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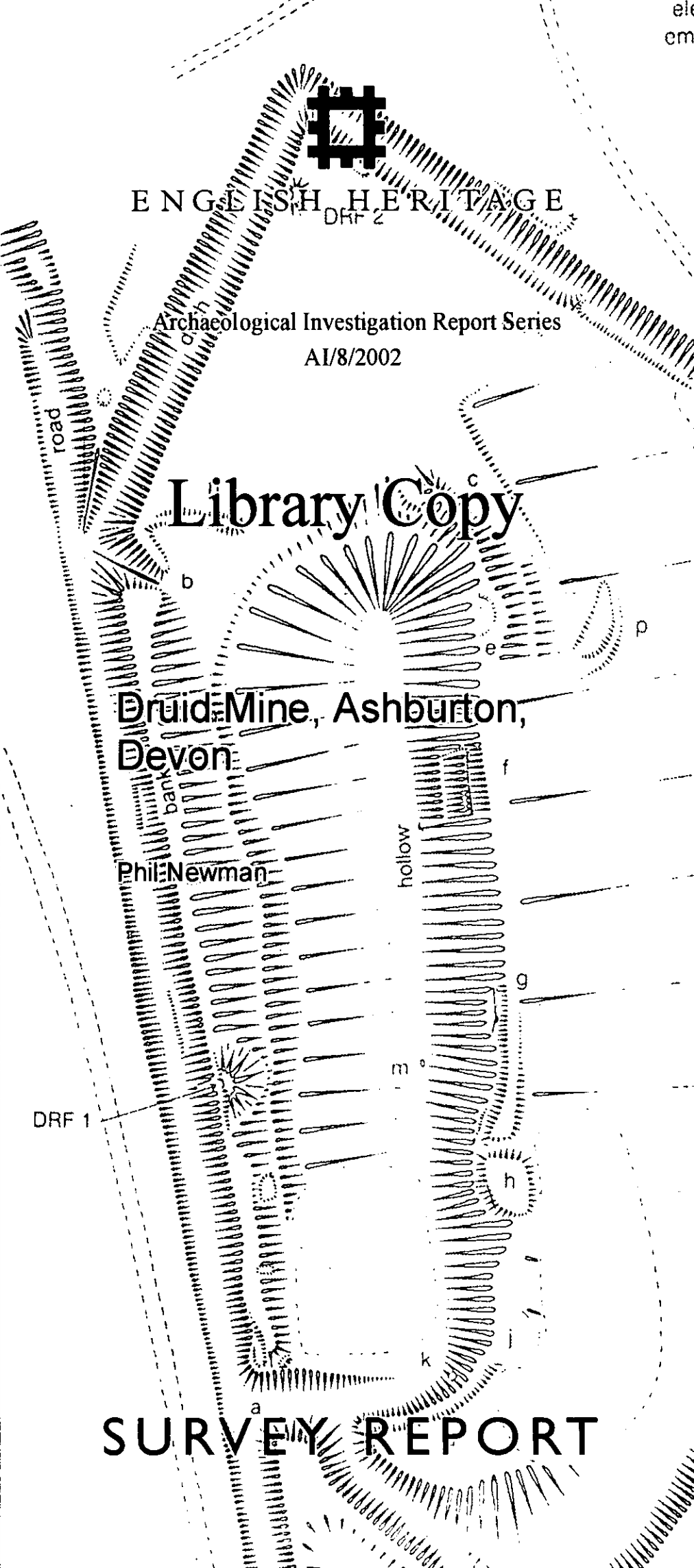
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Druid Mine, Ashburton,  
Devon

Phil Newman

DRF 1

SURVEY REPORT





# ENGLISH HERITAGE

## Druid Mine, Ashburton

An archaeological and historical survey by English  
Heritage

February 2002

County:	DEVON
District:	Teignbridge
Parish:	Ashburton
NMR No:	SX 77 SW 56
OS Map No:	SX 7171
NGR:	SX 7150 7155
Surveyed:	Nov. 2001
Report by:	Phil Newman
Surveyors:	P. Newman, M. Fletcher

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## INTRODUCTION

Druid Mine, also known as Arundell, New Victoria Mine and Devon New Copper Mine, is a small disused copper mine, located near Ashburton, 1.5km north-west of the town. Recorded activity at the mine lasted just twenty years between 1852 and 1872, when massive investment of cash and equipment was made by several companies. Apart from the removal of machinery after closure the site has remained virtually undisturbed since abandonment and several interesting features survive in a relatively good condition. The ruined engine house and its stack, both still standing, are well known and visible from the nearby road. The mine also had an impressive 60ft waterwheel, used to power crushing machinery of which the wheelpit and building remains survive. Water to drive the wheel was stored in a large earthwork reservoir nearby. A remarkable collection of documentation for the mine exists which together with the new survey provides an interesting narrative for this small but significant Dartmoor copper mine.

### Location

The mine remains are on the south-facing eastern summit of Ausewell Hill at SX 7150 7155, 245m above OD, south-west of the Rewlea Cross to Welstor Cross road, within the lands of the former Druid estate. It is sited in an area of former fields, now covered by mixed woodland.

### The work of previous writers

Dines (1956) provided a useful description of the lodes and shafts at Druid but supplied little historical information (Dines 1956). Hamilton Jenkin (1981) and Von Arx (1995) have both summarised material available in the *Mining Journal*, and the latter was also able to supplement the information with some primary documentation, probably from a private source. A useful standing building survey and discussion of the engine house, with scaled drawings has been published by W M & R D Nance (1996).

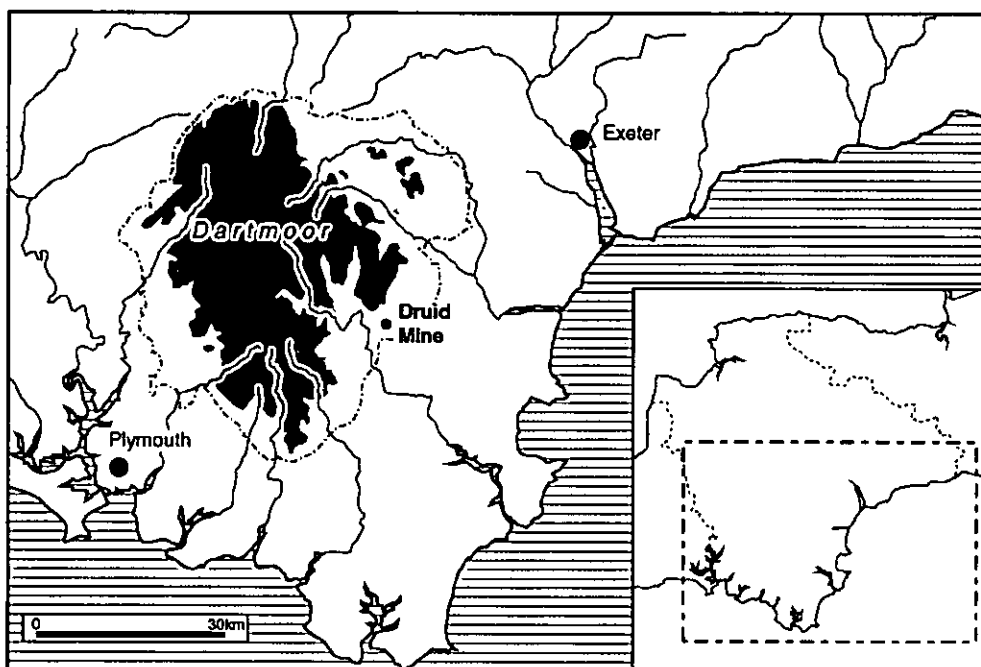
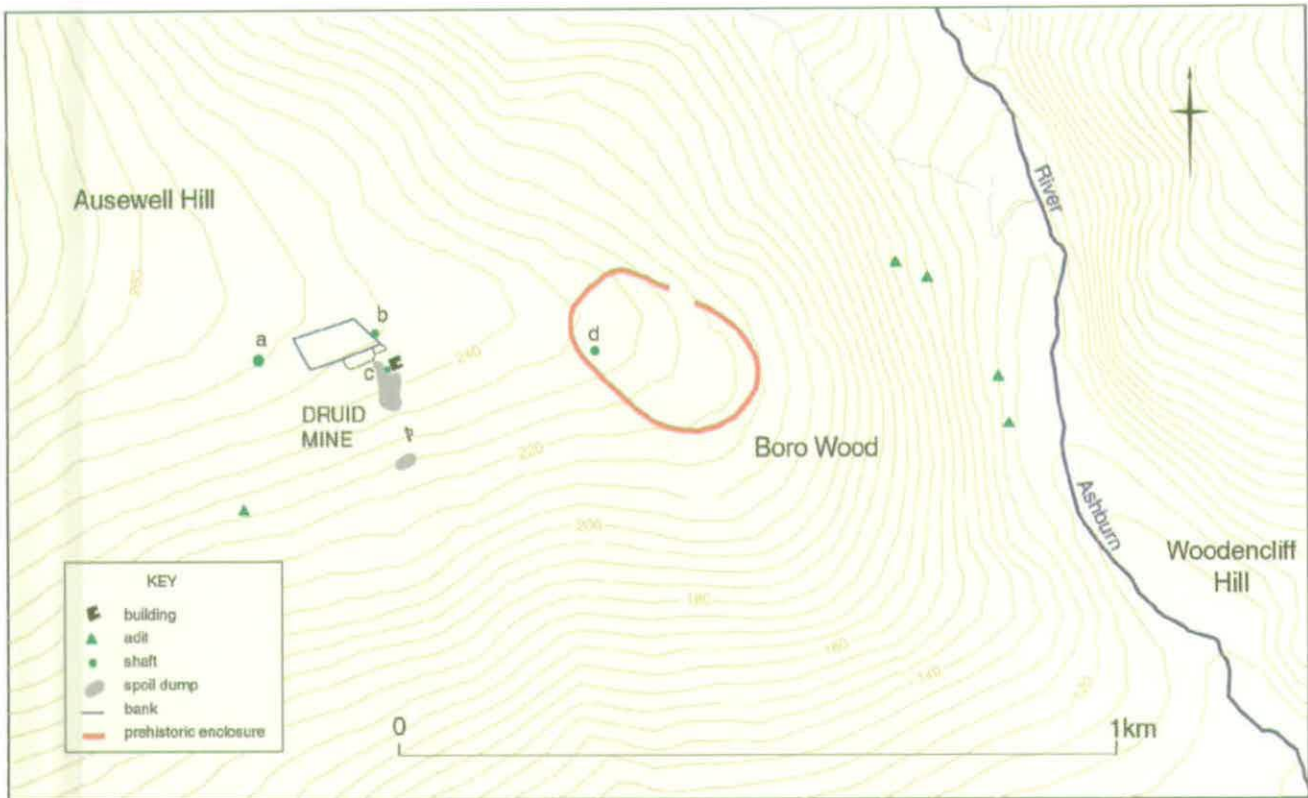


Fig. 1. Location.



**Fig.2. Contour plan showing location of mine remains.**

- a = Watson's shaft*
- b = Arundell shaft*
- c = Queen Victoria shaft*
- d = Boro' Wood shaft*

#### DOCUMENTARY EVIDENCE

It is unlikely that any mining activity took place on the Druid estate prior to the early 1850s, when activity commenced probably purely as a speculative venture; the tithe map of 1840 has no indication of anything other than fields here. The first available document alluding to mining here is a letter from Mr Shirley Woolmer to John Spark Amery, owner of the Druid estate, dated 24th April 1852 concerning the purchase of nearby Boro' Wood in which it is also mentioned that:

The times are unfortunate from the [Crimean] war affair and the long delays and excuses of the Arundell with the very uncertain results of mining are against us - all is promise promise -when will results come? (DRO 5615M/letter)

This frustration may refer to the attempts at getting a company started rather than problems on the ground as the first share issue (below) did not appear until later that year.

An indenture of 5th November 1852, between J. S. Amery, James W. Arundell, Shirley Foster Woolmer and Edmund Preston Walker (the latter three of Middlesex) is the first document known to indicate a mining company was active on Amery's land though the sett described and depicted on the attached map did not include the eventual mine site (Heatley mss). Arundell is known to have had interests at other Dartmoor mines including the Devon Tin Mine at Brimpts (Bird & Hirst 1996) and Bagtor Mine (DRO 924B/E1/4).

The surviving share prospectus for the Arundell United Copper Mines, the first named enterprise, is not precisely dated though an attached assay report by Johnson and Mathey of

19th June 1852 (DRO 565IM/prospectus). The mine, which was to be issued in 10,000 shares of £1 per share and run on the Cost Book Principle, was described as having three separate setts. According to the prospectus, 12 lodes had been discovered and work had already commenced on a shaft and adit, and, 'it is confidently expected that a sale of ores will shortly take place'. The assay report claimed that the ores raised were of 'high class' giving 9 percent of metal 'nearly 3 percent above the average of copper ores generally'. It is not known if this prospectus was published before or after the indenture mentioned above so it is difficult to know exactly where this activity was taking place, if indeed it did take place as it is not unknown for such reports to be exaggerated to encourage investment.

Though documentation is limited over the next couple of years, once the operation got started, it clearly became an optimistic time for the adventurers; on Christmas Eve of 1853 60 miners were invited to a supper at Amery's residence where food was provided by the adventurers as well as a gift of warm clothing (*MJ* 7.1.1854). On 23rd February 1854 it was reported that 'the new steam engine had been set in motion about a week since and fully answers expectation' (*DJ* 23.2.1854).

Progress was steady in 1854 if unspectacular and regular, though somewhat optimistic reports appeared in the local press:

At Wheal Arundell the lode still looks good. The engine works exceedingly satisfactorily, and a fine view of malleable copper has been discovered (*DJ* 18.4.1854).

At the mine, in a cross-cutting to the lode, native copper is produced, specimens of which may be seen at the London offices. The Captain reports very favourably of the progress they are now making (*DJ* 27.4.1854).

The spirited company at Wheal Arundell still carry on the mine with much perseverance. The lode will be shortly cut, when we trust a good profitable vein will be discovered. This company certainly are most liberal, and the thanks of the inhabitants of Ashburton are greatly indebted to them, in many instances within the last fortnight (*DJ* 29.6.1854).

A fine lode of malleable copper has been found on the Arundell mines during this week. The mine has been visited by some of the adventurers, and bids fair to be most valuable. The men engaged on the works had a treat on Monday in consequence of the cheering aspect of the mine (*DJ* 7.9.1854).

This last report refers to a gift of 2 shillings and strong ale to each of the miners to celebrate the work commencing on the sinking of Queen Victoria Shaft, reported in the *Mining Journal* for that week (Hamilton Jenkin 1982, 113). This seems odd that this should occur over six months later than the engine became operational as it is this shaft that the engine is sited over. William's and Watson's Shafts were also being sunk at that time and Victoria shaft was soon reported to have reached 35 fathoms in depth, yielding 'saving work for copper' (Hamilton Jenkin 1982, 113).

Finally in November 1854 it was reported that 'the lode is still improving' (*DJ* 30.11.1854). However, this optimism was not to last and in October 1855 operations were suspended when the company's bankers, Strahan, Paul and Bates came into difficulties (*EFP* 25.10.1855).

In 1856 an attempt was made to interest shareholders in the Borough-Wood Copper Mining Company, which was to work a separate sett, adjacent to that of the Arundell Mine. This company, promoted by a Mr T. Weston of 16 Barge-Yard Chambers, Bucklesbury, London, was to be run on the cost-book system and would be issued as 20,000 shares of ten shillings per share. The prospectus claims that the company had negotiated a 17-year lease commencing March 25th 1856. One of the main objects of this proposed company was clearly to take over the setts and equipment of Arundell Mine of which it is stated: ‘..proceedings are commenced for at once winding up that Company; in which event an advantageous opportunity for purchasing that mining sett, with all its machinery steam-engine, plant &c., will be afforded the shareholders of the present company’ (DRO 5615M/prospectus). The document mentions the digging of adits a shaft and many costeaning pits in Borough Wood. Among the ambitious claims made are the idea that new methods of ore processing could be used including ‘reduction and separation of metals from metallic ores and oxides by the action of mineral acids and of voltaic electricity’. Nothing further was heard of this company which probably never existed beyond the proposal stage. However, it is interesting to note that the office address is the same as that of the next company to take over the Arundell Mine.

On 7th July 1856 the *Exeter Flying Post* reported that ‘Arundell Mine will..soon be worked’, which suggests it still stood idle at that time (*EFP* 7.7.1856), but by December 1856 a new company was in existence called The Arundell Copper Mine. Though the company retained his name, James Arundell himself is not listed among the committee at the General Special Meeting of 10th December (DRO 5651M/minutes). A lengthy report on the viability of the mine was presented in writing by Philip Hawke, captain of Queen of the Dart copper mine, near Buckfastleigh. After describing all the lodes, shafts levels and equipment at the mine he concluded:

I have no hesitation in stating my decided conviction that this is a property of very great value....I have no hesitation in stating my conviction that, if the Arundell Mine is properly opened up ..... a very valuable Mine will speedily be realised. The whole adventure, notwithstanding the mistakes which have already been made – and outlay, no doubt, in many parts, hitherto ineffectually expended – is full of promise and reasonable expectation of ultimate and most probably speedy success. My belief is, that an immense deposit of Copper and other Mineral Ore will be laid open in this Mine, and may not be far off.....I must say that not to carry forward such a adventure with energy, now that so much heavy work has been completed, Machinery and Plant ready, and labour principally required, would be a reproach upon all Mining adventure (DRO 5651M/report).

Implicit in this last statement is a level of incompetence and badly directed use of funds by the previous management, but also that a decision as to whether to continue was waiting on the results of this report. However, the company was still operational in February 1857 and a further meeting was recorded on the 12th where:

At the meeting (Mr Shirley Woolmer in the chair), the accounts showed – Calls received £465.2s.6d: Balance last audit, £5.17s: Expenditure, Dec. Jan., £48.19s: leaving in favour of the company, £410.6s.6d. The loss of the two months working was £48.19s. Captain Moorsom and Parry and Messrs Parker, Pidcock, and Woolmer were appointed a committee until the next general meeting (*DJ* 12.2.1857).

Nothing beyond this last meeting is known of The Arundell Copper Mine, except that on 15th June 1858 an anonymous letter written at an address in Garden Court, Temple, London informed Amery that the Arundell Company was at an end.:

The whole of the machinery plant and materials has been disposed of on terms to Mr P. F. Morley and the purchase money in cash paid to the company's credit at their bankers – the amount payable to you ordered to be paid and delivered to Mr Morley the Purser and Secretary leaving him to arrange a new loan from you as you have kindly permitted. Enclosed therefore we forward you to lose no time a document by which your renewed possession of the engine ...is secured...the new company will now be ready forthwith (DRO5651M/letter).

In November 1858 'the new company' to be known as Devon New Copper Mining Company Ltd was launched to work the setts as a joint stock company with 20,000 shares of £2 per share (DRO 5651M/ prospectus). The names of the adventurers are not known but the address of the company office, 16 Barge Yard Chambers, Bucklesbury, London is the same as that of the Arundell Copper Mining Company and Borough-Wood Copper Mining Company before. An indenture and lease agreement for DNCMC exists, dated 4th June 1860, on which seven separate setts are shown including the area where the remains lie today. Also depicted, though not named, is Watson's shaft and its associated lode and adit and some buildings, including the engine house (DRO 5615M/indenture). None of the other setts depicted are known to have been developed. The company, 'run under the auspices of several gentlemen of considerable wealth and standing', had purchased the mine for £15,000 and paid £1000 for the engine. In the summer of 1861 Engine Shaft was being sunk below the 78 fathom level by nine men at a cost £16 per fathom and crosscuts were being extended at the 78 and 68 fathom levels (Hamilton Jenkin 1982, 115).

In late 1861 the captain of the mine was Philip Hawke, former captain of Queen of the Dart mine and author of the 1856 report on Arundell. Several detailed letters from Hawke survive from between early November and late December reporting on progress, where he is clearly desperate to keep the shareholders keen though the prospect for the mine was quite plainly very poor. However, these reports are important documents in that they provide detailed description of underground work. The two lodes which the miners were attempting to exploit were called the Great North Lode and the New South Lode and during this period much of the work focussed around the Engine Shaft, also known as Queen Victoria Shaft, where the miners had already penetrated to the 88 fathom level and were attempting to sink it even deeper. Hawke's descriptions of the geology are very detailed and optimistic using terms such as 'the indications here are extremely encouraging' or 'we have found a stone or two which looks very pretty indeed' (DRO 5615M/letter/29.11.1861) and he describes it in such a way as to tantalise the reader into believing success is just around the corner 'at the point of collision of these two champion lodes an immense deposit of Copper is almost certain' and 'a mass of mineral there is yet to be obtained I feel quite certain' (DRO 5615M/letter/13.11.1861). It is clear also from these reports that the influx of water at the deeper levels was a real problem where constant pumping was needed to prevent flooding, though they were at times finding it difficult to cope, which was preventing progress. At the end of these reports which really gave the directors no reason to feel hopeful, Hawke frequently concluded with a ludicrously upbeat statement, eg: 'We have before us most decidedly a most splendid prospect and the results will be satisfying' (DRO 5615M/letter/6.11.1861) or 'I would in conclusion remark the Directors may rely on the fact that success in no ordinary amount awaits them..' (DRO 5615M/letter/29.11.1861).

By 1862 36 people were working at the mine and Victoria Shaft had been sunk to 96 fathoms (Hamilton Jenkin 1982, 115) but in 1863 New Devon Copper Mine Company went into liquidation having apparently failed to produce any ore as no sale is recorded during almost five years of its existence (Von Arx 1995). On 25th October 1864 a letter from Amery's solicitors to William Moates, liquidator and shareholders of the company demanded the £300 pounds which remained owing to him and gave notice that if the sum was 'not paid within six months he will sell the steam engine and all fittings under the terms of the Resolution of the company..' (DRO 5615M/letter/25.10.1864).

The next group of adventurers to take on the mine went under the title of the Druid Mining Company and they bought the mine in November 1866 for £4000 (Hamilton Jenkin 1982, 115). In December the *Tavistock Gazette* reported:

Druid Mine near Ashburton is again set to work by an influential company, who are likely to carry out the mine as it deserves. The engine-house, engine, &c., have been repaired, and set in complete working order by the engineer, Mr James Chenhall, who deserves every credit for his plans and exertions. (*TG* 28.12.1866)

The company was represented by Loxley and Morley solicitors of Cheapside and three members of the Morley family were on the list of shareholders as well as Henry Barton who is referred to as 'the present manager of the mine' (Von Arx 1995). The Morleys could be relatives of the P. F. Morley who had acted as purser to the previous enterprise (above). Protracted negotiations took place over conditions of the lease which was not signed by Amery until February 1868 (Von Arx 1995). Work at the mine had however been carrying on since at least November of the previous year as a letter from Captain John Paul informs:

Your letter of 23rd is duly at hand. In reference to the water having raised to the 36 fathom level while crushing there was no other alternative. In keeping the 36 clear there would scarcely be one hours work of water to pump out at 10 strokes per minute. Mr Barton has ordered the pumps be dropped to the 46 fathom level and when such is done I cannot as the Captain of the mine but advise you commencing mining operations at that level as the appearance of the 36 fathom level [?]east shows that this dip of ore bearing ground is to the cherts and consequently think your chance of success is greater as they slip and slide seen at the 25 and 36 fathom levels and the effects of which have proved at a deeper level at the same time that you are opening up ground in the 25 and 36.

The current expense of the mine will be but little increased the additional weight to the engine may cost 1<sup>1</sup>/<sub>3</sub> tons of coal per week more than at present consumed.

You are aware that richer and larger deposits of ore may reasonably be expected in the deepest levels and from what we have seen in the 25 and 36, I conclude that these three levels in going west will open up a good and lasting mine. (DRO 5615M/letter/26.11.1867)

Notable in this report is the fact that at this stage this company was concentrating effort only at the shallower levels. It also implies that crushing of ores at surface was being powered by the steam engine at that time and by diverting the power away from the pumps, serious flooding had occurred. John Paul could be the Captain John Paull who worked Birch Tor and Vitifer mines the 1830s, or perhaps a relative (Greeves 1986, 21).

The next surviving report from Captain Paul is almost five months later. The letter has the familiar optimistic tone and discusses progress at the 36, 46 and 58 fathom levels:



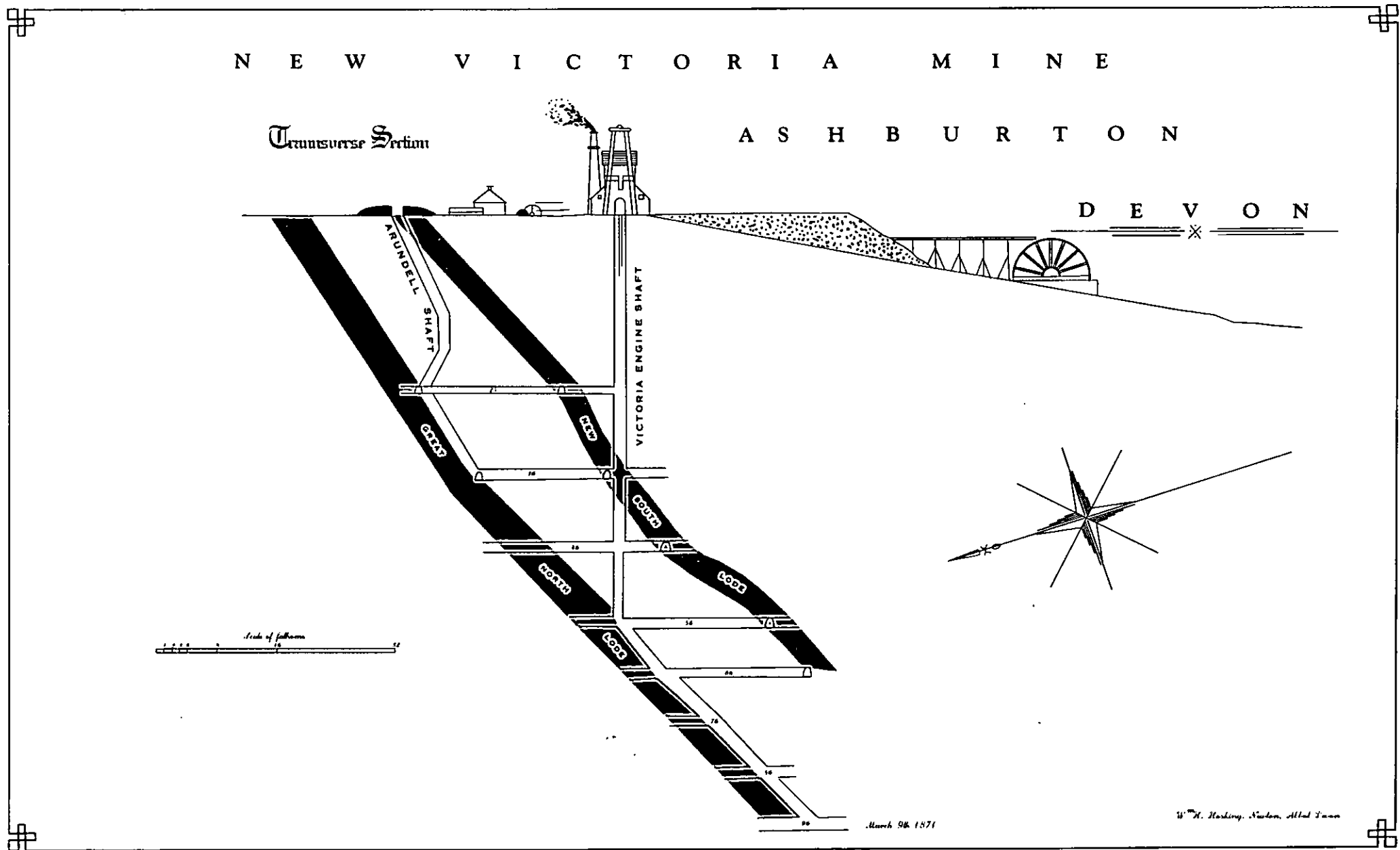


Fig. 3. Sectional view of New Victoria Mine dated 1871 (redrawn from original held in the Devon Record Office).

The engine and pumps continue in good condition and dressing and crushing at surface is going on at all speed. Three parcels of Mundick (19 tons at stamps) have been sent to Plymouth and should they prove satisfactory any amount can be raised at small expense... Taking the Druid as a whole there is not a more legitimate mining enterprise to be found which will yet be crowned with [?] success. (DRO5615M/letter/12.5.1868).

The Druid Mining Company was the only one to work the sett who have recorded sales of ore for on 23rd May 1867 14 tons of copper were sold by them at Truro for £25.11s (*TG* 23.5.1867) and on 24th July 1868 they sold 24 tons for £49. 16s (*TG* 24.6.1868). This figure appears in a local newspaper report and cannot be verified from any other source.

This is the last document referring to Druid Mining Co. and by 1869 the sett had been taken over by the New Victoria (South Devon) Mining Company Ltd whose prospectus was published in August 1869 and constituted with capital of £20,000, raised by the sale of a proposed 14,000 shares. Committee members included John Barry (Von Arx 1995) formerly of Druid Mining Co. By the 10th August 1870, at the company's second General Meeting, it was reported that the old engine which had failed to pump the lower levels of the mine under the previous company, hence their lack of success, had been replaced with a new one, the work being carried out by Henry Barton (formerly manager of Druid Mine) and that the 88 fathom level was now drained (DRO 5615M/report). On the 9th December that year the Tavistock Gazette confidently reported that: 'This is likely to become one of the prizes of 1870. A good copper lode has been cut in the bottom level, with a probability of its continuance' (*TG* 9.12.1870). The third General meeting took place on 13th April 1871 where it was explained that the board had still not been able to sell all the allotted shares. Captain William Skewis of Tavistock had been appointed as the local agent and had decided to concentrate on the 86 and 96 fathom levels where a crosscut was being carried south in an attempt to prove the opinion of a former company (DNCCMC) that the two great lodes would form a junction (DRO 5615M/report). This was a theory originally propounded by Captain Hawke ten years earlier (DRO 5615M/letter/13.11.1861). However, in Captain Skewis' report of 11th April he confirms that he does not believe this to be the case. He also reports the driving and extending of various other cross courses at the 96 and 86 fathom levels. Skewis also mentions the erection of a new Patent Jigging Apparatus, enlarging the pond and repairing the large waterwheel (DRO 5615M/report/11.4.1871). This is the first known documentary reference to the waterwheel and the pond though the fact that it needed repairs implies that it had been there for some time. Skewis mentioned that:

We find the Jigging Machine to work admirably, but the clean Ore we have obtained, although containing a large per centage of Sulphur, contains but a poor per centage of Copper. If, however, we can find a Market for this low quality Ore, at a paying price, there will be little difficulty in our raising from the levels already opened very considerable quantities.

Section drawings and a plan of New Victoria Mine have survived, showing progress up to March 1871, on which the Great North Lode and New South Lode together with all the shafts and levels worked then and formerly (DRO AMP R100B).

Nothing more is known of New Victoria after this time and a final attempt at making the sett pay was undertaken by the Ashburton Tin and Copper Company Ltd in 1872 (Nance & Nance 1996, 115). Little information is available on this enterprise though it is known that an

indenture for a company, was agreed as late as 1873. This is mentioned in a letter to Henry Barton, 'late of Brimpts' (formerly manager of Druid Mine and contractor to New Victoria Co.) in 1878 informing him that the rent was five years in arrears to the sum of £230 and the premises were therefore being repossessed by Amery's widow, Frances (DRO 5615M/letter/1878). It may be safely assumed that mining operations had permanently ceased by this time.

## FIELD EVIDENCE

### Shafts

Surface remains of four shafts survive, three of which correspond to documented shafts; an additional shaft is sited in Boro Wood, 290m from the main area of activity.

#### *Arundell Shaft*

Probably the first shaft to be sunk, the surface evidence consist only of a stony depression in the ground adjacent to the boundary wall by the road. The shaft has been capped and covered with soil probably quite recently.

#### *Victoria Shaft*

This was the engine shaft and has the engine house and pumping equipment at surface. Although the shaft had been temporarily capped, this had collapsed at the time of survey and it is now open. The upper, visible section of the shaft is rectangular in plan and has evidence of timber shoring still in place. A section of the wooden pump rod with several iron tie bands is still *in situ* and the engine house hotwell is more or less intact. This shaft is recorded as having been sunk to 96 fathoms. The problem of unwatering the mine, as reported by the various companies, and leading to the enlargement of the engine in 1869, is all too obvious today, when, during periods of sustained rainfall this shaft fills with water to the surface.

#### *Watson's Shaft*

This shaft was sunk in late 1854 and its position is recorded on the Abandoned Mine Plan (DRO R1008). The remains are approximately 183m west of the engine house and consist of a narrow diameter (1-2m) open shaft with a spoil collar.

#### *Boro Wood Shaft*

Named 'Borro Wood' shaft on the Abandoned Mine Plan this is probably the shaft mentioned on the 'Borough-Wood Copper Mining Company' prospectus of 1856, said to have been sunk in that year. The shaft is still partially open though has been used as a receptacle for rubbish. It has a spoil collar of approximately 1.5m high and a well-defined earthwork whim platform of 10m diameter is sited 5m to the north where a horse whim would have been used to wind material up and down the shaft. The relationship between this shaft and any levels cutting the main lodes at the mine, if any, is not known.

#### *William's Shaft*

There is documentary evidence for William's shaft being sunk in 1854(MJ 9.9.1854), but its precis location is not known.

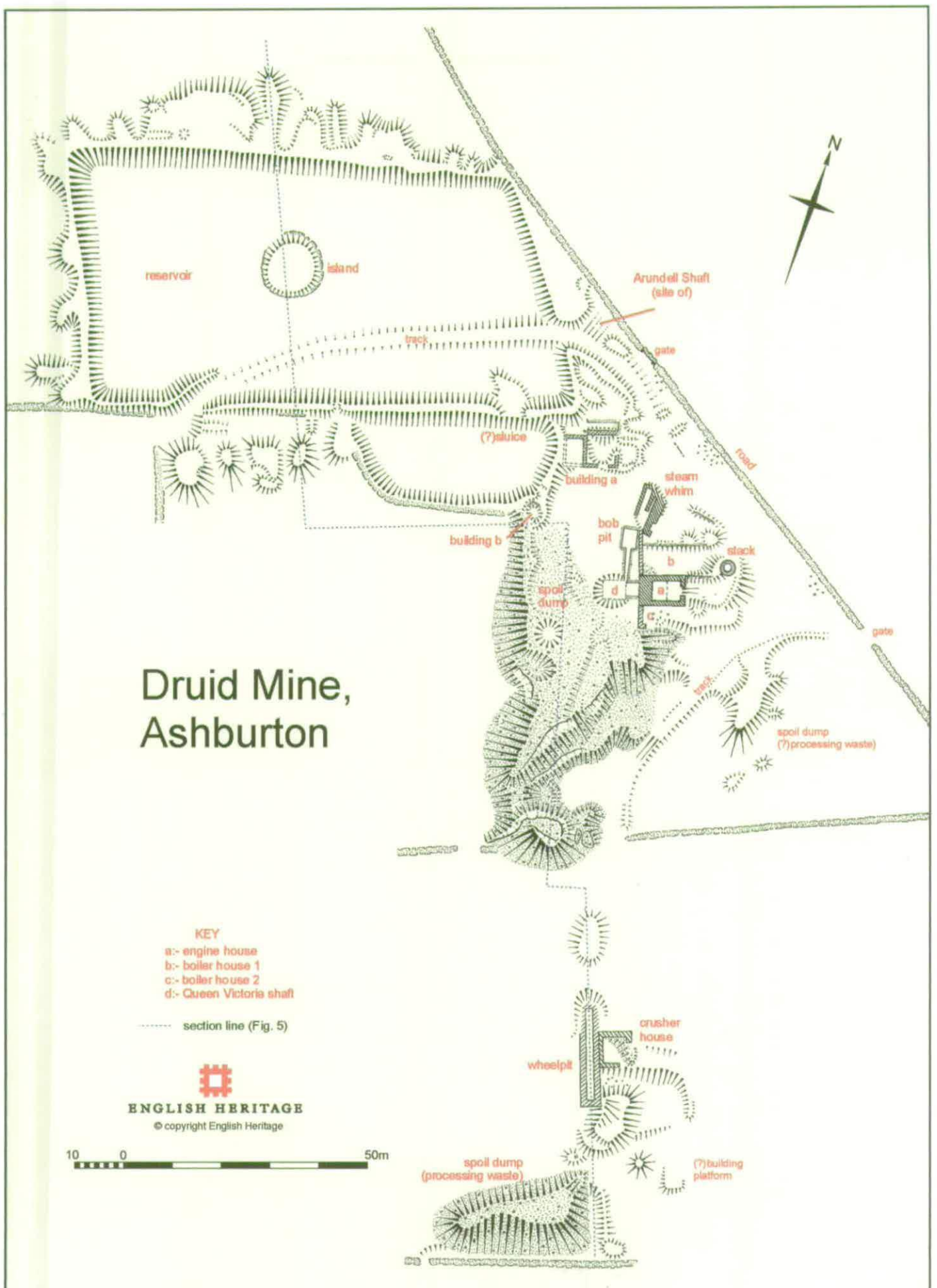


Fig. 4. 1:500 earthwork survey (reduced).



*Plate 1. Surface remains of the Boro' Wood shaft.*

#### **Adit**

An open adit with water issuing is marked on the OS 1:2500 map at SX 7429 7140, 250m south-west of the engine house. It was not examined as part of the survey. It is depicted on a plan of the sett from 1860 where it is shown connecting to Watson's shaft (DRO 5615M).

#### **The Engine House and associated features**

Much of the engine house survives; the central section which contained the bob wall and cylinder loading, together with the stack are in exceptionally good condition though are in an unstable state. The engine house has been the subject of analysis by Nance (1996a, 114-6; 1996b, 4-6), which revealed much of interest including evidence for the alterations undertaken when a larger engine was installed, as documented late in 1869 (*MJ* 11,12, 1869). The original building, built to house a 30-inch cylinder pumping engine in 1853-4, consisted of the central structure, housing the bob wall and cylinder, and the sunken rectangular lean-to structure on the north side which contained two boilers. The former is constructed from granite and survives to almost its full original height on the south side. The bob wall on the west is also intact, as probably is the eastern wall which has an intact, brick-arched cylinder opening of 1.5m wide by 4m high, approached on its exterior by an earth ramp. The northern wall has partially collapsed and is in danger of collapsing even further. The building was consolidated by two steel tie-rods passing between the north and south walls - one of which survives *in situ*, the other has been bent by the collapse of the north wall - and two passing through the east and west walls. The exterior end plates are of cast iron and bear the inscription 'Tavistock Iron Works'. The southern wall has (?)decorative vertical raised piers running the full height of the masonry and four arched window openings; one of these has been blocked while another has an intact iron window frame. Photographs taken from the south in the 1870s (Pl. 6) and 1913 (Pl. 2) show the top section of the building when intact and reveals that it had either a complex roof, combining angled and flat sections, or that this

*Plate 2. View of the engine house in April 1913. (Photo by permission of Pete Webb's photo archive Ashburton)*



outline was simply a facade. Evidence of this top section of wall, which may have been added as part of the 1869 alterations, is currently disguised by vegetation though its outline is visible. The boiler house on the north side survives only as a rectangular hollow of 14m by 5.5m by 1.5m deep with a stone revetment on the two long sides. On the west end is a slightly more substantial, upstanding wall while to the east no wall is now visible.

On the eastern exterior is the stack which still stands almost to its full original height, as depicted in plate 2. It has a base diameter of 3m. It is gently tapered, the lower section is made from small pieces of mortared granite and the top section is of red brick decorated with shallow arched niches and a protruding collar at the base of the brick section. There are two small openings at the base of the stack for fumes to pass into it from the boilers.

According to Nance (1996) several alterations were made to the building in 1869, when the larger engine was installed. This included thickening of the bob wall by 0.46m and extending the back of the house by 0.9m. The major addition however was a second boiler house on the south side of the building. This was not sunken as was the other boiler house and only part of the western wall now survives. This area, adjacent to the south side of the main structure, could have been occupied by crushing and processing equipment, prior to the 1869 alterations as it is implied in the letter from captain John Paul of 1868 that the steam engine was powering such apparatus.



*Plate 3 (left). The chimney stack.*



*Plate 4 (right). The engine house viewed from the east.*

The balance bob and counterweight were housed in a sunken revetted structure attached to the north side of the shaft. The channel in which the balance beam sat is incomplete but the beam could have been 12m long, including the bob. The area which housed the weight or bob is 2.9m by 3.9m and the whole structure survives to 3m deep. Vestiges of timber beams with vertical iron bolts survive on the surface of the revetment where the bearings of the fulcrum were fastened.

To the north of the bob pit is a sunken stone structure believed to have housed a winding device or steam whim for raising and lowering material in the shaft. It comprises two parallel stone-revetted pits, the longest of which is between 6 and 7m long by 1m wide, each of which contained a vertically set wheel. Threaded iron studs are visible on the upper surfaces of the walls.

#### **The wheelpit and crusher house**

The wheelpit is sited in a field just south of the mine and now surrounded by trees. The waterwheel is mentioned only once in the known documentary sources, late in the life of the mine (DRO 5615/report/11.4.1871) though two photographs of the wheel when still *in situ* have come to light and probably date to pre-1900 (Heatley mss). It is also depicted on the plans and sections of New Victoria Mine from 1871 (DRO R100B) though there is no mention of what the water power was used for.

The wheelpit survives intact. It is built into the slope of the hillside and is constructed in granite. It measures internally 19.1m long by 1.5m wide and 7m deep. The walling at the upper north end is flush with the ground surface but at the lower end the structure stands proud by 2.5m. It could have housed a backshot waterwheel of approximately 60ft (18.5m)



**Fig. 5. Composite section showing relative heights of the pond, spoil heap and waterwheel.**

diameter by a maximum of 4ft 6 inches (1.4m) breast, which places it among the larger diameter wheels associated with Dartmoor mining. The launder was raised on a set of piers (Pl. 5) and conducted water from a leat which ran across the top of the spoil heaps and probably originated from the large rectangular earthwork reservoir to the north of the site (below). Fifteen metres south of the wheelpit was the portal of the tailrace. This is now blocked but an earthwork channel survives which conducted the used water down to the field boundary below. It then followed the field wall west before being released into the field below through a gap in the wall.

Attached to the east side of the wheelpit is a ruined rectangular building measuring 5.2m by 4.6m and standing in places to 4m high. In the late 19th-century photograph of the wheel, this building is still intact and roofed. It had a slanted roof with the highest wall being that adjacent to the wheelpit. This building almost certainly contained crushing rollers powered by the c.60ft wheel. Adjacent to the south side of the building is much evidence of dressing waste and some *in-situ* timber remains, probably associated with the processing apparatus.



**Plate 5. The waterwheel and launder in about 1880. (photo permission of Mr and Mrs Heatley).**





*Plate 6. The waterwheel and engine house to the rear, later than plate 5 as the launder has collapsed.*

#### **Building a**

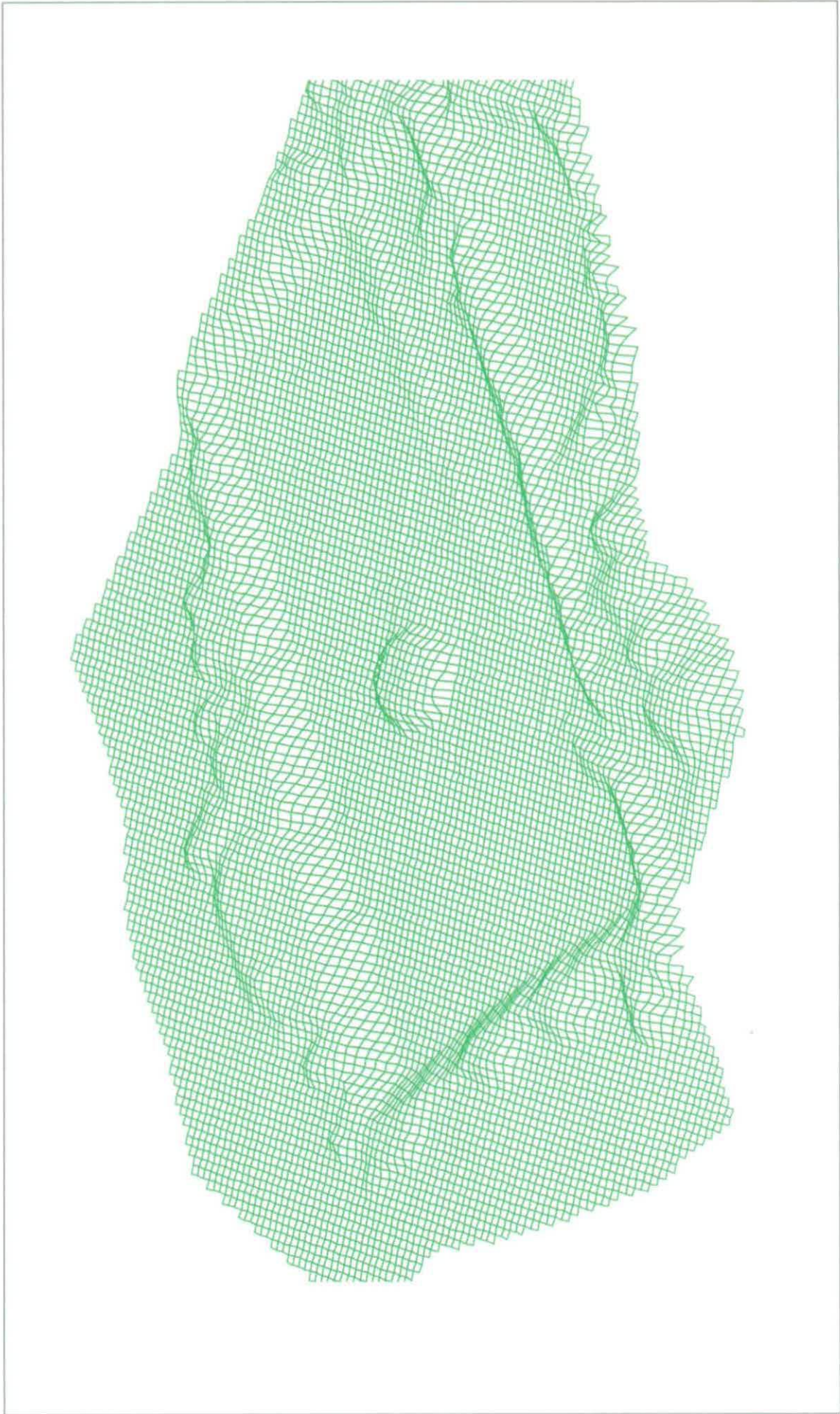
North of the engine house are the low wall remains of a building. The building appears to have comprised two compartments though earthwork remains on the eastern end could represent a third, however on an early depiction of the mine only two are shown (DRO R100B). The most visible section measures 5.2m by 5.8m with a probable entrance on the south side. The secondary section on the west end is approximately 5.3m by 3.8m. An apparent revetted alleyway of 1.7m wide runs along the northern exterior of the building.

#### **Building b**

The hollowed interior and traces of walling from a building which is depicted on the plan of 1871 (DRO R100B), are built into the corner of an earthwork bank. The interior measurements are approximately 3.7m by 2.8m

#### **The reservoir or pond**

On the higher, flatter, northernmost sector of the site is a roughly rectangular earthwork. Although, like the wheelpit and crushing house, this feature receives little mention in any of the documentation, it was almost certainly constructed as a reservoir to provide water for the c.60ft waterwheel and is the 'pond' described by Captain Skewis in 1871. The earthwork measures 98m east to west by 50m. On the higher northern side and the east and west ends the capacity has been created by removing earth to create a hollow of 2.3m deep with a level base, but along the lower southern edge a bank or dam has been raised to a height of only 1.5m (see section). The surplus material has been dumped around the peripheries of the hollow and in four separate heaps on the south side. This bank has incorporated a former field boundary, masonry from which survives along some of the outer face. In the centre of the reservoir a circular portion of the ground has been left untouched and had a revetment placed around its diameter effectively creating an island. For what purpose this was intended is not known.



*Fig. 6. Digital ground model of reservoir.*

The reservoir covers an area of approximately 4211m<sup>2</sup> (excluding the island) and could hold 6,316m<sup>3</sup> (6.3-million litres or almost 1.39-million gallons) of water if filled to its maximum depth of 1.5m. The probable outlet was on the south-east corner where a gap in the bank is visible, which could have accommodated a sluice gate. Below this opening, and attached to the exterior of the reservoir is a second, smaller earthwork with an area of 627 m<sup>2</sup>, which would also have been capable of holding water though whether that is for what it was intended is not known. The larger reservoir was breached in two places when a track was constructed through it after abandonment in 1872, but before 1885 when the track is depicted on the OS first edition 25" map. The source of water to fill this storage capacity is something of an enigma. There are certainly no divertable natural springs or streams known nearby and rainwater runoff at this altitude would have been negligible. It is possible that water pumped up the shaft could have been drawn to surface to serve this purpose and this would have added further need for the greater pumping capacity provided by the larger engine in 1869.

### **Spoil dumps**

Considering the mine has a recorded working period of around 20 years, the total quantity of dumped spoil is minimal. Although the main spoil dump, south of the engine house is impressive, standing to a maximum height of approximately 5m and covering an area of approximately 1740m<sup>2</sup>, it does not appear to represent great productivity at the mine, although some waste could have been disposed of in dead areas below ground. Also, Dines (1956) observed that traces of copper in this material were minuscule, suggesting either that the retrieval rate for the ore was high or that the copper yield from the lode was poor. The dump, which has a level upper surface, consists of a solid concretion of blackish, shaley material. Weathering has caused the dump to begin breaking up at the southern end and some undermining on the south-east side leaving unstable overhanging edges.

A further large dump of waste material is to the far south of the site below the wheelpit. It measures 35m by 15m by 2m high and apparently consists of finer material which is likely to be the waste product from the crushing and refining processes housed in the building just above.

A small flat-topped dump SE of the engine house could be processing waste from the period when crushing was taking place beside the engine house.

## CONCLUSION

In many ways the history of this mine is typical of mining ventures of 19th-century Dartmoor. Geographically remote shareholders persuaded to invest considerable sums in a mine that was never likely to produce a good return. What is remarkable is that in a short space of just 20 years, six different enterprises, with an average duration of three years were involved with this mine, despite what were clearly disappointing results from day one. Some of the people involved were associated with 2 or more of the companies that worked the sett which suggest great optimism on their part. The optimism is matched by the mine captains who consistently reported their belief that good times were just around the corner. While it is tempting to assume that this entire enterprise was a scam, it could equally have been a case of totally misplaced optimism on a grand scale, with all involved truly believing there were riches to be made here.

The amount of documentation available for the mine is exceptional, and provides not only a comprehensive history but also important information regarding the interpretation of various features on the surface. Further examination of this material could provide a fuller understanding of underground work too.

As to the mine site itself, several important elements survive. The engine house, dating from 1854, is clearly the most important of the surviving features and the 1869 alterations to it, noted by Nance (1996), make it quite unique. More detailed recording of the standing remains would no doubt prove rewarding. The construction of the wheelpit and its reservoir must have been a massive undertaking but documentation for that event eludes us. It is likely to have occurred later in the life of the mine because the great height needed for the launder was achieved by running the leat over the main spoil heap, which must have already taken on substantial proportions. The waterwheel, a particularly large example by Dartmoor standards, which had a diameter of about 60ft is sited where no natural water supply was available so a massive earthwork reservoir was constructed a little higher up the hill. Even at this point no water was present and it seems likely that water raised up the shaft by the steam engine was used to fill it.

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### Abbreviations

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*DJ Devonport Journal*

*MJ Mining Journal*

*EFP Exeter Flying Post*

DRO Devon Record Office

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