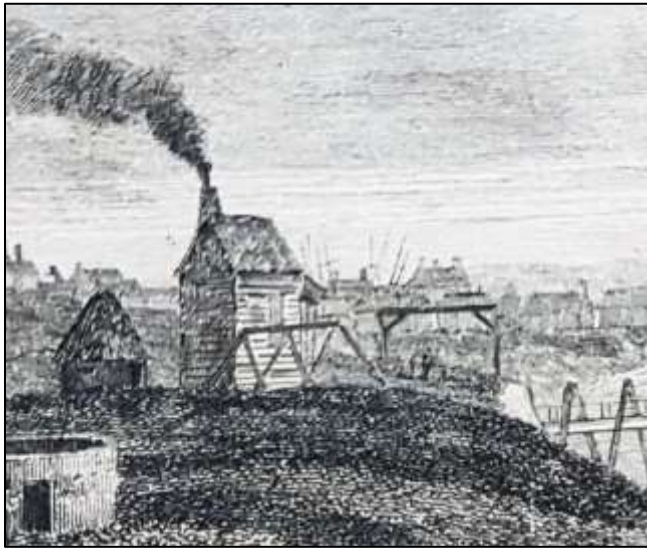
*The shaft of the mine is in the sea at about 70 fathoms (128m) distance from the house which contains the steam engine, but the old shaft was at the distance of 114 fathoms (208m). The works were nearly destroyed and the mine filled by the sea during the great storm in January 1796 (Hatchett, 1967).*

Hatchett's measurements result in a separation of 44 fathoms (80.4 m) between Old Shaft and New Shaft. Our survey shows a separation of 43.3 fathoms (79.3m) between the remains of New Shaft and the pit tentatively identified as Old Shaft (measured centre to centre). This represents a discrepancy of just over a metre – a remarkable concordance given that we do not know how Hatchett measured these distances. He does say '*about 70 fathoms*', which suggests an approximation. Taking his distance of 70 fathoms (128m) from New Shaft to the engine house, and projecting the line of posts discovered, gives us a position for the original engine house just in front of the modern sea wall, under what is now the shingle beach (fig 27). We know that at the time of the first mine this area was occupied by sand dunes, which is also how it appears in the contemporary drawings (fig 5).



**Fig 29** Postulated position of the engine house derived from the projected line of the bridge based on the 24 wooden posts discovered and Hatchett's distances plotted on the modern plan (2020)

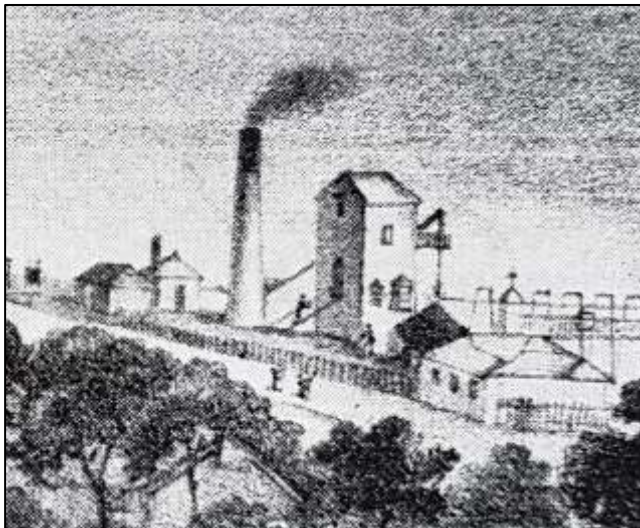
There is probably nothing left of the original engine house, but geophysical survey of the beach in this area is certainly worth a try. Previous publications have placed the engine house under the promenade or even further inland – but given our position for New Shaft this alternative location looks more likely.



**Fig 30**

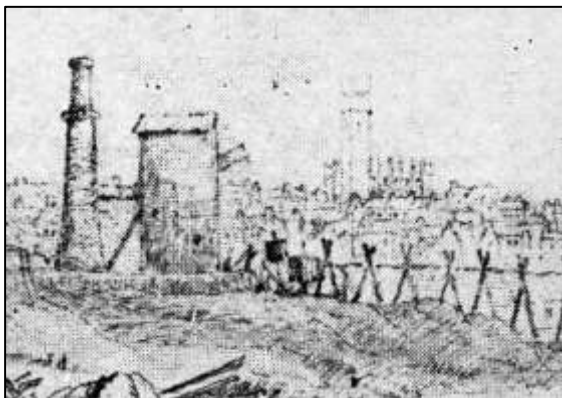
The 1793 engine house as illustrated in the Hawkins 1818 article. This seems to show a partly wooden engine house. The engine was a two-cylinder compound design by Hornblower. The engine was altered in 1797 'to admit steam direct onto both pistons' – hence it was no longer compound. This would suggest that the engine as first built was not entirely satisfactory

## The Second Engine House



**Fig 31**

The 1837 engine house as depicted on the Tonkin print. This housed a 40 inch engine known as 'The Queens Engine' built by Sandys & Co of Hayle. After the Wherry closed this engine was sold to Wheal Owles in 1840, and the engine house was demolished in October 1840



**Fig 32**

The 1837 engine house as depicted on the Scobell print. The chimneys in particular differ considerably as do the trestles of the bridge



The location of the second engine house is given in a newspaper account of the Wherry Mine shareholders meeting in 1837:

*...the engine house ... has been completed. A new 40-inch engine ... would be ready for work in the course of a fortnight and a bridge or stage built, extending from the engine 80 fathoms (146m ) beyond high water mark into the sea (RCG 5.5.1837).*

Once again we are presented with a suspiciously round number suggesting that this is an approximate distance. However, 80 fathoms (146m) from the surveyed remains of New Shaft, along the line of posts recently located, places the second engine house partly under the old public baths at Wherrytown, which is under the modern promenade adjacent to the Wherrytown carpark. The only remaining doubt is whether the New Shaft sunk in 1796 was the same shaft as the one dug in 1836-7. Until evidence of another shaft is found, we must assume this was the case.

## Twentieth Century Prospecting

The Wherry Mine continued to generate interest from mining prospectors long after the mine had disappeared. For example in 1962 an unnamed Canadian company was granted permission by Penzance Town Council to undertake diamond drilling on the shore at Wherrytown – whether this ever took place is not known.

In 1967 ARC Ltd, operators of the Penlee Quarry, undertook prospecting work. Work began in 1967, and has left visible remains on the Lariggan Rocks. Three drill holes are visible at the Lariggan, and probably represent ARCW1, W2 & W3 <sup>51</sup>(45°, 60° & 90°). The holes are 0.15m in diameter and are to be seen in a north – south line spaced some 7 metres apart end to end.



**Fig 33:** The ARC diamond drill holes visible on the Lariggan rocks. On the left The hole drilled at 60°, on the right the hole drilled at 45° (1m ranging pole).

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<sup>5</sup> Sketch map by JJ Goode for ARC 1967



**Fig 34:** ARC diamond drill hole; this one appears to be drilled vertically



**Fig 35:** Traces of the ARC scaffold; part of a steel tube cemented into the rocks

From the drill log of ARC borehole 4, made on the western edge of the Wherry Rocks' Brian Spratley has calculated that the dip angle of the elvan at Wherrytown is  $47^{\circ}$ - $48^{\circ}$ . This agrees closely with the dip of '6 feet in 1 fathom' [ $45^{\circ}$ ] reported by **Charles Hatchett in 1796**.

## References

The sources for the historic events mentioned in this report are all specified in the Wherry Mine timeline which appears below (pp 49-57).



## Conclusion

The most widely known surviving element of the Wherry Mine is an iron pipe sitting vertically, part buried in the seabed on the northern edge of the elvan reef. Photographs of this have appeared in numerous publications and on various web sites. It is a 20 inch diameter cast-iron flanged pipe, the type often used as rising mains in mine pumping systems. This, presumably, is why many writers have identified it as the rising main associated with the original Wherry Mine, also sometimes known as Old Shaft. If this was part of the pumping system then it was not situated within the wooden caisson which protected Old Shaft from the sea – there was simply not room for it and a kibble. We are told by two separate contemporary writers that the internal dimensions of this caisson were only 2 foot 1 inch square – a space so small that the miners were lowered through the caisson by winch to the rock cut shaft below where dimensions were more generous and descent was by the more usual ladders. The actual position of the shaft itself is still a matter of conjecture. There are several rectangular cuts in the elvan reef which lie on the seaward side of this pipe, but the cut immediately to the south of the iron pipe seems the most likely. The pipe itself sits in a large depression which never dries and shows no obvious evidence of any shaft (fig 9).

At this stage there are two possibilities for the function of this pipe. If it was a part of the pump column used to drain the mine between 1793-96 (when the steam pumping engine was used to drain the mine) then it must have exited the shaft on the outside of the caisson. The other possibility is that the pipe is not part of the pumping system at all – but is in fact one of the eight iron legs which supported the winch platform which sat above the caisson at Old Shaft from 1778 until the pier and steam engine were built in 1793. This original winch platform was used to drain the mine by means of kibbles of water being manually winched to the surface through the caisson. The only communication between this winch platform and the shore was by boat until the pier was built in 1793.

As is so often the case, our survey work at the Wherry Rocks has posed more questions than it has answered. We have located and recorded the remains of an infilled mine shaft (3 x 2.1m) situated in the intertidal zone on the Wherry Rocks. These remains are known locally as 'New Shaft', but the question is which new shaft? We know that a new shaft was dug in 1796 after the original shaft was flooded by storm damage. Just two years later the mine was abandoned. Another 'New Shaft' was sunk in 1836 when the mine was briefly restarted. The most logical interpretation is that the same shaft was reused by the 1836 restart. However, we have no proof of this and must at least consider the possibility that the 1836 shaft is situated somewhere else on the Wherry Rocks.

Our survey also located and recorded the remains of 24 timber posts, running from the shore out towards Old Shaft in two parallel lines some 2.8m (9 feet) apart. The posts were made from largely undressed pine trunks averaging 0.3m (1 foot) in diameter. These posts would have supported the pier which ran from the engine house to the shaft in the intertidal zone. The spacing of the posts is not precisely regular, but it is regular enough to convince that they all belong to the same structure. The conundrum here is which pier: the 1793 pier or the 1836 pier of the restarted mine? The fact that these posts are aligned on the remains of the iron pipe marking the site of Old Shaft perhaps suggests the former; a theory bolstered by the continuation of the posts beyond the remains of New Shaft by some 13.8m (45 feet).

The survey of these posts proceeded from the beach and progressed slowly seaward. The last few posts found (the two most southerly) are now underwater even at extreme spring tides. Further investigation of pier posts will be extremely difficult as the area to be investigated is only accessible on a handful of spring low tides a year, and is perpetually underwater. A further impediment is that this part of the Wherry Rocks is covered in luxuriant growth of seaweed which obscures the remains and is extremely slippery to walk on. The situation will only get worse as the sea level rises annually, at present by 3-5mm; it was at least 0.35m lower in 1793 when the first pier was constructed.

The original Wherry Mine has always been a site of curiosity and interest. In the eighteenth century it was famous and many distinguished visitors made it their first port of call on reaching Penzance. The site is still attracting visitors today, and at most spring tides collectors of mineral specimens can be seen plying their hammers out on the rocks. In recent years they have been joined by archaeologists measuring and surveying the submerged remains – and long may it continue.

## Further Work

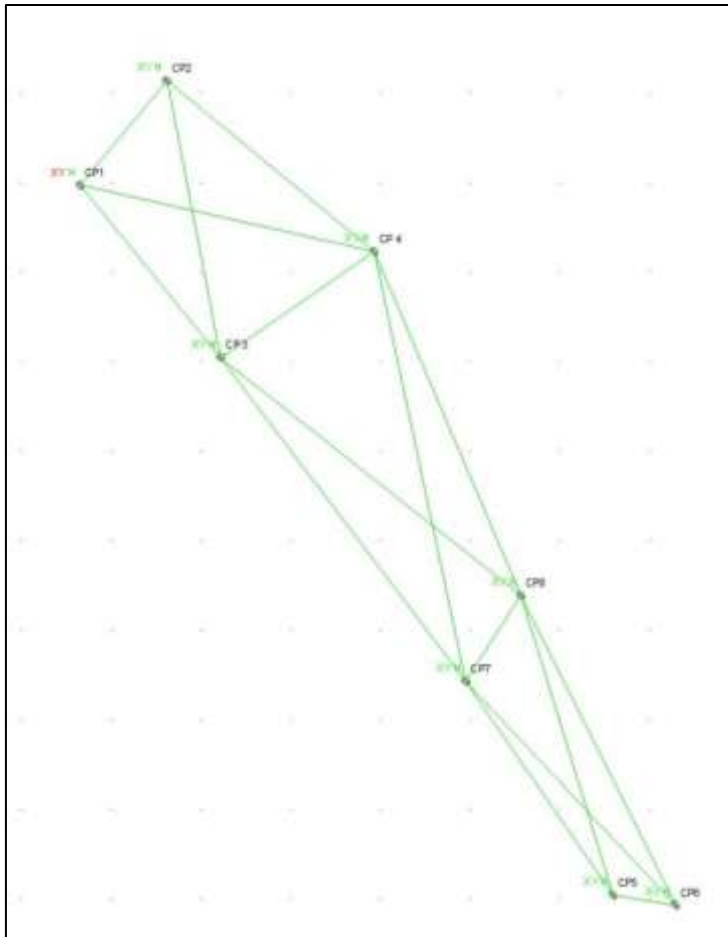
If our calculation of the position of the original engine house are correct then it was situated in front of the Promenade where the shingle beach is now. The topography has changed dramatically since then, but there is a chance that some remains of the footings might survive beneath the shingle. Occasionally this beach is stripped by storm action and the next time this happens an inspection of the area would be worthwhile. Similarly, posts from the pier are probably preserved under the sand, and these may be exposed occasionally.

Aerial photography of the rocks on a spring low in February when the weed covering on the rocks is at its minimum might yield useful information about the whereabouts of any, as yet, undiscovered rock cut features.

Finally, severe storms may well wreak shifts of sediment and rocks which could bring new remains to light. Time will tell.

## Survey Methodology

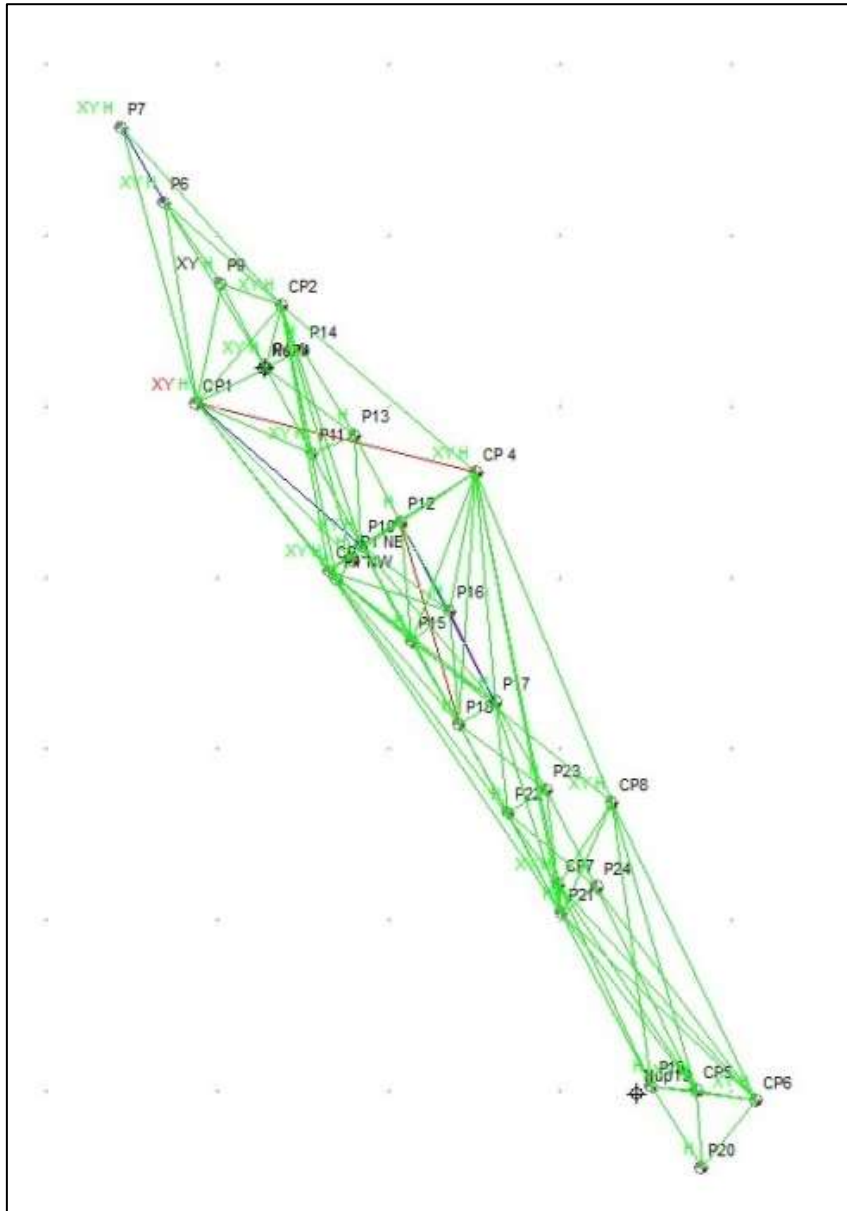
The survey was undertaken using Direct Survey Measurement (DSM) from a network of control points fixed to the rocks using iron pitons. Eight control points have been installed to date, stretching from the beach out to New Shaft. The measurements were input to an archaeological GIS programme (Site Recorder) which applies 'best fit' algorithms to the survey. We have used this system for 20 years and have found that it produces good results.



**Fig 36**

Screenshot of the GIS programme, Site Recorder showing the eight control points used to position the surveyed objects on the Wherry Rocks

However, this only ensures that the relative positions of the items surveyed are correct. We then had to place the network into real world coordinates – in this case UTM on the WGS84 spheroid and datum. The control points were positioned using a hand held EGNOS enabled GPS unit. Each position was determined by taking the average of 60 readings on each point. This process was repeated on a number of different days. These were then again averaged – so that each control point position was an average of more than 400 GPS readings. The adjusted control point network is probably thus positioned with an error of less than 2m.



**Fig 37**

The survey network (October 2020). Each line represents a measurement taken using a tape measure

## Wherry Mine Timeline [v4\_69]

Date	Event	Source
Early 18 <sup>th</sup> C	<p>The offshore reef (off the Wherry Rocks) was probably worked for tin around the <b>beginning of the 18<sup>th</sup> century</b></p> <p>‘The first attempts to work this singular mine are said to have been made towards the beginning of the last century’</p> <p>‘the veins of lead, tin, and copper ore, are said to be seen, even in the utmost extent of land at low watermark, and in the very sea; so rich, so valuable a treasure is contained in these parts’</p> <p>‘Here, according to tradition, the numerous veinlets of nearly pure cassiterite were worked by the “old men” as weather and tides permitted, early in the 1700s’</p>	<p>Joseph 2012 p8</p> <p>Hawkins 1818 p136</p> <p>Defoe 1734 p241-2</p> <p>Jenkin 1979 p18</p>
1725	<b>Thomas Curtis</b> senior born (date inferred from age at death)	
1750 23 June	<p><b>Thomas Curtis</b> senior married Elizabeth Varker in Breage</p> <p>There are baptism records for six children</p> <ol style="list-style-type: none"> <li>1. Ann 26.12.1751<sup>1</sup></li> <li>2. <b>Thomas 20.4.1753</b></li> <li>3. Jennipher 25.7.1755<sup>2</sup></li> <li>4. Francis (son) 24.4.1757</li> <li>5. James 12 7.1761</li> <li>6. Joseph 6.1.1762</li> </ol>	The Parish Clerk
1753 20 Apr	<b>Thomas Curtis</b> junior baptised at Breage	The Parish Clerk
1762	The <b>Wherry bounds</b> were in 10 shares. This means that the bounds of the Wherry Mine would have been declared to the Stannary Court.	Joseph p9
1778	<p>‘About the year 1778 a <b>poor miner</b> of the parish of Breage, whose name was <b>Thomas Curtis</b>, had the boldness to renew the attempt’</p> <p>Collins, perhaps getting the name wrong says ‘in the year 1778 <b>John Curtis and others</b> of Breage, with capital of a few pounds only, <b>were induced</b> to make it an object of mining adventure’</p> <p>‘At about the close of the eighteenth century the famous Wherry Mine at Penzance was drained by a rag-and-chain pump worked by 36 men...’ If true this pre or postdates the installation of the steam engine – there are no other references to rag-and-chain pumps at the Wherry</p> <p>To work the reef... which was 120 fathoms (219m) from the shore at high water. The surface of the reef is said to be 19 feet (5.8m) deep at high water. A frame of boards was built around the shaft to form a collar (2ft 1 inch square) cemented to the rocks with pitch and oakum making a boarded turret 20 feet (6.1m) above the rocks</p> <p>Another account by J de Luc (1811) is quoted by Joseph – ‘A kind of large tub without a bottom was first prepared, so high that the waves of the highest tides could not pass over it; the lower part of this tub was inserted in the cross course, as near the water’s edge as possible, their junction being sufficiently secured with brick-work and plaister to be impenetrable to water. At the top of the tub was placed a windlass to draw up the materials detached within, and a bridge was made from thence to the shore.’</p>	<p>Hawkins 1818 p136</p> <p>Collins 1912 p67</p> <p>Lewis 1908 p12</p> <p>Joseph 2012 p9</p> <p>Joseph 2012 p10</p> <p>De Luc 1811 p237</p>



Date	Event	Source
c.1780	<b>Sweet visits</b> PZ – West country travels - JRIC	
1789	'and in the year 1789 he [ <b>Curtis</b> ] opened a <b>pit on the shoal</b> near his shaft and from it obtained tin worth £30' letter from Samual Milford to John Hawkins Truro March 11 1834(?)	Russell 1949 p521
1790	<b>Hawkins visits</b> the mine, autumn of 1790 according to his 1805 account Greatest depth 36 feet (6 fathoms); Depth to the level of the passage 26 feet; Greatest diameter of chamber 18 feet; Least diameter 3 feet. He says it is called <b>Huel-ferry</b> [Huel is an old form of Wheel]	Hawkins 1805 p864
1791	<b>Hawkins</b> relates the state of the mine, this time in autumn 1791 in his 1818 publication. Depth has now reduced to <b>26 feet</b> [this is what he reported for the passage last year]. He says the elvan <b>underlies 'one foot and a half in a fathom to the S.W.'</b> [this equates to a dip of about 75° - but to the SW??] He now calls the mine <b>Huel Wherry</b>	Hawkins 1818 p140
1791	In the autumn of 1791 the shaft was 4 fathoms and 2 feet deep (26 feet – 7.9m). The workings were 18 feet (5.5m) wide; in places the rock covering them was only 3 feet thick. 'Twelve men were employed for two hours at the 'wins' hauling water, with six men 'teaming'.... from the bottom of the level into the sump.' 36 sacks of tinstuff were broken on average every tide	Joseph 2012 p11  Boase 1976 p45 Cornishman 17.1.1884
1791 [V]	Thomas <b>Curtis dies</b> at the age of <b>70</b> 'the mine ... started in 1778 by Thomas Curtis of Breage ... Curtis died in 1791, and the mine was taken over by Thomas Gundry and other local adventurers' The earliest mention of his death would seem to be Hawkins writing in 1805 'The extraordinary man who conceived and executed the work ... died in the winter of 1791 aged 70 years' but note that Hawkins does not name Curtis until his 1818 account. Hawkins describes the caisson and winch platform, giving details of the construction  Also WB obituary says <b>Thomas Curtis died</b> in November 1828 – Joseph speculates that the two dates could refer to father and son. Thomas Curtis apparently asserted 'There is more tin in the Wherry than would purchase all the land round Penzance'. Russell says that in the 20 years of the 'Curtis' mine £70,000 was raised	Russell 1949 p522  Laws 1978 p15  Hawkins 1805 p864  Hawkins 1818  Joseph 2012 p32  Russell 1949 p524
1791 Summer	In the summer of 1791 <b>Edward Danial Clarke</b> (age 22) <b>visits</b> the mine. Two sentences about Penzance and description of the mine and mackerel fishing. <i>We saw here a tin mine worked in the sea. It is situated about half a mile from the shore. The tin is found in hard rock, and appears in small black spots mingled with the stone. They are only able to work it five months of the year; and we were told that during the last season the owners cleared five hundred pounds.</i>	Clarke 1793
1791 23 Feb	A <b>Thomas Curtis is buried</b> at Germoe (near Breage) aged 66	Parish Clerk
c.1791	List of <b>Wherry adventurers</b> - undated watermark 1791 Richd Oxnam, Thos Curtis, James Pascoe, Jno Semmins, Willm Carne, Thos Woodis, Richd & Jno Cunnack, Richd Moyle, Thos Bolitho, Daniel Ley, Thos Gundry (Senr&Junr), Birmingham Co, Geo C Fox & Sons and Jno Smith See adventurers document	Joseph p11  CRO AD1583/11
1792	<b>A house</b> made of the stanniferous elvan 'near the green' was pulled down on account of its tin content and rebuilt using other stone	Joseph 2012 p12

Date	Event	Source
1792	Thomas Wilson (the B&W rep), <b>Boulton and Watt</b> were adventurers in the Wherry mine by this time	Joseph 2012 p12
1792 1 Sept	<b>Thomas COURTIS</b> (Yeoman) marries Catherine SLEEP of Germo (sic). Witnessed by Joseph SLEEP <sup>5</sup> & Edmund SIMMENS – they were married at Breage	Parish Clerk
1792 16 Nov	'... it was agreed for <b>Hornblower</b> to build the Engine on the Wherry that the Engine house was Sat ... - shall go to Mr Curtis tomorrow to Try for a Vue of the Wherry set'. This shows there is a Curtis involved in 1792 (TC II?)	Letter Vivian to Wilson KK AD1583/5
1793	Sometime before 1794 a <b>Hornblower</b> compound <b>steam engine</b> (possibly built by John Winwood, a Bristol iron-founder but also referred to as 'Wales engine') was installed in an engine house on the shore connected to the shaft by a trestle bridge. The engine had 2 cylinders of 21 and 27 inches diameter with strokes of 6 and 8 feet respectively. A letter from Mr D Gilbert to John Hawkins (written sometime after 1792) states 'A steam engine is erecting on the green opposite, and they are constructing a wooden bridge from thence to the rock, to serve as a communication till the engine shaft has been sunk sufficiently deep, and a drift worked out to the mine...'. Before the 'bridge' was built transport to the shaft was by boat (wherry)  The <b>engine was installed</b> in November 1793 and stopped in 1797 The engine was 'altered in 1797 to enable steam to be admitted direct onto both pistons' – suggesting that this was no longer a compound engine.	Joseph 2012 pp15-19  Joseph 2012 p27  Hawkins 1818 p141  Stewart 2017 p128  Barton 1966 p98
1794	The mine is <b>visited by William Maton, Thomas Rackett</b> and Charles <b>Hatchett</b> . Maton's account mentions seeing the distant 'scaffolding of the famous Wherry mine' – He mentions the steam engine and the descent into the mine by rope. He says ' <i>the inclination of the lode is to the north, about six feet in a fathom</i> '. '...a narrow platform leads to it from the beach: close to this is the engine shaft, through which the water is brought up from below' – this demonstrates that the rising main was outside the caisson <b>[Forbes visits mine – JRIC]</b>	Maton 1797 p208
1794/5	'About half a mile west of Penzance is a remarkable tin-mine, called the Wherry Mine, about thirty fathom deep, the mouth of which, at high tide, is six fathom under the surface of the sea. A bridge, one hundred and twenty fathom long, reaches from the shore to a large platform, which is surrounded by water, as above; <b>the miners descend through a wooden case, by means of a windlass</b> , to the mouth of the shaft or mine, and from <b>thence by ladders</b> to the bottom. The mine is remarkably rich, and yields the adventurers large sums'	UBD 1791 PZ
1795-6	The <b>engine</b> was apparently ' <b>stopped</b> ' (not working) between October 1795 and May 1796 . <Is this due to the storm damage mentioned below which occurred in January 1796?> <b>[Skinner visits mine]</b>	Joseph 2012 p29

Date	Event	Source
1795	18 <sup>th</sup> of June an <b>anonymous diarist</b> on a tour of Cornwall says: 'Veins of lead, tin and copper about the Town, even under the Sea. All these mines run from East to West. In this Town is a wonderful curious mine under the sea. On the shore is a very large steam Engine from which is built a scaffold in the Sea that is full a quarter of a mile long. At the end are the pumps that draw the water from the mine which is worked by the steam Engine from that distance by <b>iron barrs</b> that work from one end to the other. At the extremity of this scaffold is the opening of the Pit, tho in the Sea <b>80 yards</b> deep. <b>The miners are let down</b> thro a tube into the mine, and is so well contrived that the Sea cannot enter it, and what is remarkable, the water that is pumped up from the mine is salt. This is one of the greatest curiosities in England.	Spreadbury 1971
1795 [V]	18th August 1795 the mine was <b>visited by John Henry Manners</b> (the 5 <sup>th</sup> Duke of Rutland) who was aged 17 at the time – he wrote an account of the visit which is extensively quoted in Joseph (Note Joseph's date of 1793 is an error). The following are detailed: <ul style="list-style-type: none"> <li>• Wooden bridge or pier 114 fathoms (208m) long between shore and shaft</li> <li>• Initial descent by perpendicular wooden shaft about 2ft square and 7 fathoms deep (coffer dam)</li> <li>• Lowered down by winch in coffer, thereafter by ladder</li> <li>• Depth of mine 21 fathoms (38m)</li> <li>• Blasting with black powder during visit</li> <li>• Ore rich in quality but lead also present</li> <li>• <b>90 men employed</b> in the mine</li> <li>• The men work six hours at a time day and night (Sundays excepted)</li> <li>• The mine has been worked about 30 years</li> <li>• Pump is erected on the winch platform '<b>and very near the shaft by which we descended</b>'</li> <li>• The pump is worked by a steam engine on the shore and connected by means of two long <b>wooden rods</b> slung under the bridge</li> </ul>	Joseph 2012 pp17-20  Manners 1805 pp169-174

Date	Event	Source
1796	<p><b>The storm of January 23<sup>rd</sup></b> was reported by Millett to have removed a 300-ton ship from Penzance harbour “with cable and post attached” and stranded on a nearby rock.</p> <p>“On the 23<sup>rd</sup> January, 1796, there was a strong gale from the south and south-south-west, with a very high tide, and a Bremen ship of about 300 tons, having with her cable hauled out a post upon the old pier, was stranded near Cairn Jenny.” Millett says Cairn Jenny was near the Abbey Slip and was removed in the early 19<sup>th</sup> century. However, J.S.Courtney says ‘Near the Old Pier head was a pile of porphyry rocks, called Carn Jenny’ NB Tide 23.1.1796 was 5.3m 0333 and 1559 (Total Tide) current tidal range on springs is 0.8 to 5.6m</p> <p>‘The Pier at <b>Penzance is washed away</b>; and two vessels, a Danish and a Dutch, driven to sea, where it is imagined, both must be lost’</p> <p>‘The storm was so severe that the Penzance pier was washed away’</p> <p>‘A violent storm which commenced here on the 23<sup>rd</sup>, has done great damage to Penzance Quay, and driven a <b>ship</b> of about 300 tons berthen thereout, which vessel is stranded; she is reported to be of and belonging to Bremen, laden with coals and has been detained here some time on government account. Also stranded, a Danish brig about 150 tons, laden with salt, which vessels are present in such state that the cargoes may be saved’</p>	<p>Joseph 2008 p59</p> <p>Millet 1880 p21</p> <p>Courtney 1878 p30</p> <p>Oxford Journal (06.02.1796) Dublin Evening Post (9.2.1796) Larn 1995 V1 S4</p> <p>Sherborne Mercury (1.2.1796)</p>
1796	<p><b>Boulton &amp; Watt</b> claimed a ‘premium’ payment for the Wherry Hornblower engine was due to them for infringement of their patent. Some payment was apparently made in 1800 - 1801</p>	Joseph 2012 p26
1796	<p>The site was <b>visited by Charles Hatchett</b> on 13<sup>th</sup> May 1796: ‘The shaft of the mine is in the sea at about 70 fathoms (128.01m) distance from the house which contains the steam engine, but the old shaft was at the distance of 114 fathoms (208.48m). The works were nearly destroyed and the mine filled by the sea during the great storm in January 1796. The old shaft has been therefore given up and the present one began. The latter is already made to the depth of 4 fathoms and when completed will be 24 fathoms after which they must drive to about 12 fathoms more before they begin to cut the Vein or Lode. The old shaft was 20 fathoms... the (lode) <b>dip is 6 feet in one fathom</b> (to the north)’. Clearly by 1796 the new shaft had been started and the old one abandoned. ‘New shaft at spring tides is dry, but is covered with water at high water, about 4 fathoms in depth’.</p>	<p>Joseph 2012 p25</p> <p>Hatchett 1967 p33</p> <p>Barton 1967 p80</p>
1798	<p>The <i>Monthly Mirror</i> (July) is reported by Joseph as saying ‘A rich vein of <b>cobalt</b> was lately discovered in the Wherry mine near Penzance’</p>	Joseph 2012 p28

Date	Event	Source
1798	<p><b>The American Ship.</b> A much recounted spectacular end to the first mine is reported as a collision with a ship. Hawkins writing in 1818 says ‘An American vessel broke from its anchorage in Gwavas Lake, and striking against the stage, demolished the machinery, and thus put an end to an adventure, which, both in ingenuity and success, was probably never equalled in any country’. Interestingly Hawkins does not give a date for this event, and indeed does not mention it at all in an earlier version (1805). RCG in 1834 mentions the American Ship incident while reporting on the similar Wheal Mexico but only says ‘not many years since’. Smith writing in 1840 simply says ‘some years since’ while Russell writing in 1949 states that ‘In 1798, however... it came to an untimely end through an American vessel breaking its anchorage in Gwavas Lake ... and striking against the turret’. Joseph clearly has some doubts ‘The tale of the ship is widespread but its origins, and hence veracity are unknown’. No contemporary record of this event has been located. However one source, William Lovett writing in 1876, does put a name to this American vessel - ‘Among my earliest recollections was that of being taken in my grandmother’s arms to see the illuminations for the short peace of 1803, was that of seeing a plentiful supply of raisins in the town, occasioned by the wreck of the fig-man — as she was called — the vessel that, I think, knocked down the works of the wherry mine in a storm’. The difficulty here is that Lovett was not born until 1800, so if the ship struck the mine in 1798 his recollection of raisins around 1803 would seem improbable. An unidentified American brig was wrecked in Mounts Bay (near Marazion) 29-01-1796 ‘Voyage St Ubes – Copenhagen, Cargo Salt, Believed to be an American brig’ Have we been led astray by Russell - did the collision occur in 1796 rather than 1798?</p>	<p>Hawkins 1818 p142</p> <p>Hawkins 1805 p864 RCG 13.9.1834 p2</p> <p>Smith 1840</p> <p>Russell 1949 p524</p> <p>Joseph 2012 p28</p> <p>Lovett 1876</p> <p>Larn 1995</p>
1798	<p><b>John Thomas</b> (a Penzance printer &amp; bookseller) says the mine was abandoned in 1798 – interestingly no mention of any ship. ‘The adventurers of this mine were induced to sink a shaft in this place, through the representations of an old miner... It consisted in valuable tin stuff and cobalt. But after some time, the dangerous situation of the shaft, the injuries occasioned by storms and high tides, and the declining state of the lode, induced the adventurers to abandon the workings altogether in 1798’.</p>	<p>Thomas 1820 p46-7</p>
1806 [V]	<p><b>Visit by De Luc.</b> Mine not working but tales recounted by Mr Thomson (vicar). Says that the bridge was built first and the engine added later. Interesting variation of the ship episode ‘during a violent storm, the masts of a vessel, which had been driven from its anchorage, struck the bridge, and broke down the exterior edifice: the mine was consequently soon filled with sea-water; but was not much regretted, because a little while before, a vein of cobolt had been met with, and the air of the mine had become unwholesome’ Date of ship/mine end not given ‘some years before I was there’</p>	<p>De Luc 1811 p237</p>
1808	<p>The mine is <b>visited by the Reverend Richard Warner</b> in August 1808 when the mine is in ruins ‘We had promised ourselves much pleasure in surveying the celebrated Wherry Mine ... but the works had been for some time discontinued, and we saw only the place where they had carried on, and the skeletons of the machinery used for that purpose.’</p>	<p>Warner 1809 p147-9</p>



Date	Event	Source
1809 [V?]	<p>'The peculiar situation of the mine rendered it <b>an object of considerable curiosity</b>, and attracted the attention of all persons who visited this part of the country'. States that the shaft is now filled up and the framework nearly annihilated.</p> <p>'A company of adventurers were induced to sink a shaft in this place, through the representations of an old miner, who foretold the acquisition of great treasure from the richness of the lode' a great quantity of rich tin stuff was found. But 'the dangerous situation of the shaft, the injurious effects arising from storms and tides, and the partial failure of the lode, induced the adventurers to discontinue their workings in 1798' Some quotes from Maton.</p>	Brayley & Britton 1809
-> 1818	<b>Sir Humphry Davy</b> visited the Wherry and writing in 1818 on the geology of Cornwall he says that 'A most remarkable vein of this kind was worked some years ago at the Wherry mine near Penzance; the principal metals were oxide of tin, and sulphuret of copper; but ores of cobalt and lead likewise occurred, and the variety of metallic substances found with them in minute quantities was very extraordinary. I have seen in the refuse heaps blende, (zinc?), oxide of uranium, oxide of titanium and of iron, pitchblende (uraniunite),nickel and arsenical pyrites...'	Davy 1818
1822	Talking of elvan courses in Cornwall he says in a footnote 'In the Wherry tin mine...the <b>underlie is</b> , in some parts, <b>two fathoms to one</b> in depth; an underlie so great that the workmen would actually walk up its southern wall'	Carne 1822
1823	<b>Shares</b> in the 'New Wherry Mine' were advertised in the West Britain, interestingly the applicants need to apply to 'Messrs. Curtis & Gundy, Penzance' – little, if anything came of this. Is this the same Curtis who is reported to have died in 1791? His son?	Joseph 2012 p32 WB 3.1.1823 p3
c.1824 [V]	<b>Stockdale</b> visits PZ and recounts the <b>Celebrated Wherry Mine</b> which ceased working in 1798	Stockdale 1824 p60
1828	<p>'<b>Died</b> at Penzance on Tuesday, Mr <b>Thomas Curties</b>, aged 76 years. Several years since, when a labouring miner, he obtained a large sum of money by taking pitches at Wherry mine, which ran under the sea, but the working of which has since been discontinued'. Note the spelling of Curtis (Curties)</p> <p>14 Nov 1828 <b>Thomas Curtis</b> (76) of Penzance was <b>buried</b> at Germoe. His Will is at– this may be the same Thomas Curtis [II] baptised 20 Apr 1753 at Breage. He died a wealthy man with a house in Penzance, an 'estate' at Pentreath and Hendra</p>	WB 13.9.1828 p3  Parish Clerk
1830s	<p>According to Hamilton Jenkin a mine similar to the Wherry was attempted sometime after 1820 on the Long Rock. There was a 'collar' or caisson around a shaft on the intertidal reef, there was also a line of flat rods to the shore where there was an engine house (which was allegedly not powerful enough). The mine was also destroyed by a storm. Today a line of large rocks (each drilled with a single hole) runs from the shore to the reef (partly buried in the sand).</p> <p>Barton quotes the RCG 1834 reporting on the Long Rock enterprise which was apparently called <b>Wheal Mexico</b> (hence the Mexico Inn at Long Rock?)</p> <p>RCG 13.9.1834 says the mine has been flooded and will soon be back in production once the current preparations to install a steam engine are complete – mine called Wheal Mexico</p>	Jenkin 1979 p24   Neill 2016 p4 Barton 1967 p80  RCG 13.9.1934 p2

Date	Event	Source
1836	<p>A <b>new company</b> to work the mine was set up (allegedly by a London Company). Rich deposits of tin as well as copper and cobalt were all mentioned. By 1837 'the engine house ... has been completed. A new 40-inch engine ... would be ready for work in the course of a fortnight and a bridge or stage built, extending from the engine 80 fathoms (146m ) beyond high water mark into the sea' A horse drawn tramway ran along the bridge and flat rods ran along the side connecting the engine to the shaft. The engine was named '<b>The Queen's Engine</b>' and was built by Sandys &amp; Co of Hayle. The engineers were 'presided over' by non-other than Samuel Grose. Indications of upcountry investors viz at first annual shareholders meeting 'Henry Pope and Joseph Raleigh of Manchester were appointed Honorary Directors to facilitate communications between the Directors on the mine and Shareholders in Lancashire'.</p> <p>'About <b>1836 a company was formed to rework the mine</b>...it was necessary to again erect a staging or wooden bridge, to connect the shaft with the engine-house on the shore. The mouth of the mine was enclosed with a square waterproof boxing...the bridge about 12 feet wide'</p>	<p>Barton 1967 p81 Joseph 2012 pp32-35  RCG 5.5.1837          Boase 1976 p45 Cornishman 17.1.1884</p>
1837	<p>'The mine was a <b>tourist attraction</b> and visitors could get permission to walk along the bridge and peer down the shaft'</p> <p>'This mine...became one of the sights of the town, more particularly as permission could be obtained ...to walk to the end of the pier to look down the shaft' &lt;Note first seaside pleasure pier was Ryde Pier 1814&gt;</p>	<p>Joseph 2012 p35   Boase 1976 p45 Cornishman 17.1.1884</p>
1837 June	'There are only two mines in which <b>steam-engines</b> are used <in Madron parish and Penzance>; viz., the Wherry Mine, which has a steam-engine with a forty-inch cylinder, and was begun to be worked in June 1837 and the Tregavara Downs Mine <near Marazion>, which has a steam-engine with a thirty-six inch cylinder'	Edmonds 1839 p206
1838 July	<p>In July 1838 about <b>30 men were employed</b> in the Wherry Mine</p> <p>'...the <b>mine did not pay</b>. After some time (and of course, much loss of money), she was knacked; I believe in 1838...The mouth of the shaft, covered with an iron cap, overgrown with seaweed, can still be seen at low water, surrounded with tin-stone, the produce of the mine, quite different in appearance to the seaworn pebbles and slate rock which line the shores of the bay'</p>	<p>Edmonds 1839 p206   Boase 1976 p45 Cornishman 17.1.1884</p>

Date	Event	Source
1840	<p>'..<b>Operations ceased</b> and the 40" engine was sold, some <b>£9,600</b> having then been called up...'</p> <p>The engine, boilers and pitwork were offered for sale – the engine went to Wheal Owles (near St Just). The pitwork listed shows 15 and 12 inch pumps/rising-mains. The engine house was demolished in October 1840. An interesting tale told by Smith is worth recounting: ' "I remember," said another passenger, "the case of the <i>wherry</i> mine being re-opened by a set of mad adventurers, whom no Cornish man joined; thinking it hopeless: and upon that occasion one Cornish gentleman said to his neighbour, as they were chatting over their wine, "Friend Coolish, do you purpose holding shares in the <i>wherry</i>?"'. "No," said he, with a look of unfeigned astonishment; humorously adding, "I'm not so <i>werry</i> foolish!"</p> <p>The <b>engine house was demolished</b> in October 1840 The company was finally wound-up at a meeting held in 1842 at the Union Hotel.</p>	<p>Barton 1967 p81</p> <p>Joseph 2012 p38</p> <p>Smith 1840 ch XII</p> <p>WB 9.10.1840</p>
1840s	The <b>Wherrytown</b> houses are said to have been built from the masonry of the second Wherry mine engine house	Joseph 2012 p7
1842	A brief description of the mine contained in this guidebook. ' <b>A vessel, in a storm</b> , was once driven against the platform, and carried away a portion of it'	Reading 1842
1845	'During the rage for mining in the year 1836, the working of the <b>Wherry</b> was again <b>resumed</b> : it was supposed that the application of modern machinery and the many improvements of the art of mining, would have rendered it a profitable speculation, but experience proved the contrary, and after a loss of some thousands of pounds it was finally abandoned'. Since the operations in this mine have been discontinued, the Counting house and workshops have been converted into dwelling houses, these and a number of very comfortable cottages erected by J.J.A. Boase of Lariggan, form the Wherry Town'	<p>Courtney 1845 p51</p> <p>Courtney 1845 p52</p>
1859	<p>'This was not the end of the Wherry Mine. In 1859 there must have been prospecting or mining activity there as 19s 7d dues were paid to the Duchy of Cornwall (owners of the mineral rights under the sea) in that year for <b>tin ores raised</b>'</p> <p>'First begun about the year 1700. £70,000 worth of ore said to have been raised from here before 1818. A little got in 1859'</p>	<p>Barton 1967 p81</p> <p>Collins 1912 p611</p>
1870 20.4.1870	An unnamed correspondent reporting on an exceptionally low tide on 17.4.1870 (0.3m @12:14 according to TotalTide). Describes ' <b>the old pump at the shaft's mouth</b> ' and 'Near it also some <b>rude masonry work</b> , connected with the upper portion of the shaft, still remains'. He also describes a print drawn by Mr <b>R.T.Pentreath</b> of the mine	Cornish Telegraph 20.04.1870 p2
1870 27.4.1870	'An old Penzance man' replying to the above described the 1838 mine stage and the earlier works of '50 years before, which <b>was broken down by a large vessel</b> being driven against it during a heavy gale of wind, in the latter part of last century, when the wood pillars that supported it were broken off almost close to the ground'. He goes on to say 'when rambling on that shore more than 60 years ago , what some then called oak-trees were nothing but <b>stumps of pillars</b> of the old stage, which could be traced in <b>two regular lines</b> along the beach and between the rocks from the site of the old mine to the shore' Note – more than 60 years means before 1810 and thus from the 18 <sup>th</sup> C mine	Cornish Telegraph 27.4.1870 p4

Date	Event	Source
1870 01.06.1870	Continuing the above correspondence the writer distinguishes between the mine stumps and the submerged forest and tells how <b>the stump remains</b> extended from 'the old pump (which I saw the other day) and was extended to the shore nearly in a straight line with the boat-house'	Cornish Telegraph 1.6.1870 p4
1873	Local guide book largely quoting Collins – good description of the elvan 'This <b>elvan</b> is full of joints in some places and very much decomposed, and the joints are often full of particles of tin-ore, mingled with chlorite, with, sometimes beautiful crystals of cassiterite. The elvan is, at one point, intersected by what is called " <b>the black lode</b> ", and it is here that the tin-ore is most abundant' The <b>American Ship</b> is mentioned but no date	Cornish 1873
1884	<b>Hunt</b> retells Hawkins (1818) and brief account of the second mine. Mentions <b>Cobalt</b> and suggests this was used to manufacture <b>Smalt</b> (a type of blue pigment?)	Hunt 1884
1884	'The mouth of the shaft, covered with an <b>iron cap</b> , can still be seen at low water, surrounded with tin-stone, the produce of the mine'	Boase 1976 p45 Cornishman 17.1.1884
1860	<b>Leifchild</b> retells much of Hawkins (1818) account of the Wherry Mine but adds 'The mine was worked again a few years since; but although a very large sum of money was expended, and although all the advantage of the application of improved machinery was found, yet it failed to be a profitable adventure...'	Leifchild 1860 p39
1905	<b>Mr J White</b> recounts memories of the Wherry Mine. He recalls attending a <b>banquet</b> given to celebrate the starting of the engine in 1836 at the Ship and Castle Hotel in PZ. He says the shaft was to the west of Lariggan stream, while the end of the bridge was on the east side of the stream (???). He also says that the sea was shallower then as much sand had been removed from the beach – which was now rocky where formally it had been sand. 'Seventy years of carting sand for farming and building purposes makes a great difference in the depth of the water at the place from which the sand is taken'	Cornishman 30_03_1905
1922	Two Trinity house pilots, Mr Adam & Mr Kitchen report finding <b>timber and 'lengths of wire' in the sea</b> 'when about half a mile from shore'. They attributed these remains to the Wherry Mine. However, steel wire was not in use in Cornish mines until after 1860 – so possibly not from the Wherry Mine – remains of wreck?. A short history of the Wherry Mine by the editor which followed the above piece says that the mine was worked by 'Capt. Thomas Curtis, a miner, who lived at Buriton-row, Penzance'.	Cornishman 22.11.1922 p5
1950s	Document at Morrab attributed to Edgar Rees says 'The shaft to the mine was dug at low water, having a boarded turret sufficiently high to exceed the sea at all times of tide. Here in six summer months of 1791, 10 men working only six hours each tide raised £6000 worth of tin ore. The <b>chief adventurer and manager being Thos Curtis</b> , a labouring miner born in Breage, 10 miles from Penzance, but resided most of his life in Penzance. Induced by this mas other adventurers joined him and erected a steam engine (Hornblower) above high water mark, with a wooden bridge connecting it with the boarded turret. £70,000 worth of ore was thus raised. The stage was then destroyed by a vessel driven against it in a storm (see geological Soc of Cornwall, vol 1, page 136). The mine was resumed in 1836 and another steam engine erected with a similar wooden bridge extending to <b>the same shaft</b> , but not proving productive it was soon abandoned...'	Morrab Library REE/108

Date	Event	Source
1956	H.G.Dines says the elven is ' <b>underlying 15 to 20 NW</b> ' and is ' <i>up to 18 ft. wide</i> '. Mine reached a depth of 25 fathoms. He says the shaft is situated ' <i>230 yards SE of the Coastguard station in Wherrytown</i> '. Caisson 2 ft square and 20 ft high. He says the mine was <b>destroyed by a ship in 1789</b> and work ceased [this date is almost certainly an error]	Dines 1956 p171
1962	An unnamed Canadian company are granted permission by Penzance Town Council to drill three <b>diamond-drill</b> test bores from the shore to ' <i>investigate the lode associated with the Wherry Mine</i> '. The work was to be undertaken in October 1962, whether it ever took place is another matter	West Briton 13.09.1962 p10
1967	<b>Diamond drilling</b> was undertaken on the Wherry and Larrigan rocks by Amalgamated Roadstone Corporation (ARC) to prospect for minerals. A drilling platform is shown in several extant photographs. A shaft was also sunk, apparently by miners from South Crofty, in the old Western National Bus depot yard. What became of this prospecting is not known. Sketch map by JJ Goode shows two scaffold platforms and six different drill holes (3 at Lariggan and 3 at the Wherry) . There are many photographs of the scaffold on the Lariggan but none of the scaffolding on the Wherry have been found to date. The three test holes on the Lariggan rocks are still visible today	Joseph 2012 p39

(Barton, 1966) (Davy, 1818) (Hatchett, 1967) (Hawkins, 1818) (Joseph, 2012) (Lovett, 1876) (Russell, 1949) (Smith, 1840) (Stewart, 2017) (Leifchild, 1860) (Courtney, 1845) (Edmonds, 1839) (Thomas, 1820) (Defoe, 1724) (Jenkin, 1979) (Hawkins, 1807) (Ballantyne, 1869) (Boase, 1976) (Neill, 2016) (Barton, 1967) (Lewis, 1908) (Laws, 1978) (Collins, 1912) (Warner, 1809) (Manners, 1805) (De Luc, 1811) (Spreadbury, 1971) (Watson, 1843) (Cornish, 1873) (Brayley & Britton, 1809) (Reading, 1842) (Hunt, 1884) (UBD, 1791-1795)

## Known Dimensions

Wherry Mine 'known' dimensions				
Description	Original Dimensions	Metres	Date	Source
Old House to Old shaft	114F	208	1795	Manners 1805
Old House to New Shaft	70F	128	1796	Hatchett 1967
New House to New Shaft*	80F	146	1837	RCG 5.5.1837
New Shaft to HW	1 furlong	201	1884	Boase
Depth Old Shaft	36'	11	1790	Hawkins 1805
	26'	7.9	1791	Watson 1843
	17F	31	1794	Maton 1797
	21F	38.4	1795	Manners 1805
	20F	36.6	1796	Hatchett 1967
Depth to level of passage	26'	7.9	1790	Hawkins 1805
Workings 'breadth'	18'	5.5	1791	
Depth New Shaft – dug	4F	17.3	1796	Hatchett 1967
Depth New Shaft - intended	24F	44	1796	Hatchett 1967
Intended drive	12F	22	1796	Hatchett 1967
Width of lode	10F	18.3	1796	Hatchett 1967
Angle of lode/elvan	6' per F	45°	1790	Hawkins 1805
	60° to 70°	60°		Russell 1949
Chamber (stope) diameter	3-18ft	0.9 – 5.5	1790	Hawkins 1805
Inside of coffer (Old shaft)	2ft square	0.61	1795	Manners 1805
	2' 1"	0.635		Hawkins 1818 Watson 1843
Turret height above rocks OLD	20'	6.09	->1796	Russell 1949 Watson 1843
Turret Height above HWS	12'			RCG 5.5.1837
Width of bridge (1830s)	12'	3.65	1830s	Boase 1976
Shaft to beach at high water	720'	219	1798	Watson 1843
Depth over shaft at spring tide	19'	5.8	1798	Watson 1843

\* from the engine 80 fathoms (146m ) beyond high water mark into the sea



## First Mine Adventurers

Wherry Mine Adventurers (c. 1791) CRO AD1583/11/100			
	<b>Name</b>	<b>UBD 1791</b>	<b>Pool</b>
Richd	Oxnam	Merchant	Partner in the Penzance Bank 1797
James	Pascoe	Attorney	
Willm	Carne	Grocer	
Richd	Cunnack	Tanner	
Jno	Cunnack	Tanner	
Richd	Moyle		
Daniel	Ley	Gent & Councillor	
Thos	Bolitho	Tanner	
Thos	Gundry Senr		
Thos	Gundry Junr (purser)		
Birmingham	Co		
Thos	Woodis		
Jno	Semmins		
Geo C	Fox & Co		
Jno	Smith		
Thos	Courtis		

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