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HOLNE CHASE TIN MINE, HOLNE, DEVON
AN ARCHAEOLOGICAL SURVEY

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ARCHAEOLOGICAL
SURVEY AND INVESTIGATION

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Holne Chase Tin Mine, Holne, Devon

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County:	Devon
District:	Teignbridge
Parish:	Holne
NGR:	SX 7231 7144
NMR No:	SX 77 SW 63
Date of survey:	January 2006
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Photography by:	Phil Newman

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Summary

A 1:1000 survey of Holne Chase Tin Mine was carried out by the English Heritage Archaeological Survey and Investigation team in January 2006. The survey has revealed that this small undeveloped and poorly-documented mine has important field remains, highly representative of a certain category of tin mine known to have been common in the 19th century. The earthwork and structural remains include extractive evidence as well as extensive well-preserved dressing floors and a remarkable tramway and incline extending for 950m between the two. The remains also indicate that the mine was scarcely worked to any depth, produced little ore and was probably worked for a short period of only three or four years, though earlier phases are likely.

LOCATION, TOPOGRAPHY, GEOLOGY AND VEGETATION

Holne Chase is a northward projecting, steep-sided peninsula, 4.5km north-west of Ashburton. It owes its form to the meanderings of the River Dart where a long loop in the river between New Bridge and Holne Bridge extends for over 3km, creating a spur 2km long by 1.5km wide. The spur has steep valley sides falling over 100m down to the river and a pronounced rise in the centre where the summit is 190m OD. The south side of the summit rises gently from the ridge unlike the north side which falls away sharply down to a shelf 60m below. A late-prehistoric hillfort sits on the gentle slope of this shelf. North of the hillfort a steep and rocky scarp descends to the river at the northernmost point of the peninsula. Holne Chase lies entirely within the Dartmoor Metamorphic Aureole, the granite mass lying almost 2km to the west. The dominant geology of the Chase is Carboniferous shale (BGS sheet 338) and the mineralized lode which has been worked near the summit lies within an area of

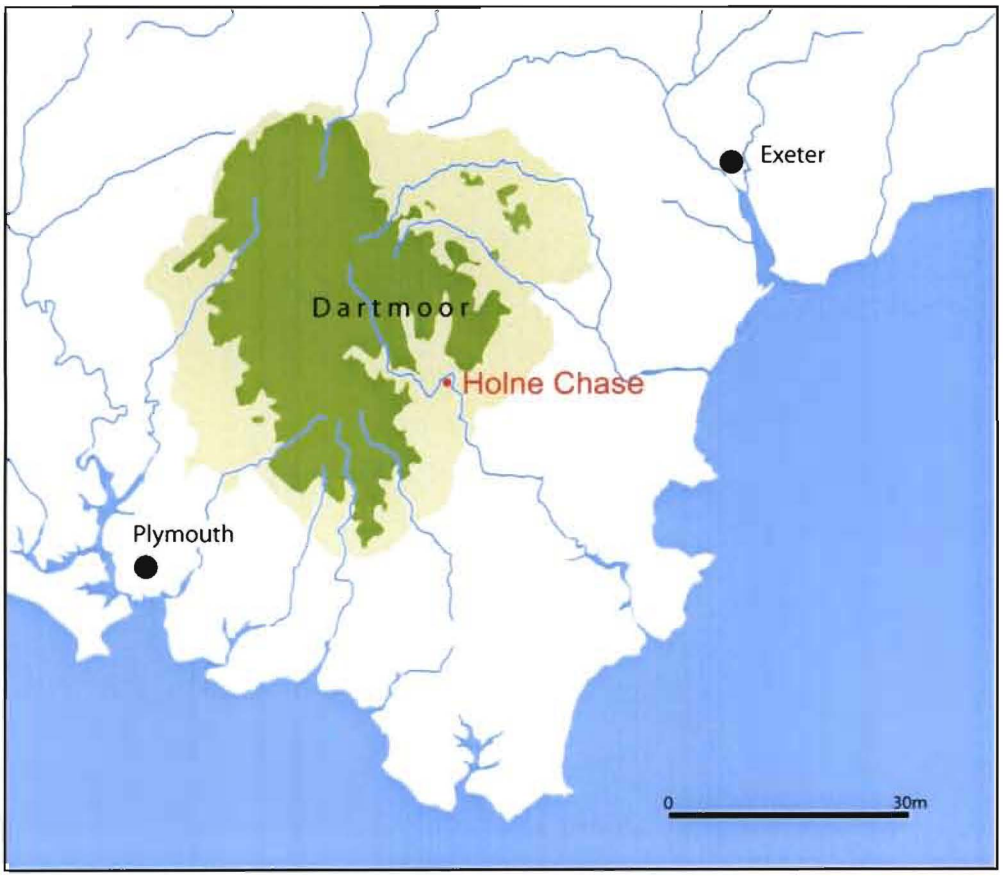

Figure 1 Location map.

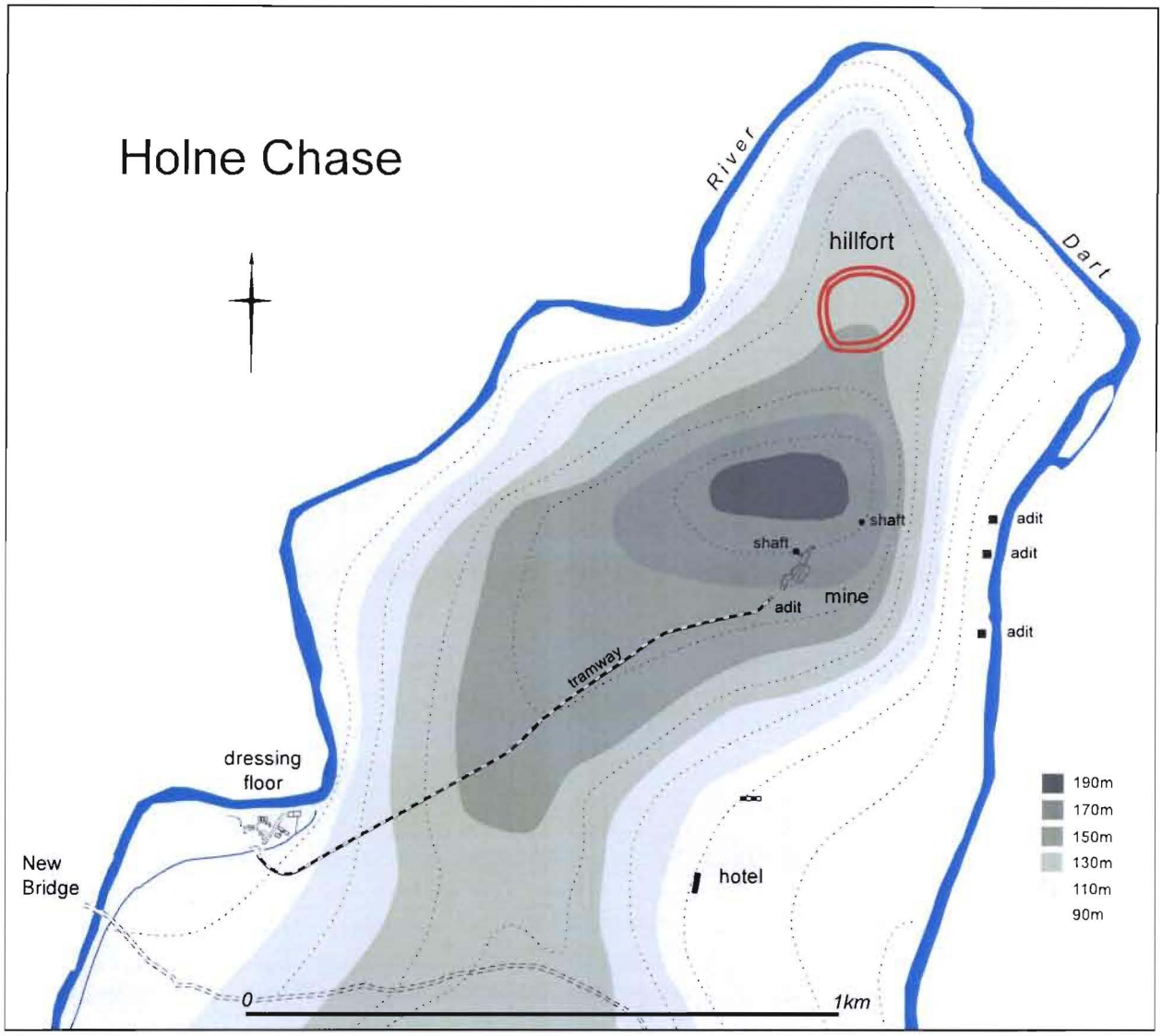

Figure 2. Relief map of Holne Chase showing elements of the mine.

Mount Ararat Chert formation (Page 2003). The woodland of Holne Chase is managed as an SSSI and made up predominantly of native species. The area around the openwork and sections of the tramway lie within a clearing of recent date but the dressing floors are currently overgrown with trees and undergrowth and badly affected by forest debris.

HISTORICAL SUMMARY

Documentary research, past and present, into Holne Chase Mine or Chase Mine has revealed surprisingly little. A reference in the *Mining Journal* of 1859, which simply lists the mine as working provides one brief glimpse (*Mining J* 23.7.1859) but also in that year it was recorded that the mine was held on a 21-year lease at 1-16th dues and divided into 5000 shares. The lode was said to be an extension of the Devon Great Elizabeth copper lode and was visible in the river bed of the Dart (Brook Index; Holne; *Mining J.* 2.7.1859). Many other references in that periodical to 'Holne Mines' in the 1850s are almost certainly referring to those on the open moor at Ringleshuttes. A second company was formed to work Holne Chase and operated between 1874-7 (Brook Index, Holne). In 1874 it was also recorded that a leat was being cut from the Dart for driving the machinery of the new Tin Mine on the property of Sir

Bouchier Wrey (*Totnes Times* 19.4.1874). The only recorded sale of tin was in 1875 when 4 tons 16cwts of black tin, sold for £253 16s 6d (Brook Index, Holne).

By 1886 the mine is marked as disused on the 1st-edition Ordnance Survey 25-inch scale map. It seems likely that the activities of the late 1850s and the 1870s represent two separate episodes though little is known of either or whether anything occurred before or between these dates.

THE SURVEY

The survey was undertaken as part of the Hidden Dartmoor project which aims to investigate certain neglected themes and areas for study within the National Park. Mines and other industrial remains are a neglected element of the landscape of Dartmoor but particularly so within the peripheral woodlands of the Park. Following a programme of reconnaissance and documentary investigation in the winter of 2005-6, Holne Chase was one of two mines (the other is Huntingdon) which were selected for large-scale survey on the basis of the good preservation of evidence and the representative nature of the remains. The survey was conducted using a Total Station Theodolite. Control was established using two ring traverses of ten and four stations, linked by a baseline traverse following the course of the tramway. Detail was recorded electronically from each of these stations.

The openwork, shaft and adit

Evidence of extractive activity is located a few metres south-east of the summit of Holne Chase at SX 7231 7144. This lies between the 170 and 180m contour, and comprises an openwork, shaft and adit. Although the remains of the worked area appear to represent two differing extractive techniques, there is no certainty that these represent two widely separated episodes.

Figure 3 The openwork.

Holne Chase Mine

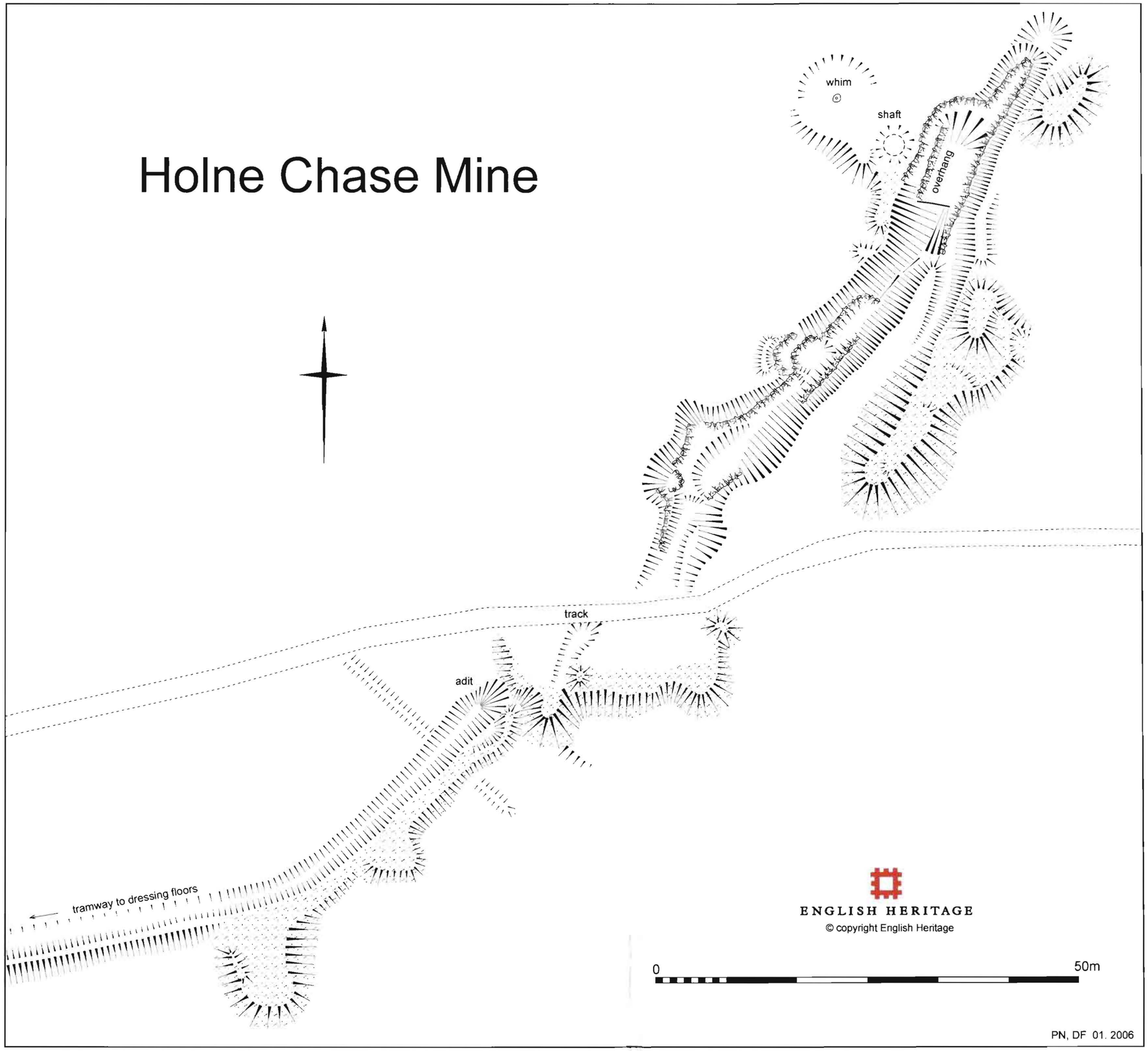

Figure 4 1:500 scale earthwork plan of the openwork , shaft, etc

An open rock-cut gunnis, with steep sides and following a strike of approximately 35°, certainly represents the first extractive activity. This may have been formed initially by digging an alignment of closely-spaced pits or 'goffans' onto the back of the lode which outcropped close to the surface, the area between the pits being removed as a second stage in the process leaving the continuous trench which remains. The evidence of numerous shotholes in the faces of the outcrops indicate the use of explosives to remove the rock and implies a probable 19th-century date for this openwork. The lack of a spoil heap associated with this phase suggests that a good deal of the material removed was transported away for processing.

To exploit the deeper sections of lode an attempt at underground working is evident by a shaft which was sunk close to the western edge of the openwork at SX 7233 7148. A thin curtain of rock separates the shaft from the deepest point of the earlier working and near the floor of the openwork the shaft has broken through, leaving an overhang. Rubbish dumped into the shaft is now spilling out into the base of the openwork.

Hoisting in the main shaft was powered by means of a horse whim, located 6m to the north-west. The whim survives as an 8.3m diameter level earthwork platform, which cuts into the slope on the north side. A mellior stone, with its socket exposed, is sited approximately in the centre. Once raised, waste material was barrowed via a gully on the east side of the openwork and dumped onto a moderate linear heap. A roughly built stone revetment, which extends across the openwork just south of the shaft, may have been constructed to reinforce the barrow run. The size of the spoil heap (34m x 14m x up to 2m high) suggests that the shaft was not sunk to any great depth.

An adit portal is sited below the track, 90m south-west of the shaft and was clearly driven to connect with it. The adit is open and clear for its full length of approximately 16m, although rubbish has been dumped in the entrance. A small spoil heap representing material removed from the adit has been dumped at the end of a linear gully. This extends south west from the adit for 36m and is up to 5m wide and 2.5m deep. Near the heap the gully is much shallower and turns gently WSW where it forms the start of a tramway installed to transport material directly from the adit level to the dressing floors, 965m to the south west.

The tramway and incline

The course of the tramway survives as an earthwork over its entire route and its profile varies at different points. After leaving the immediate area of the mine it follows an approximately level course for 420m, i.e. to the top of the inclined section, descending only 1m. For the first 150m it is visible as a shallow cutting with a bank of spoil on the downslope side. However, where the tramway runs parallel with a later woodland track the bed becomes slightly raised and more spread. The inclined section commences at SX 7183 7114 as the tramway leaves the natural plateau of the promontory and descends towards the dressing floors. A short section of raised embankment marks the change from level tramway to incline and was probably necessary to cancel out the gradual decline and rounded profile of the natural slope. Attached to the south side of the embankment is a level topped mound

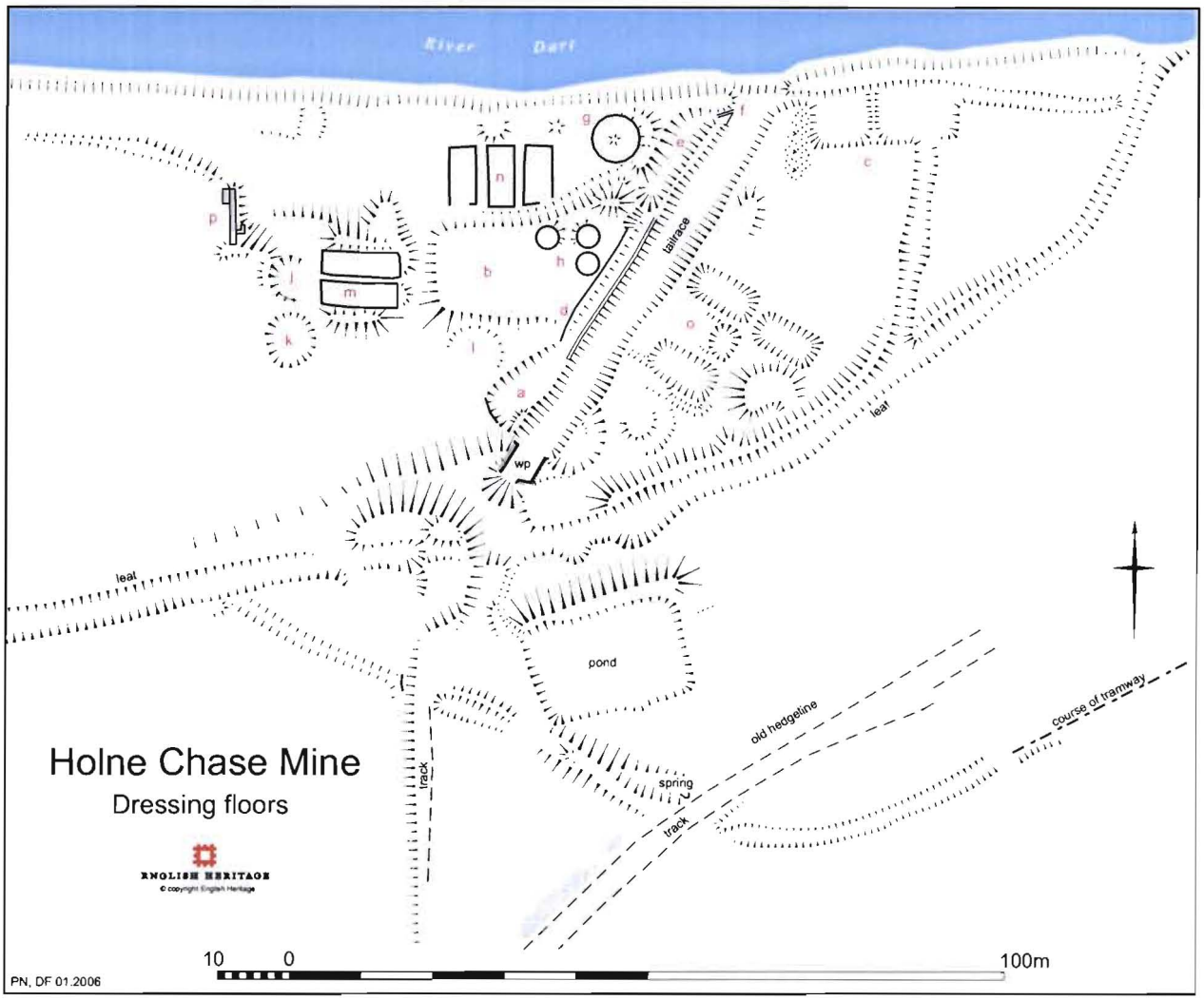

Figure 5. 1:1000 scale earthwork survey of the dressing floors.

which may have accommodated winding gear associated with the incline. From this point the slope of the hillside is fairly even and the incline follows a direct course down towards the base of the hill and the dressing floors, descending 60m over a distance of 425m. Approximately half way down, a slight natural break in the slope was overcome by digging a cutting of a little over 1m deep and 110m long between SX 7168 7106 and SX 7160 7101. A bank of material resulting from this cutting lies parallel to it on the west side.

At the base of the natural slope the tramway levels out and curves around to the west towards the dressing floor via a further shallow cutting. It appears to terminate at a tipping point just above and to the west of the wheelpit at SX 7142 7098, having covered a total distance of 965m.

There is no evidence to suggest what, if any, motive power was used to haul skips up the incline. There is no waterwheel pit associated with it and it is difficult to imagine how the stamps wheel may have been utilized for this secondary purpose. The gradient is too steep for horses to have pulled directly up the slope and there is no trace of a steam engine, though it is possible that a portable engine of the Robey type could have been stationed at the top. A system whereby the weight of loaded skips descending the slope was utilized to haul empty ones in the opposite direction is a possibility. However, as the trackbed generally, as well as the cutting, is too narrow for a continuous double track, a passing loop would

Figure 6 The wheelpit, disguised by trees and forest debris.

have been needed half way up. Another possibility is that a horse powered whim, similar to that used to hoist material up the shaft, could have been sited at the top of the incline, connected by cables to the skips. Unfortunately there is no earthwork remains to confirm that either of these systems were used.

The stamping mill and dressing floors (centred SX 7143 7100)

The dressing floor is sited adjacent to the south side of the River Dart, 280m north east of New Bridge on a level area that appears to be subject to occasional flooding. Hamilton Jenkin (1981, 109) implies that he was unable to trace the evidence of the dressing floors, which were described by Dines (1956, 737), though they are clearly marked on the 1st edition OS 25-inch map of 1886. The dressing plant was extensive considering the probable low total output of the mine, covering an area of approximately 1ha and containing a wheelpit, six round buddles, eleven rectangular pits, a large pond and a ruined building. Many of these features are illustrated on the 1886 OS map, including most of the round buddles and rectangular pits. The layout does not conform to the standard of the mid-nineteenth century, and the presence of so many round buddles, which were not introduced to Dartmoor until the 1850s, suggests that in their surviving form these features are associated with the briefly documented 1870s activity. It is also notable that the site is more or less flat, rather than the more usual location on a slight slope. The latter was necessary for the flow of water, essential to the dressing processes, to be utilized to the best advantage.

William Crossing (1912, 341), noted the large leat that supplied water to the dressing floors but recorded that, at the time of his visit, this had been adapted to supply some fish-rearing ponds. He could only have been referring to the rectangular pits mentioned above, in which case some or all of them either had origins as buddles but were adapted for fish rearing later, or they were not created until after the cessation of mining operations and therefore not mining related at all. However, a third possibility is that Crossing misinterpreted what he saw and that fish-rearing never took place here.

The wheelpit (wp) is of a sunken construction, approximately 4m deep and 4.2m wide, although it is probable that the wheel only occupied part of this width. The structure is 4.5m long on the west side but only 4m on the east where a back return wall reduces the length slightly. Judging by the height of the leat which is at maximum 6m above the current base of the wheelpit (allowing for silting), if overshot, the maximum diameter of the wheel would have been just under 6m (19.5 ft). This would have protruded just beyond the end of the structure and the axle would have been lower than the top of the wall. However, a breast-shot arrangement could have been used in which case the wheel would have been larger, possibly 8m diameter, and extending beyond the end of the stone structure. This arrangement would have placed the wheel in a better position to power a set of stamps on the narrow terrace on the north side of the wheelpit, but this is a large diameter for such a modest stamp mill. This stamping area (a) consists of a slightly lowered, approximately levelled area with traces of a revetment along one of its scarped edges and was too small too have accommodated more than four or six heads of stamps.

There is a massive tailrace consisting of a straight 6.8m wide linear gully, currently up to 2m deep in places, but heavily silted and permanently wet. The tailrace extends from the wheelpit down to the River Dart, a distance of 65m. The surplus material which resulted from the digging of this gully has been dumped on the west side and deliberately spread to form a raised level area (b). Three of the buddles (below) are located on this plateau.

Water was provided via a substantial leat, which was dug in 1874, and diverted the water 540m from a point on the River Dart at SX 7108 7059, upstream of New Bridge, just below Salter's Pool. At this point the channel was cut through the solid rock of the river bank to establish the correct level for the weir outlet. A stone-built sluice survives a few metres downstream, bridging the deep channel of the leat, and would have been used to control

Figure 7 The leat take-off point on the River Dart below Salter's Pool.

Figure 8 The large round buddle.

the flow of water from the sometimes volatile River Dart. The leat passed beneath the road just east of the bridge though its course has been covered by tarmac since it fell into disuse. Although now heavily silted, the leat channel in the proximity of the dressing floors is up to 3m wide and probably passed below the tramway via a conduit thence onto a raised wooden launder to supply the wheel. The leat continues beyond the wheelpit at a much lower level, running back into the River Dart at SX 7152 7105.

A short branch of the leat once fed two rectangular pits which sit side by side at SX 7148 7104 close to the river (c). These are likely candidates for some of the fish-rearing ponds mentioned by Crossing, firstly because they are connected to the water supply from the leat as he described and secondly, because there is an outflow channel back into the river which is close by.

As described above, the most likely location of the stamping mill was to the north of the wheelpit, although the levelled area is not very large, 5.3m by 13m, and could only have contained a maximum of eight stamps, but more likely four or six. After crushing, the pulp was probably collected in a settling tank contained within the area marked by a 16m-long by 2.8m-wide channel (d), edged with a stone wall on the east side and running parallel with the tailrace.

At the northern end of this channel is the probable tailings pit (e). The pit is approximately 15m long by 5m wide and up to 1m deep with sloping sides. At its northern end there is a narrow, stone-lined sluice channel (f) for releasing water into the tailrace to flow back to the river.

After crushing, the resulting pulp was concentrated in buddles. Four round buddles survive with masonry linings still in place; a further three are visible as earthworks. The remains of one other marked on the OS 25-inch 1st edition map of 1886 may have survived but is not currently visible due to dense brambles. The largest of the buddles (g) has a diameter of 6.55m, is approximately 0.3m deep, and has an intact masonry lining around its circumference. There is an outflow opening of 0.7m wide on the south side, which directed waste water into the tailings pit set just below. A slight mound in the centre of the buddle is probably the remains of the central dome.

Three smaller round buddles (h) are located a few metres to the south west on the slightly raised area described above. They all appear to have intact linings, but are heavily disguised by silt and woodland debris, and are all of approximately 3.25m diameter. Of the other three examples (j, k, l) which survive as shallow circular earthworks, their approximate diameters are between 4.5m and 5.5m, but only one has any masonry present.

The function of the rectangular pits and the question as to why there were so many, considering the number of round buddles also in place, is intriguing. The problem is compounded by William Crossing's remark regarding fish-rearing ponds, as these could have a similar appearance to rectangular buddles. Although Crossing's description was first published in 1909, it is notable that the rectangular pits, together with the round buddles, wheelpit, leat and other features, were depicted on the 1st edition OS 25-inch map as early as 1886, only 11 years after abandonment of the mine, and that although the presence of a disused mine is noted on the map, there is no mention of fish ponds.

The pits are arranged into three distinct groups, each with differing characteristics and each arranged in parallel twos or threes. On the western side of the site is a pair of closely spaced pits aligned east-west (m), with vestiges of a masonry lining on the interiors. The dimensions are 10.7m by 3.3 – 3.5m wide and very approximately 0.4m deep. The spoil that was removed when the pits were created has been dumped around their edges.

A second group (n) is near the river bank and oriented north-south. The three pits are spaced about 1.4m apart, all lined with masonry and very regular in shape. They are all between 7m and 8.5m long by between 3.5 and 4m wide. The average depth is 0.2m. A channel runs along the south side of all three pits, which probably diverted water from them into the tailings pit. This association with the tailings pit offers some support for the idea that these three were more likely to have been part of the ore dressing process. They are also rather shallow to have served as fish-rearing ponds.

The third group (o) is located on the east side of the tail race and oriented NW-SE. Three rectangular pits are visible, two of which lie end to end, and a forth feature, which could be an incomplete example. These pits exist as earthwork hollows with sloping sides and no linings. They are between 9.4m and 10m by 5m and 5.5m wide, with a depth between 0.6 and 0.9m. It is worth noting that these three pits are separated from the main dressing floors and the stamps by the tail race and it is difficult to see where in the normal flow of the tin dressing process they could have fitted.

Although rectangular pits of the type represented here are not uncommon at tin mines of this period, they seldom served as buddles. They more usually served as tailings pits and were rarely so numerous. Some doubt has to remain as to whether any of these pits are associated with the mine or if they were indeed fish ponds.

Another large pond, which survives as a dry and silted earthwork, is located on the south side of the leat higher up the slope. The earthwork was cut into the hillside and the upcast excavated from it was formed into a retaining bank on the lower side. The resulting approximately rectangular hollow is 22m by 13m but survives to less than 1m deep being heavily silted. The pond was created to collect water from the small spring which issues 15m above beside the path. A small quantity of water still flows through the pond and exits via a channel in the north-west corner into the disused leat below. Its purpose is not obvious, particularly as the leat from the Dart would have provided a substantial supply of water to all the processes at the dressing floor, negating the need for this diminutive source. It may be that this pond has origins before the creation of the surviving dressing floor and may represent evidence of an earlier phase of activity, but its limited water supply and capacity suggest it was not associated with a water wheel of the size one would expect to be in use in the 19th century. An alternative explanation is that some means of preventing the water from the spring from swamping the dressing floors was needed and this pond solved the problem by storing it. The water could then be utilized on some of the dressing processes. This idea is particularly appealing because the current situation, whereby the area around and within the wheelpit is soft and boggy, demonstrates how wet this area can get without the pond functioning.

On the north-western quarter of the site is the tumbled remains of a wall, 7.8m long and 0.8m thick (p). On its eastern side a small L shape wall survives attached but it appears unlikely that either wall was part of a building. Unfortunately the structure is too badly collapsed to interpret its function. On the north-western tip of the wall a low, slightly curving, earthwork bank with a spread of up to 3m, extends for 22m to the west. This has created a shallow pond behind the bank, which fills with water in the winter and may have been deliberately constructed to do so.

Other mining-related evidence

Traces of mining activity survive at other points within the woodland at Holne Chase, notably three adits sited just above river level on the west side of the hill. There is no surviving record which refers to these adits and it is uncertain as to whether they were associated chronologically or otherwise, with the main working area. They were not driven to any great extent. At SX 7263 7136 the adit extends on a more or less straight course for approximately 30m before terminating. The second example at SX 7264 7148 driven at an angle to the hillside, but turns through 90° after 20m or so. It then turns again after 5m. The third adit was not entered as part of this survey but has a wide portal opening at SX 7136 7151.

A large pit with associated spoil heap is located near the top of the Chase, north-east of the openwork at SX 7244 7154. It may represent an attempt at tracing the lode at a higher point, though certainly unsuccessfully.

CONCLUSION

Despite the lack of available documentary evidence for this particular mine, the field remains fit a familiar model for mines in Devon in the 19th century, particularly from the late 1840s onwards. The well-developed dressing floors and other surface infrastructure including the impressive tramway, coupled with minimal evidence of extraction is typical of a mine launched by a group of adventurers as a speculation, with the intention of profiting from the sale of shares. It is likely that a small outcrop of cassiterite, possibly visible at surface, was exploited as a first phase of activity, and may have appeared rich and promising to those who dug for it. At what date this occurred is uncertain. The surviving rock faces, with evidence of blasting using explosives, certainly point to a 19th-century date and could be associated with the documented 1850s work, but initial activity may have been earlier. The attempt to exploit the lode at greater depth by underground methods may have followed immediately after the openwork phase or it is possible that the evidence of earlier extraction inspired the later adventurers to try and prove the lode at depth. Whichever of these is correct, it seems certain that very little cassiterite was present and the sale of c.5 tons of black tin was the sum total from the later period. If this is accurate then it is far more than could be expected from the limited underground activity and makes an 1870s date for the openwork more likely. This small amount of tin hardly justifies the capital outlay on the tramway, incline and dressing floors. However, because the site was undeveloped the field remains clearly demonstrate very well the early stages of a Dartmoor tin mining operation of the second half of the 19th century.

ACKNOWLEDGEMENTS

We are grateful to Patrick Simpson, owner of Holne Chase, for permission to undertake the survey and for vehicular access to the site. Dave Field gave valuable assistance with the survey and Chris Kelland provided some useful newspaper references.

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NB *Holne Chase is sited entirely within privately owned woodland with no public right of access. The woodland is a designated Site of Special Scientific Interest and the mine adits are important habitats. They are also dangerous and must not be entered.*