The Burning House at Atlas Mine, Ilsington, Devon

Historic Building Survey

March 2016

Survey and report
by
Phil Newman

Southwest Landscape Investigations

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A Bovey brick found lying loose at the site

Acknowledgements

This survey was begun as a software trialing exercise, led by members of the English Heritage metric survey team in February 2009 but was not completed. Work re-commenced in February 2016 by Phil Newman of Southwest Landscape Investigations, whereby the fieldwork was concluded and the eight 1:50-scale plans were fully drawn up. I am grateful to Heather Papworth and Jon Bedford of English Heritage for their help and knowledge in the initial stages of the work.

Previous owners of the site have kindly allowed me access to the burning house, including Joe Delfont, during the first phase of survey in 2009, and David Courtier who permitted initial entry to examine the site in 2000. I am very thankful to Mrs Gemma Roberts, current owner of the site, for commissioning this report, thus allowing completion if this work.

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The Atlas burning house is situated in Middlecott Wood, near Trumpeter in Ilsington parish, Devon (SX 78103, 76581) (Fig 1). It is one of several surviving features associated with the Atlas Tin Mines, from a documented episode of mining in the area between 1859 and into the 20th century. The building is a very fine surviving example of a19th-century, twin reverberatory calciner, where impurities were burned from the mined tin ore as part of the dressing process. Although in need of repair, the building is intact, and for that reason, among others, must be considered one of the most significant examples of its type in Britain and grade 2 listed.

In January 2016, an historic building survey was requested by the owner, Mrs G Roberts to provide a basis for conservation. A 1:50 scale survey was completed in March 2016 and includes plans, elevations and a fabric survey, accompanied by photographs and a description. An historic outline of the Atlas Mines is included, as well as a discussion of the processes associated with calcining, the functionality of the buildings, and a history of their development within the tin bearing zone of Cornwall and Devon.

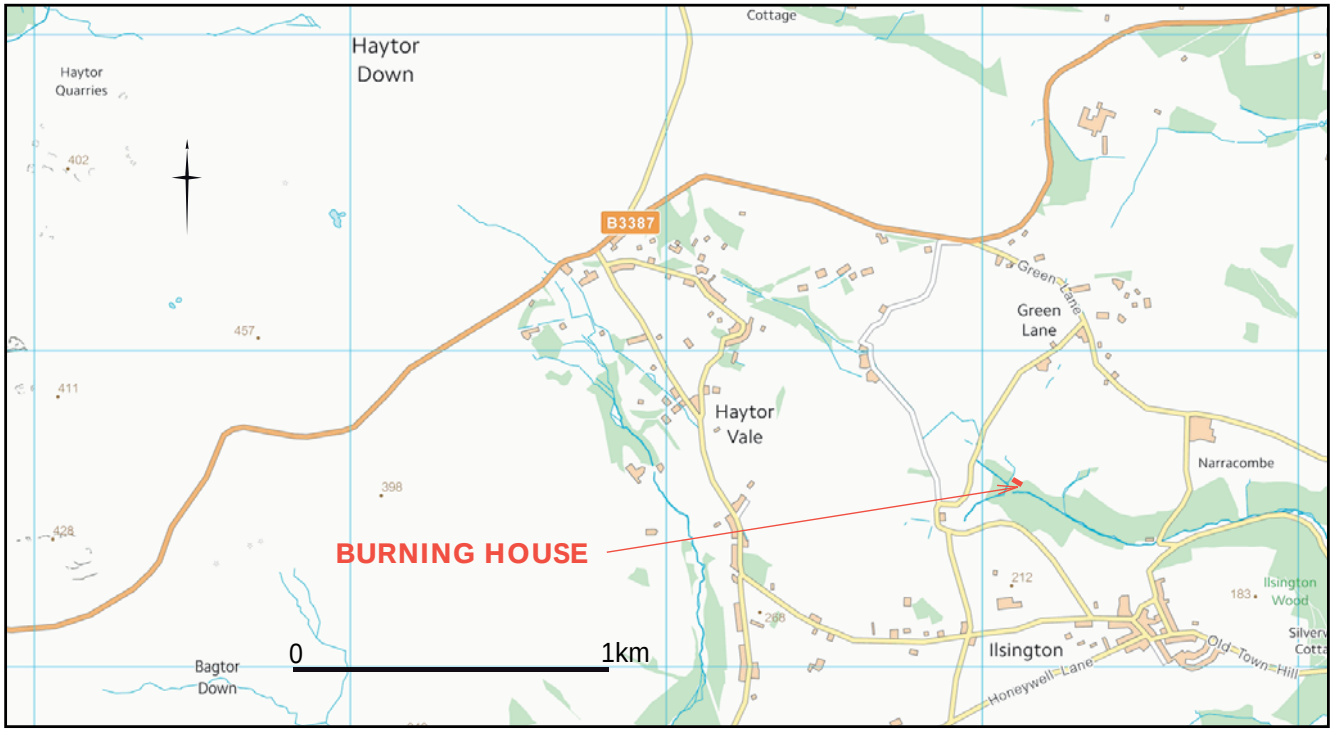

Fig 1 Location map. Ordnance Survey © Crown Copyright and database right 2015. Open source data

1. INTRODUCTION

1.1 Research context

Although the significance of the burning house has been known for some time, few detailed accounts or site investigations have been undertaken. The building first entered the National Record of Industrial Monuments (NRIS) in 1972, recorded by the Dartmoor Author Harry Starkey, but a more detailed investigation was published by Peter Richardson in 1992, which included plan and elevation drawings of the building at a time when it was heavily covered by ivy (Richardson 1992). The structure was considered for designation during the English Heritage Monument Protection Programme (MPP) in the 1990s[1]; it was not scheduled but remains listed at grade 2. It is the only reverberatory calciner in Devon to be listed and one of only four in the UK to be designated.

1.2 Atlas Burning Houses: outline history

The earliest search for exploitable metals to take place in the Ilsington/Haytor Vale area would have been for the alluvial deposits and shallow tin lodes, situated on the granite geology of Haytor Downs, Bagtor Downs and Horridge Common. These tinworks are very clear on the open moorland, where they survive as areas of disturbed ground and waste dumps, and once extended into the enclosed lands of Haytor Vale, Pinchaford and Bagtor, where they followed the valleys of the River Lemon and its tributaries. Although few dates for these

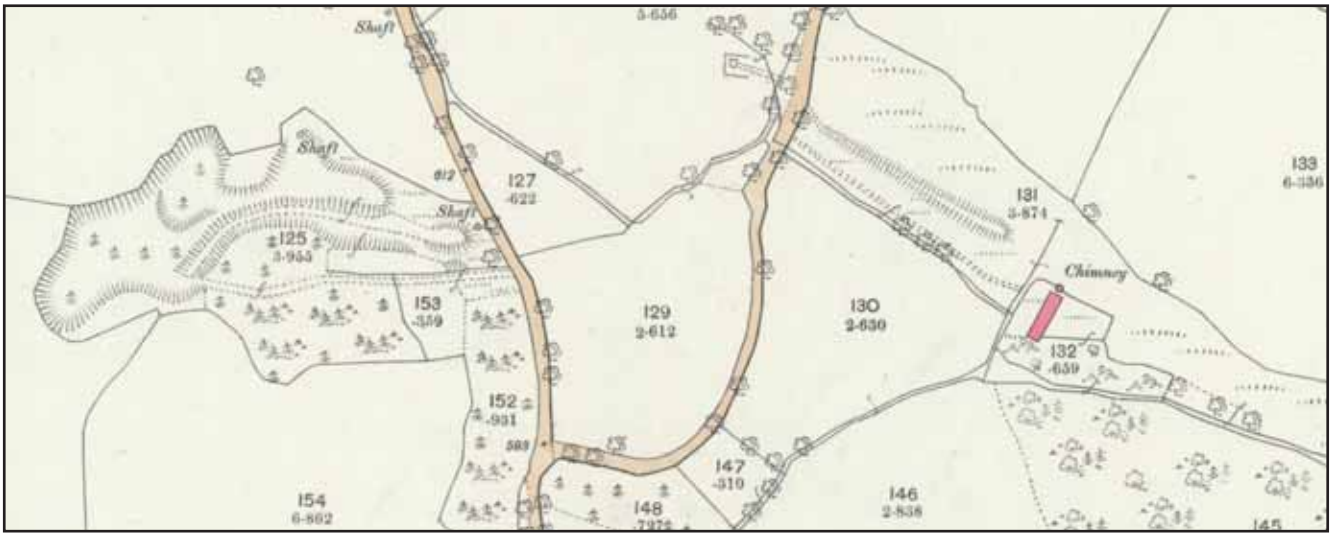

Fig 2 Ordnance Survey 25-inch first edition map of 1884-5 showing early layout of the Atlas burning house in red.

tinworks are known, the most likely period of activity would have been between the 14th and 17th centuries, when this industry on Dartmoor is known to have been prosperous, but the possibility of activity both earlier and later than that window should not be precluded. Both 'Luthorn' (Lewthorn) and 'Smalcombe' (Smallacombe) were mentioned in tinworking documents in the 16th and 17th centuries (Greeves 2008, 34), though no field evidence from those episodes has been identified specifically.

By the mid-19th century, during a revival of interest in Dartmoor mining, the Haytor Vale and Trumpeter area was the location for several enterprises which attempted to exploit tin and iron. At Haytor Vale it is known that attempts to mine iron date from at least the 1830s, when John Hatherley was negotiating with the Haytor Granite Company to move iron from Haytor via the granite tramway (PWDRO 310/20). However, mining activity at Trumpeter, to the southwest, commenced in 1858-9, when both iron and tin were the objective.

The precise details of the companies working these mines is complex, and beyond the scope of this report, but it is known that the South Devon Iron and General Mining Company (SDIGMC) and the Atlas Tin and Iron Mine were operating here in the late 1850s, though these two companies may have been in some way connected and, according to Hamilton Jenkin (1981), one was a subsidiary of the other. In 1862, the SDIGMC was wound up and the Atlas name was revived in the form of Atlas Mining and Smelting Company Ltd (BI, Ilsington).

The first mention of a 'burning house' at the site came in April 1861, when a building and the chimney stack

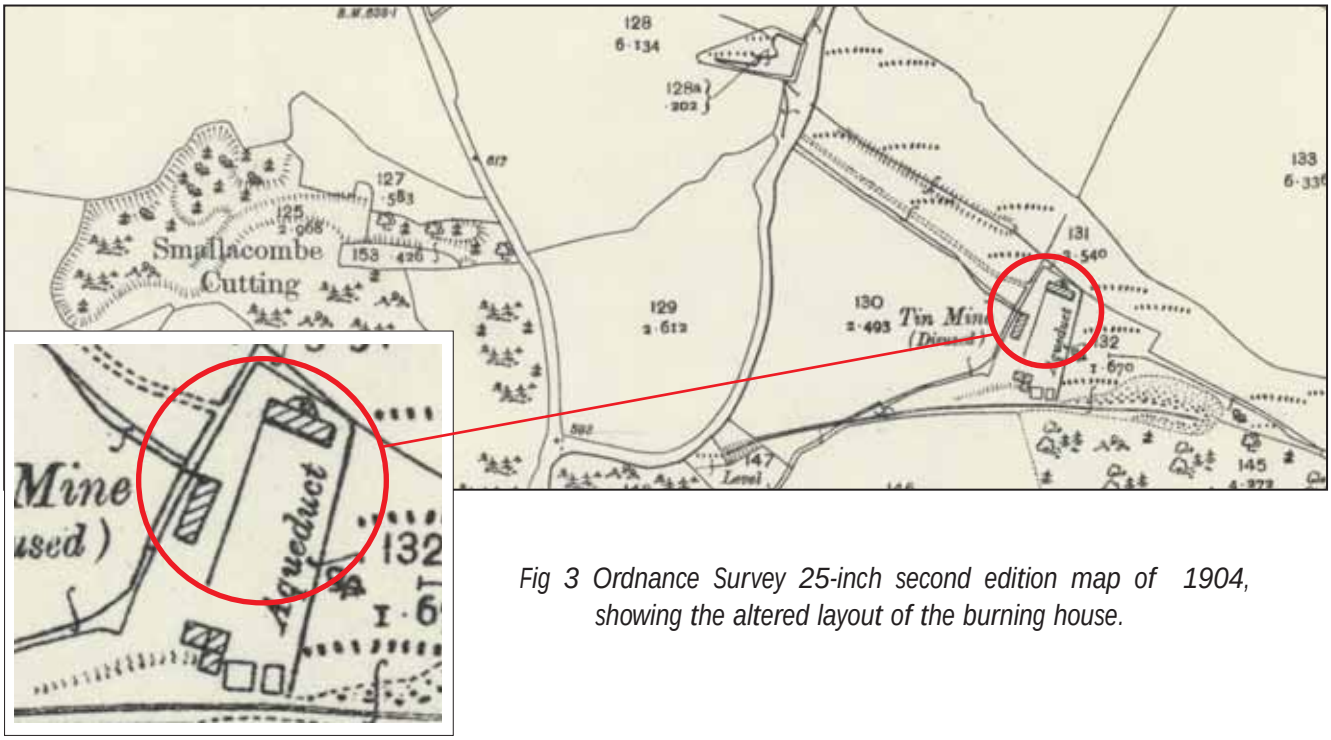

Fig 3 Ordnance Survey 25-inch second edition map of 1904, showing the altered layout of the burning house.

were reported to be under construction, and in January 1863 it was claimed that tin was being burned (Greeves 2008, 35).

However, this 1860s building, with the exception of the chimney, was probably not that which survives at the site today, because it was depicted on the 1st edition OS 25-inch map of 1886 (surveyed 1884-5) with a different layout (Fig 2). Although the chimney is in the same location, the long, rectangular building associated with it on the map is oriented at 90 degrees to the surviving building, with their footprints slightly overlapping.

A later reorganisation of the mining company, to be known as Atlas Tin Mining Company Ltd, was formed in 1889, and at a meeting of Shareholders in 1890 it was stated that a waterwheel with 28 heads of stamps, dressing floors and two burning houses had been constructed that year (BI, Ilsington). The fact that two burning houses were mentioned specifically, suggests these were new buildings, constructed on the layout that survives today, utilising the earlier chimney. This altered layout was depicted on the OS 25-inch revision (2nd edition) of 1904 (Fig 3), when the site was described as disused.

Although the Atlas Tin Mining Company was wound up in 1914 (BI, Ilsington), oral information collected from local people by Greeves, suggests that mining activity around Trumpeter in some form continued until 1930 (Greeves 2008, 36). However, it is likely that the twin calciners had a relatively short working life. The company that installed them in 1890, suspended operations at the mine in 1893 and so it remained for much of the 1890s (Burt et al. 2014). Towards the end of the decade there was a small attempt at revival but by that time the ore was shipped to Cornwall in an unprocessed state (Greeves 2008, 37), so the calciner would not have been needed.

1.3 The mining landscape around Trumpeter (Fig 4)

Surface activity associated with the 19th-century mining episode around Trumpeter extends south to Lewthorne (Loothorne) Cross where, in the woods to the north of the Haytor road, a number of shafts are depicted on the 1886 OS maps. These have been capped but some earthwork evidence survives. It is known also that a 30-inch pumping engine house existed here in 1859 (BI, Ilsington), which is depicted on an Abandoned mine plan (DHC AMP R54D), though this was later totally effaced. Cottages at Lewthorne Cross were built in the late 19th century to house miners working in these mines (Wills 2000). Other remains, including an adit and minor earthworks, continue northwards down to Trumpeter, where, in the rear garden of one of the houses, a large stone structure is likely to have had associations with the mine. Smallacombe Cutting and its associated, very visible, spoil dump to the east of the road, make up the largest mining features in the locality. The origins of this opencast, which exploited mainly iron, are not known for certain but it is possible that work on it commenced in the early 19th century (rather than earlier as with tin opencasts) and was still being worked in 1859 (BI, Ilsington).

Southeast of the cutting, the position of the blocked Deep Adit of Atlas Mine is still visible by the stream of water issuing from it and the remains of a tramway curving away slightly to the east. When investigated in 2000, timber sleepers were still visible in the bed of the track. The tramway extends for approximately 230m, terminating on a moderate spoil heap on the north edge of Middlecott Wood. Before arriving at its destination, the tramway passed a stamping mill and dressing floor on the north side, several metres down the slope. The water wheel pit survives in good condition, sunken into the ground at the east end of the dressing floor. It measures 9.9m by 1.6m and would easily have accommodated the 30ft (9.2m) water wheel installed in 1890 (BI, Ilsington), which was said to drive 28 heads of stamps; these no longer survive but were located on the west side of the wheel and were depicted on a photograph of *c*.1900 (Greeves 2008, Fig 10). This image also shows the wooden leat launder running north from the wheel, while a second photograph (Greeves 2008, Fig 9) depicts the launder, raised on tall timber trestles running through approximately 90 degrees to bypass the burning house. From there it extended a further 40m northwest to align with the top of a substantial leat embankment. This impressive finger-shaped earthwork extends for over 100m, interrupted by the road, to the west of which a small reservoir is depicted on the OS 2nd edition 25-inch map of 1904. This area has not been archaeologically surveyed, but it is likely that a combination of natural and artificial earthworks were used to collect water from a small spring, which still runs today.

Buddles and other dressing apparatus were depicted on one of the 1900 photographs, between the stamping mill and the burning house. However, this area appears to have suffered much scouring by the fast-flowing stream, which emanates from the Deep Adit mentioned above.

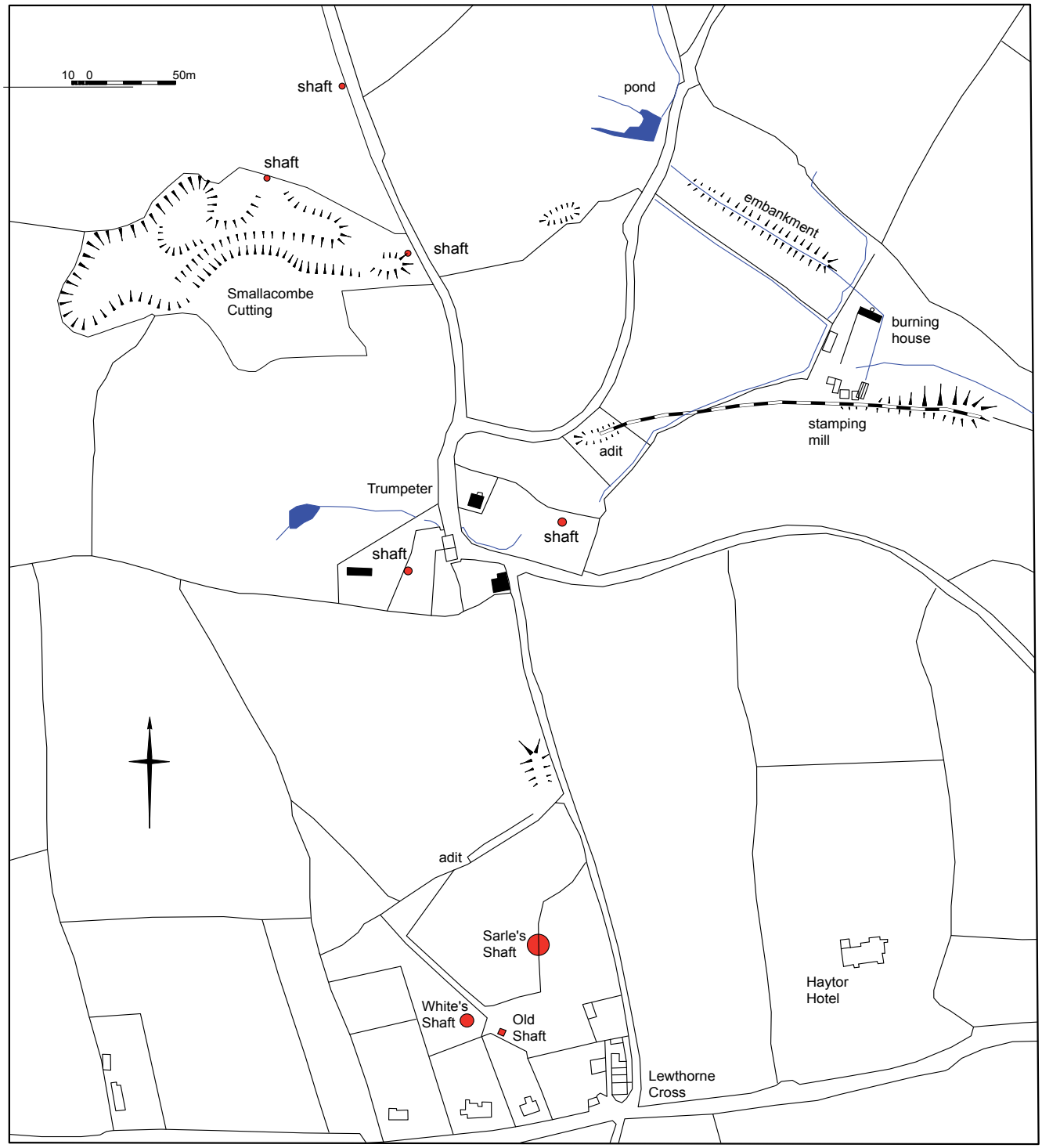

Fig 4 Map showing various landscape evidence of mining in the Trumpeter area, including Smallacombe Cutting, shafts at Lewthorne (Loothorne) Cross and the site of the burning house, stamping mill and dressing floor. Also, the adit tramway, leat embankment and site of the pond. Based on OS 25-inch 1886 and 1904.

1.4 Calciners: historical and technological context

After being dug out of the ground, tin oxide (cassiterite - Sn) needs to undergo a series of processes to refine and concentrate the ore into a usable commodity. Mined tin ore was seldom pure and existed within a matrix of impurities, collectively known as 'gangue', from which it had to be liberated. Firstly the unrefined ore was crushed in a stamping mill before being concentrated or 'dressed', a process which took place on the dressing floor. Fortunately, cassiterite, with a specific gravity of between 6.5 and 7.1, was much more dense than gangue materials of a similar mass, typically 2.5 to 2.8, and would therefore sink more rapidly in still water, and be moved less freely by the current of running water. This principle is the essential basis behind most processes and techniques of tin concentration. The most common apparatus was in the 'buddle', whereby finely crushed ore and water were run into shallow tanks with sloping floors, where the separation would take place. Buddles came

in several formats and designs, often reflecting developing methods, including rectangular and circular or 'round' buddles. The latter are known from photographs to have been in use at Atlas, contemporary with the calciners (Greeves 2008, Fig 10).

However, the above processes are ineffective in the removal of certain impurities that are disseminated within some forms of mined ore. These are:

Mundick – iron pyrites (sulphide) *FeS2*
Mispickel or arsenic – arsenopyrite *FeAsS*
Black Jack or blende – zinc sulphide *ZnS*
Wolframite *(Fe2+) WO4*

An anonymous writer of 1671 (Anon 1671, 2212) mentioned that 'mundick' (usually referring to iron pyrites, though often also used as a term for mispickel or arsenopirite) was the main impurity with 'some lodes being much pestered with it, others not at all'. To that may be added, according to the Cornish writer, Pryce (1778, 223), copper, lead, and Black Jack (blende or zinc sulphide - ZnS). If these substances were not dealt with, they would cause the smelted tin to become brittle. The partly dressed ore therefore, was roasted or calcined in a reverberatory furnace where the corrupting minerals or 'weed' were burned off as gases. For tin, this process was usually referred to as 'burning' rather than roasting; the latter term is more usually applied to a similar process used on sulphide ores of copper such as chalcopyrite.

From earliest times it is quite clear from written accounts that only certain tin ores needed burning. The earliest is European writer Georgius Agricola, who in 1556 stated that:

> *..it [tin] is burned if it is dark-blue in colour, or if pyrites and stone from which iron is made are mixed with it, for the dark-blue colour if not burned, consumes the tin* (Hoover & Hoover 1950, 348).

Accompanying this was a depiction of a furnace, with description, in which the ore and fuel are shown placed in such a way that the burning fuel does not come into contact with the ore.

The anonymous writer of 1671 described a 'Tin Kiln' serving the same purpose at Devon tin workings, where a structure housing two horizontal slabs of moorstone placed one above the other about one foot (0.3m) apart. A fire is set under the lower stone and the heat passes through a gap at the rear. Tin ore is fed onto the lower stone through a central hole in the upper stone. The furnace was often drawn by a flue and chimney

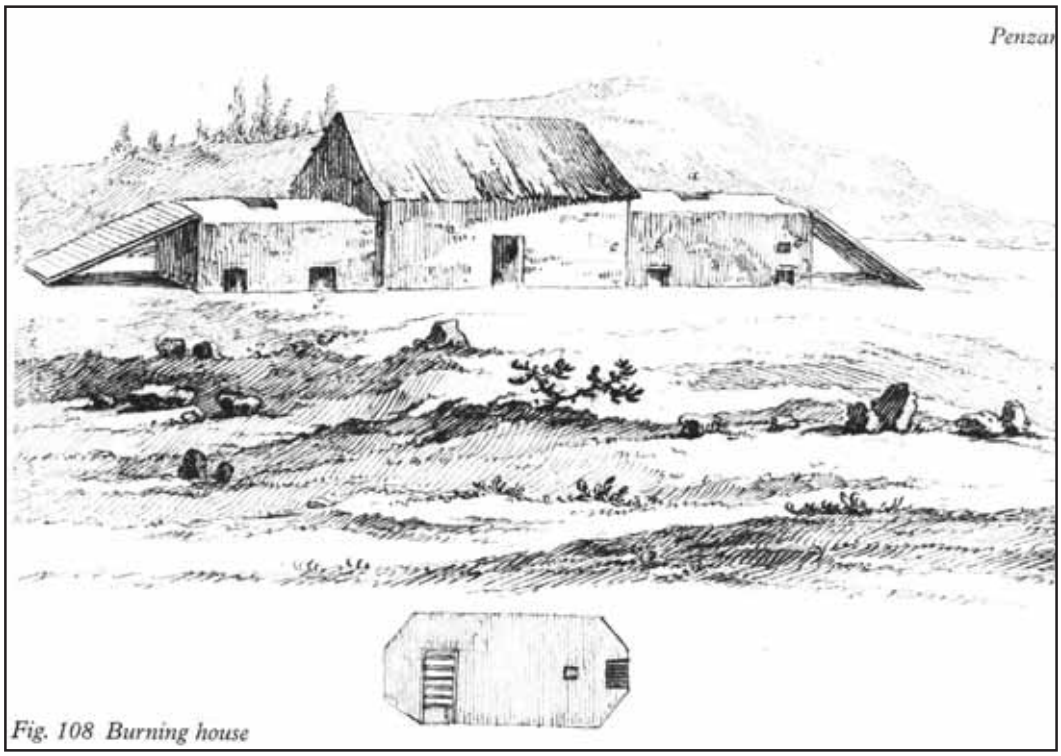

Fig 5 Image of a twin burning house from Angerstein's Illustrated Travel Diary 1753-5.

stack, usually not far from the building. This, essentially, is the layout used for all future reverberatory calciners, but ironically, although describing Devon practice, no field remains which fit this type and period has yet been recorded on Dartmoor. However, this writer also adds that this device was only used 'when we perceive much Mundick in our Tin' (Anon 1671, 2111-2), a point reiterated by Kalmeter over 50 years later, when he wrote that burning occurred 'in places where the ore is mixed with mundic' (Brooke 2001, 64).

During a visit to Cornwall by Swedish writer R R Angerstein in 1753-5, he witnessed the use of burning houses where 'the ore that is contaminated with sulphur and copper must be calcined' and he provided several useful drawings (Fig 5) of burning houses of the period (Berg & Berg 2001, 106-7, Figs 97 & 108).

Pryce (1778, 224-5) also provided a lengthy description of the use of the burning house, used for 'tin that is corrupted….' as opposed to 'clean work'.

Henwood, writing in 1832, claims that; 'the greatest part of the tin-ore produced in Cornwall needs roasting' (Henwood 1832, 153), a point repeated by Henderson in 1853 and Ferguson in 1873. It would seem that over time, the various authorities disagree as to the total amount of tin that needed calcining but the later writers err on the side of *all* tin requiring the process.

It is notable that all the recorded Devon burning houses (*see* below) are located around the peripheries of Dartmoor, away from the granite zone. This is almost certainly because tin extracted from the granite areas was uncontaminated by the sulphide elements of other metals, whereas tin formed within the metamorphic aureole was more likely to have copper, arsenic, mundic and blende residing alongside it in the country rock. This ties in with, and offers some explanation for, the testimony of contemporary accounts cited above, that not all tin was in need of this form of treatment.

By the time of these later writings, the reverberatory calciner was housed in a purpose-built structure and

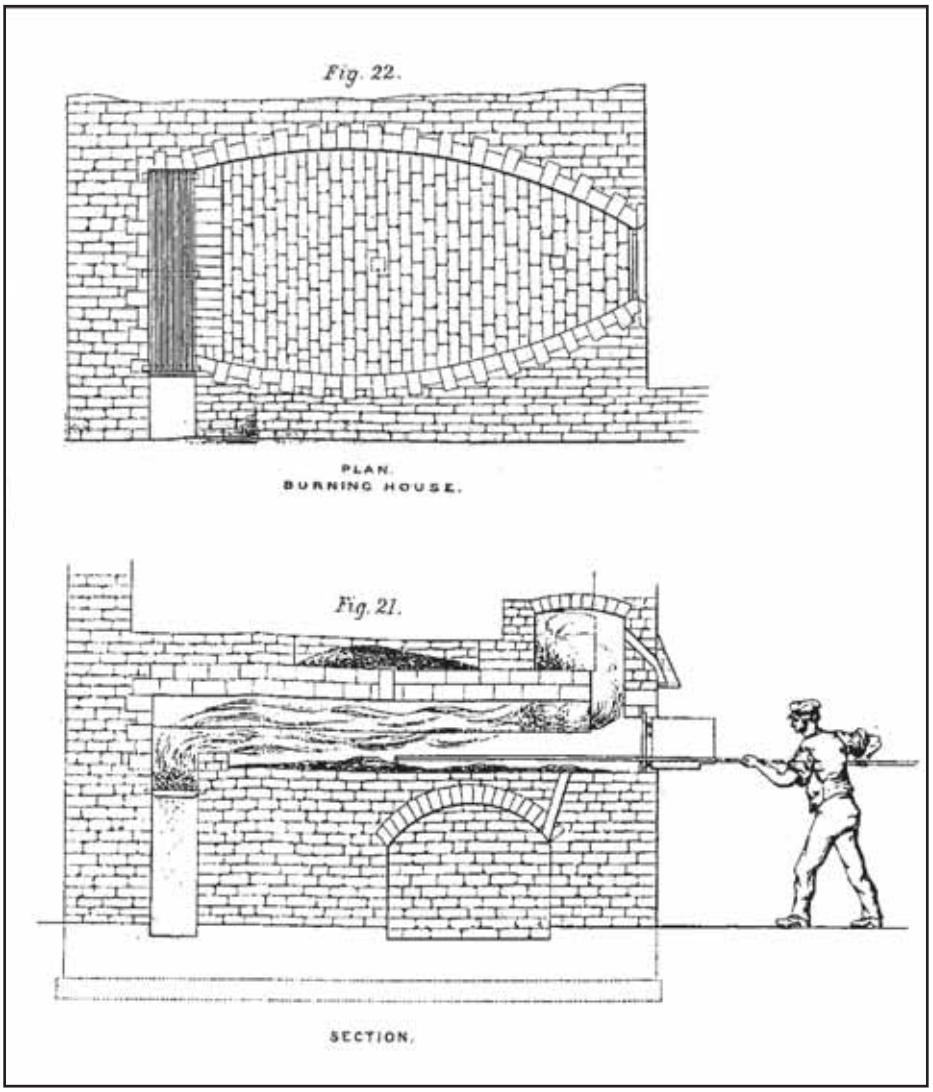

Fig 6 Plan and section drawing of a reverberatory calciner by Henderson 1858.

consisted of a burning chamber with a raised floor and low vaulted roof with a fire set at one end. At the other end was a flue outlet and an opening with an iron door, through which an operator could rake the ore whilst it was being burnt. The dressed ore was fed into the furnace from an upper floor through a small opening in the ceiling. The upper floor, which would have been warmed by the fire below, would also serve to dry the ore before placing it in the furnace. This process, and the design of the structure, was well illustrated by Henderson's plan of 1853 (Fig 6) and all the components depicted exist at the Atlas example.

2. THE BUILDING – SURVEY and DESCRIPTION (for plans see appendix 1 – 8)

2.1 Method

A total station theodolite was used to capture all detail of the building 3-dimensionally. The data was downloaded into a CAD environment to produce elevations and plans. Most parts of the structure were accessible by this method, except the interior details of the flues, particularly those associated with the eastern calciner, where the door cannot be opened. A photogrammetric fabric survey was also undertaken using rectified digital photographs, with detail traced directly into CAD. This method can only depict detail that was visible when the photographs were captured and areas obscured by vegetation are omitted.

2.2 Description

The burning house comprises four main elements. These are:

- two rectangular calciners
- a central structure joining those two
- a detached chimney stack

The building and chimney were constructed from a locally available metamorphic slate, known as killas. Brick was also used extensively, mainly for window reveals and heads, internal chimneys, the lining of the burning chamber and furnace, the drying floor, and the top section of the external chimney. Remarkably, large sections of the calcining furnace chambers were built from re-used granite rails from the Haytor Granite Tramway. These rails are elongated and squared pieces of granite, which originated on Haytor Down. When in use as rails they had flanges carved longwise into one surface to engage with and guide the tram wheels, but these were chiselled off when the blocks were incorporated into this building, leaving a tell-tale smooth strip along each block, representing the surface on which the tram wheels ran (*see* Appendix 5-8). The tramway, which was built in 1820 between the Haytor quarries and Ventiford at Teigngrace, had become disused before the 1860s and although much of it survives *in situ*, many of the rails were removed and incorporated into building projects in the area, or used for gateposts.

The combined external length of the building is 13.45m by 3.96m. The gable ends are approximately 5m high and the average height of the front and rear walls is 3.8m. Although the building sits on level ground, the western end has been subject to a build up of silt, washed down by the nearby stream. This has accumulated to a depth of up to 0.6m, obscuring the base of the rear (north) wall and detail of the western furnace.

The two calciners are built on the same (approximately northwest to southeast) axis. They are of similar design, though in mirror image, but there are subtle differences in construction. They do, however, very much represent a standard layout for the type, which can be witnessed elsewhere in Devon and Cornwall and in Henderson's drawing of 1858 (Fig 6) for example.

Each is built on two levels: the lower level (Appendix 2) contained the furnace at one end, and the burning chamber taking up most of the space. Below the burning chamber, at the opposite end to the furnace, is a cooling chamber. The upper level (Appendix 3) has a brick floor over the burning chamber, and a central drying pan into which ore was fed. This area is enclosed by stone walls and a gable roof.

The outer walls of the lower levels of both calciners, containing the burning chambers, are constructed largely from the re-used granite tramway blocks, to provide a thicker robust structure. Each chamber has four iron braces passing through it - two above and two below the void - connecting with vertical exterior clamps on the front and rear to further consolidate the walls. Each iron clamp is 1.6m long and secured to the braces with 2½ inch square nuts with round washers, tightened on to square plates (Fig 7). An additional, small, square iron

plate and nut of a single brace is visible on the south wall of the eastern calciner, though evidence of its opposite end on the north wall is obscured by other structural features.

The burning chamber and furnace are lined entirely with brick, which is encased by the outer structure of granite and killas. In plan, the burning chamber interiors have parallel sides, 2.45m apart, for over half of their length, which then taper to form funnelled ends, narrowing down to 0.55m at the access door. The walls of the chamber and furnace are between 0.8 and 0.9m thick. The ceiling is subtly vaulted (Fig 8), with a maximum height on the curve of 0.48m.

Fig 7 Iron clamps on the exterior of the burning chamber.

The furnaces are located within the end portion of the building and comprise chambers of 0.5m wide running across the internal width, with the rear, northern end opening through the wall to provide stoking access and draught. These openings had iron doors, which are no longer present, but the iron plates forming the bottom of the portal are still in place. The base of the furnace chamber, where ash would collect, was at approximately the base level of the main walls and in height the furnace extended to the top of the burning chamber, leaving the space between the floor and ceiling of the burning chamber open for the heat to pass across. Iron plates, surviving *in situ*, stretch between the two walls of the furnace (Fig 9). These would have supported a grate, not surviving, on which the fire was set, positioned slightly lower than floor level of the burning chamber. A single course of bricks along the lip of the burning floor (Fig 8) created a low screen to separate the chamber from the furnace, allowing the heat to travel across the chamber but avoiding the flames coming into direct contact with the ore which was spread over it.

At the opposite end to the furnace, recessed into the wall, is the narrow opening through which the operator could keep the tin moving during the calcining process using a long handled metal rake. The need to do this explains why the sides of the chamber are angled, so that all parts are accessible from the opening.

The opening on the eastern chamber is lined with brick on both sides and above, reinforced top and bottom with horizontal iron plates. The western chamber has brick sides, but above the opening a large granite lintel replaces both the brick and the iron plate (Appendix 5; Fig 10).

The rectangular openings are lined with an iron frame supporting a hinged iron door, which could be fastened shut. Both doors miraculously survive *in situ*, though the eastern door has corroded hinges, and is frozen into a half shut position.

Fig 8 Interior of the east burning chamber, looking east towards the furnace, showing the lining of brick, the curved vault, and the low course of bricks at the edge of the furnace.

Fig 9 Furnace interior (east) showing the iron rails that supported the grate. Note also the wall to the right which does not extend up to the vault of the burning chamber.

Fig 10 Showing the recessed access door to western burning chamber, with brick lining and granite lintel.

Fig 11 Interior view of the vertical flue looking down from the upper floor.

Just inside the access door, a square vertical flue runs to the top of the building via a chimney (Appendix 4). On the eastern chamber the chimney is made entirely from brick, though on the west the brickwork commences approximately 1m above the opening (Appendix 5). On both sides the brickwork has been incorporated into a mostly stone wall. For the flue not to overlap the recessed access opening situated at its base, it had to be built onto the inside of the calciner's inner end wall, then angled up to the chimney. This can be seen on the upper floor above the burning chamber, where the brickwork protrudes out from the wall at floor level, then is stepped toward the wall to accommodate the angled passage of the flue, which thereafter takes up only the thickness of the wall, and where the brickwork is flush both sides (Fig 12). The height of the stepped section of brickwork varies on the east and west calciners, with that on the east being much higher.

Both chimneys had slots for iron dampers built into the brickwork, which were operable from the upper floor. This was to control the draft between these flues and additional flues, which ran horizontally through the back of the building and out to the large freestanding chimney to the rear. These flues are only visible from the northern exterior of the building, though on the upper floors a stone casing to house them is visible against the chimney walls. The flues were brick lined and approximately 30cm square. They met with the vertical flues, just above the inside of the access doors. On the exterior, no trace of the flues survive in the gap (2m on the west side and 2.6m on the east) between the building and the freestanding chimney, but it is likely to have been made up by a ceramic or iron pipe which has not survived. The small, brick-lined opening in the chimney (Figs 13 & 14) would imply this to be so.

Beneath the burning chambers, at the opposite end to the furnace, are the cooling chambers, also known as the 'wrinkle', where the fully calcined ore was collected to be cooled before removal. They take the form of square-section tunnels 0.8m by 0.8m and 2.9m long, reinforced with iron strips across the ceiling. A small rectangular opening in the floor of the burning chamber led to a vertical chute into the cooling area, down which the operator could direct the ore using a long handled tool.

The upper level of each calciner comprises a brick floor covering the burning chamber and furnace, with a circular depression, which served as drying pan, set approximately centrally within the floor (Fig 15). The circumference of the circle is defined by a rim of edge-set bricks giving an internal diameter of 1.25m (4ft), by 0.12m (4.5 inches) deep. The charge of ore would be placed within this circle to dry, then directed down onto the floor of the burning chamber below, via a narrow square chute placed centrally in the circle. A square recess of approximately 40cm surrounding the chute opening, undoubtedly held a metal hatch to shut it off.

The upper floor of both calciners was entered via an external door placed centrally on each end of the building (Appendix 6). Ore could be manhandled or barrowed up to the hopper via a ramp. The ramp on the western end survives *in situ*, comprising a stone revetted structure with a surface sloping to the south. The ramp on the eastern end has been thoroughly effaced, and the entrance was accessible only with the use of a ladder at the time of survey. A timber door and doorframe also survives on the western calciner, but it is not known if it

Fig 12 (top) The brick chimney built into the internal wall of the western calciner, showing slot for damper and stepped lower section.

Fig 13 (left) The brick-lined flue opening in the exterior chimney.

Fig 14 (right) Horizontal flue exiting the rear (north) side of the western calciner.

is original. Each calciner had a brick-lined window opening on the south side where both survive *in situ*.

The calciners are built on the same axis, 4.3m apart, leaving a level earth floor between for the operators. Between the calciners, walls were built front and back to merge the three elements into a single building, to provide shelter from the elements (Appendix 7 and 8). The south side has a central door with a window opening either side. All three openings have arched, brick heads and the windows have part brick-lined reveals, although squared granite has been used in part, while on the door, the reveals are constructed solely from granite. No trace of a window frame or any means of fixing glass are apparent on any of the windows.

Currently, the roof has a covering of somewhat decayed corrugated galvanized sheeting, supported by the two gable ends and central partition walls, with timber wall plates and purlins. It is unlikely that any of the surviving material formed part of the original structure, but the materials are similar to those pictured in *c*.1900.

The external chimney stands 0.9m to the north of the main building. It is not placed centrally but skewed 0.8m to the west of central. Two roughly constructed walls run tangentially off the base of the chimney, connecting it to the north wall of the building forming a triangle, which was probably filled with rubble and earth and supported the ceramic or iron flues discussed above.

The base diameter of the chimney is approximately 1.8m and at the top the diameter is 1.15m. The overall height above current ground level is 8m. The main shaft is constructed from killas although, as is usual, the top 1.4m section is made from brick, with a stepped, triple band of bricks protruding just below the top opening. The survey has revealed slight irregularities in the shape of the chimney, probably caused by movement over time, but also as a result of repairs to the fabric.

3. CONDITION

The survival of this building in its current state is partly due to the usability of the upper floors and central section, which have in the past been utilised as hay barns, but some credit must be given to former owners,

Fig 15 Plan view of the brick floor and brick-lined drying pan in the upper level of the calciner. Shows the central, square opening of the chute down to the burning chamber and square recess of a probable covering hatch.

the late Arthur Courtier and his son David, who, at their own expense, took on repairs to the building, which prevented further, potentially catastrophic, decay. When photographed from the south by Peter Richardson in 1990 (Richardson 1990, Pl 32), almost the entire structure was engulfed by mature ivy, in particular the eastern end, where the roof was covered. The chimney was also clad with ivy at that time. Much of this ivy was removed in the 1990s and repairs were made to the mortar, where affected by the ivy. However, when the site was visited first by the present author in 2000, large trunks of ivy were still affecting the eastern calciner where the roof had completely decayed (Fig 16).

By 2008, just before the property changed hands, all the mature ivy had been removed, additional repairs to stonework and mortar had been carried out, and parts of the roof had been re-sheeted. The new owners completed repairs to the roof in 2009, re-sheeting the eastern end. Following this, nothing further has been achieved and ivy is beginning to make a return, especially on the south wall (Fig 17).

Structural movement can be seen on the rear upper wall of the western calciner, and where the brickwork of the internal chimneys connect with the stone work, large cracks have formed, probably due to the ingress of water through gaps in the roof. However, although clearly in need of further consolidation and roof repairs, the building otherwise appears to be holding together.

The eastern calciner was for several years exposed to the elements and although now re-roofed, the interior continues to be affected by vegetation. Also there is no door to prevent the weather and vegetation from entering.

Fig 16 View of the north side of the burning house in 2000, showing the missing section of roof and extensive ivy growth on the chimney and eastern end of the building.

Fig 17 View of the south side of the building in 2008, after the removal of much ivy and some repairs to the mortar. Eastern end still awaiting re-sheeting of the roof.

4. SIGNIFICANCE

Despite the many technical writings on this subject, and the implication from them that calcining was an essential dressing process at many tin mines, the field evidence around Dartmoor is very fragmentary, where only around ten calciners have been recorded. Two of these are known from documentary evidence only, at Whiddon in Ashburton, and Yeoland near Horrabridge. Whiddon was the earliest documented burning house on Dartmoor, recorded in 1757 (CRO R/4998); fragmentary evidence may survive at the site, which is on private land. At Yeoland Consols, a barn now stands at the location of a burning house depicted on an abandoned mine plan (DHC AMP R153). Three Dartmoor mines, Wheal Friendship, Owlacombe and Devon United, had Brunton calciners (a later, more developed design), two at each mine arranged in pairs. In all three cases, however, their main purpose was for the production of arsenic, which was a marketable product in the later 19th and early 20th century. If arsenic was collected from either type of calciners, a labyrinth of flues was required to condense the arsenic. Such a system is absent at Atlas where the installation was intended only for the cleaning of the tin.

Around Dartmoor, there are five certain and one possible reverberatory calciners, or burning houses, surviving as archaeological remains. The smallest of these is at Gem Mine on the River Walkham, only 4m long overall with a furnace opening of 0.4m, which indicates a fairly limited capacity. At Smith's Wood (only 1.9km SW of Atlas), now within a private garden, only parts of the wall survive, but an intact stone-covered flue is *in situ*, running up the slope to a small chimney stack, which is still standing. A similar layout exists at West Beam (3.7km SW of Atlas), where a single calciner has collapsed to the level of the furnace top, but the flue is clear running up the hill to the site of the chimney, which has also totally collapsed. At Devon United Mine in Peter Tavy, although the upper floor walls are missing, the burning chamber and ground floor features have survived. On this example, a long arsenic flue and chimney are depicted on the 1905 OS 25-inch 2nd edition map, attached to the rear of the structure, though the chimney has since fallen. At Furzehill in Walkhampton, a roofless structure, which was a likely burning house, has been adapted for other purposes, possibly a barn, at some time in the past.

Eleven of this class of building have also been recorded in the Cornwall Historic Environment Record; most are ruins, though in some cases, structures or parts of structures have survived. Only three have been designated in the National Heritage List for England (Wheal Coates, Wheal Busy, New Consols), although in other cases, surviving chimneys and flues belonging to effaced or ruined buildings have also been designated, or incorporated within designated mining landscapes.

Atlas, which is the only listed burning house in Devon, (List entry no. 1240497) is arguably the best preserved of any burning house in either county, which makes it of national importance. Its later use as a hay barn, together with the positive interventions by past owners, has ensured its survival, remaining as a roofed structure, with the majority of its original features in place, including both burning chambers with iron doors *in situ*, furnaces, cooling chambers, upper drying floors and an intact chimney stack. The re-use of granite rails from the Haytor Tramway gives a uniqueness to this building within a national context, but also contributes much to the historic narrative of the Ilsington Haytor Vale area, where the tramway casts an imposing presence over 19th century industrial archaeology of South Devon, long after its closure.

The mining context of the building is also well represented with much mining evidence surviving in the landscape, albeit discretely. This includes the intact stamping mill wheelpit and its massive earthwork leat launder, the waste heap and mine tramway bed, as well as the general character of the locality around Trumpeter, where intervention by miners has contributed much to its past development and present appearance.

5. SOURCES

Abbreviations

BI, Ilsington – Justin Brook Index of Mines for Devon. Devon Heritage Centre, Exeter

CRO – Cornwall Record Office, Truro

DHC – Devon Heritage Centre

PWDRO – Plymouth and West Devon Record Office, Plymouth

Notes

1. Under the MPP programme, the building was incorrectly considered to be associated with the arsenic industry rather than the tin industry.

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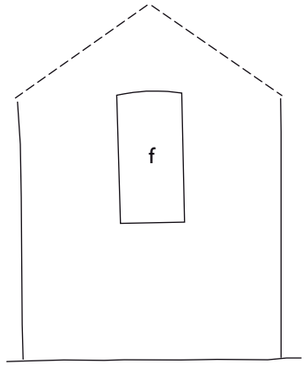
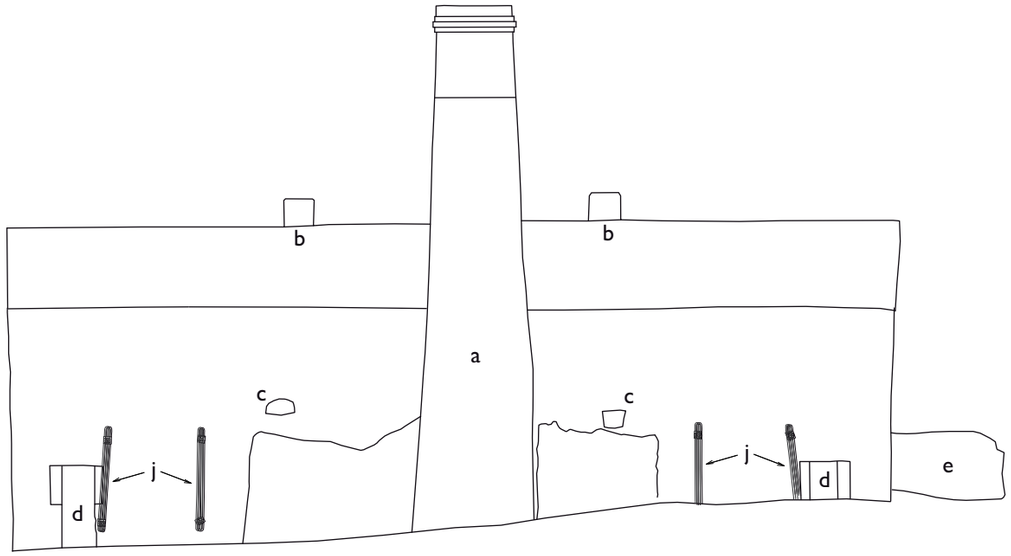
EAST

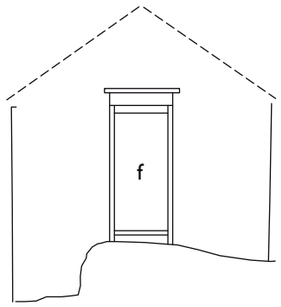


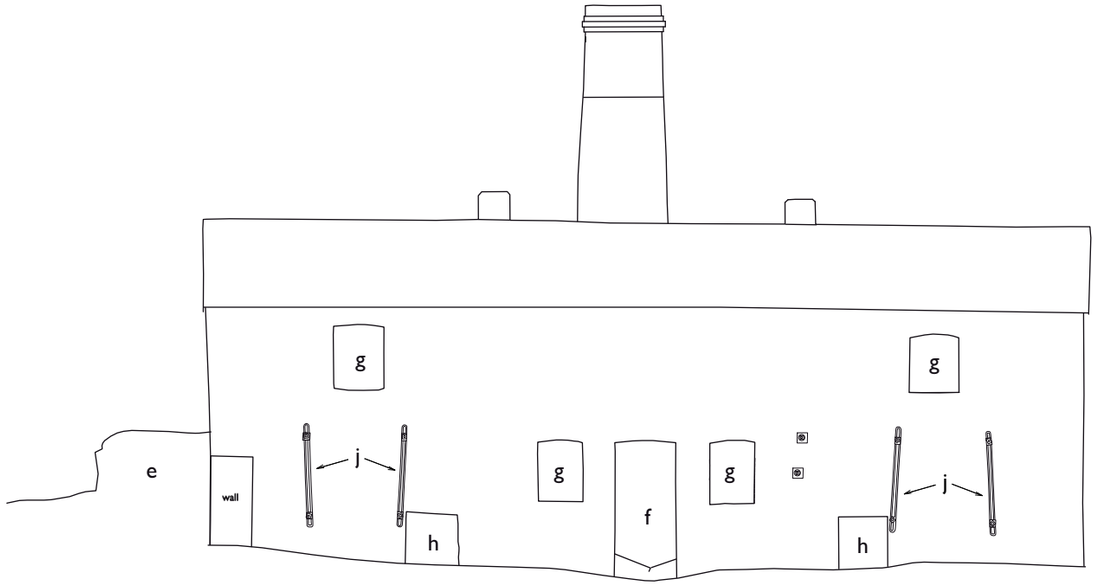


NORTH

a. external chimney
b. internal chimney
c. flue opening
d. furnace opening
e. loading ramp
f. entrance
g. window
h. cooling chamber
j. iron brace

WEST





SOUTH

0 5m

THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

SURVEYOR: Phil Newman	CLIENT: Mrs G Roberts
APPENDIX 1	DATE: 11 March 2016
PLOT SCALE: 1:100	

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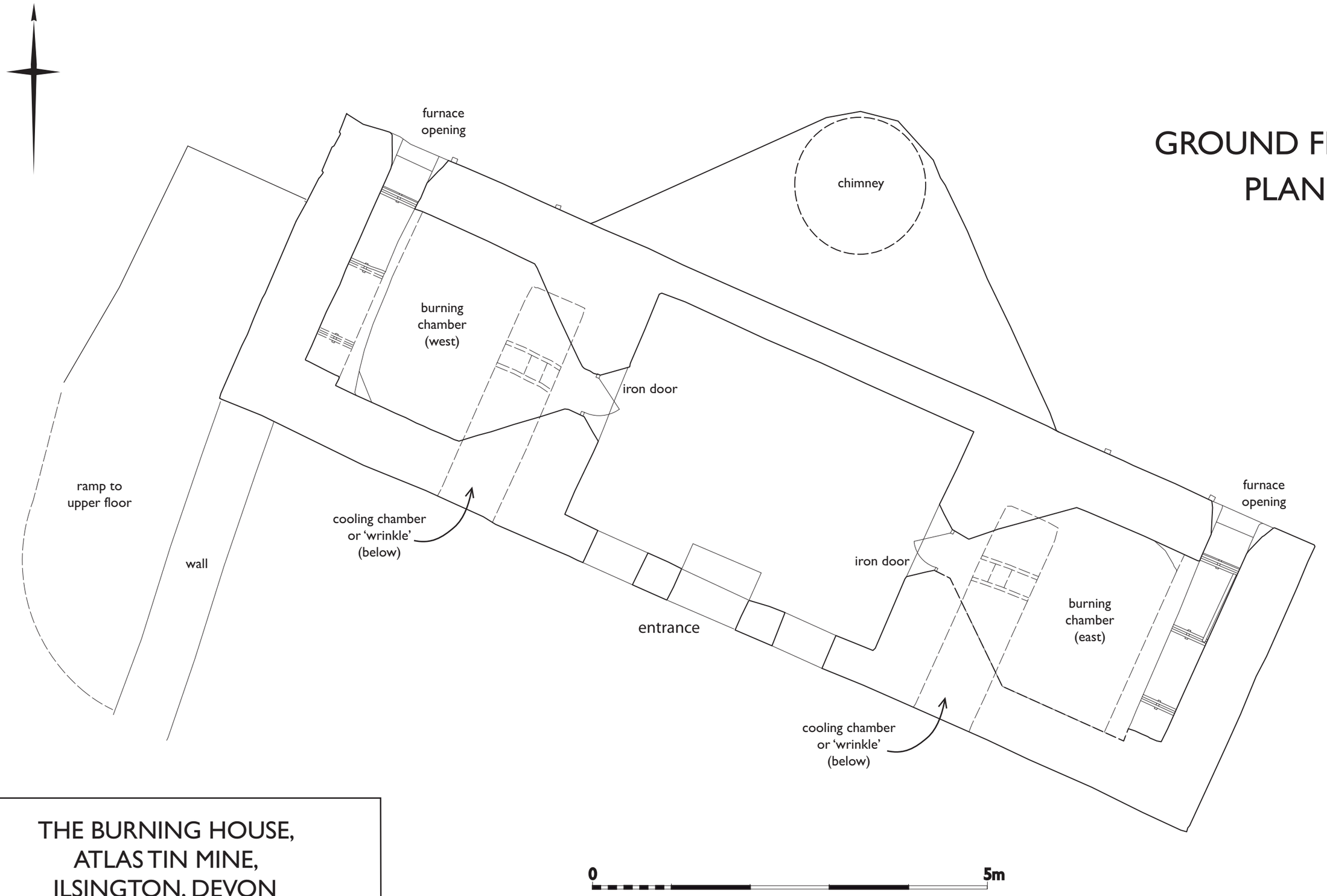
GROUND FLOOR PLAN



THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

SURVEYOR: Phil Newman	CLIENT: Mrs G Roberts
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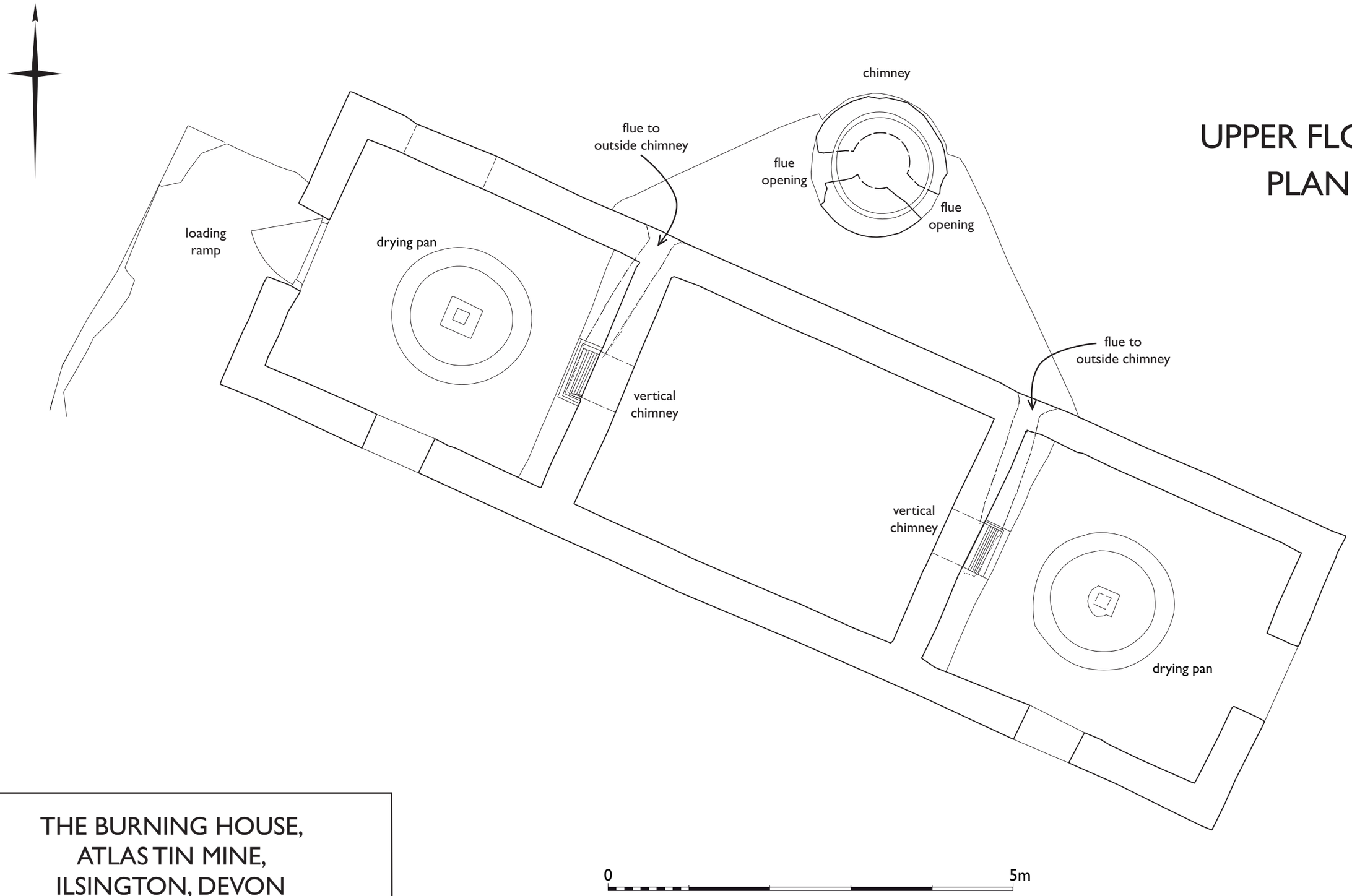
UPPER FLOOR PLAN



THE BURNING HOUSE,
ATLAS TIN MINE,
ILSINGTON, DEVON

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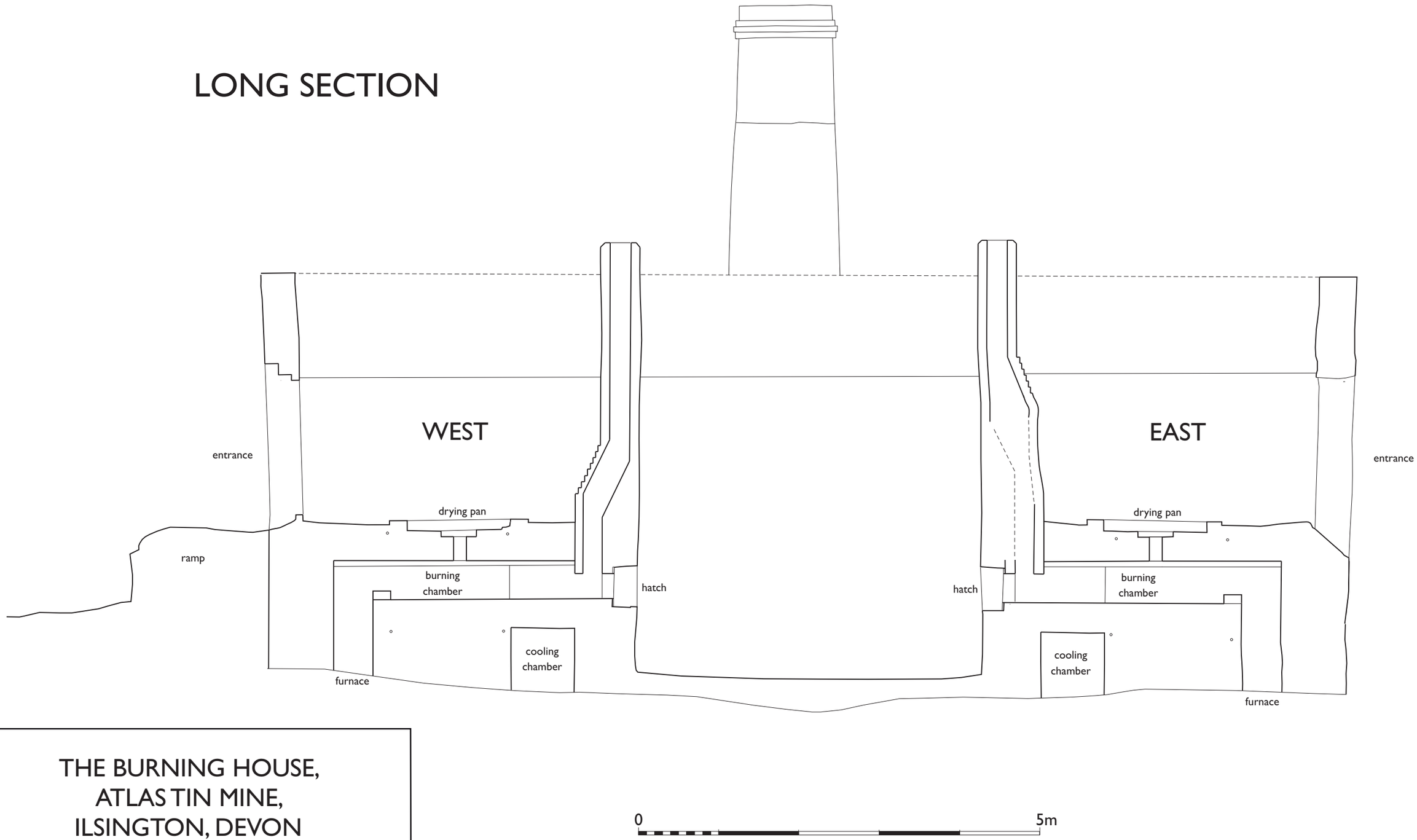
LONG SECTION



THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

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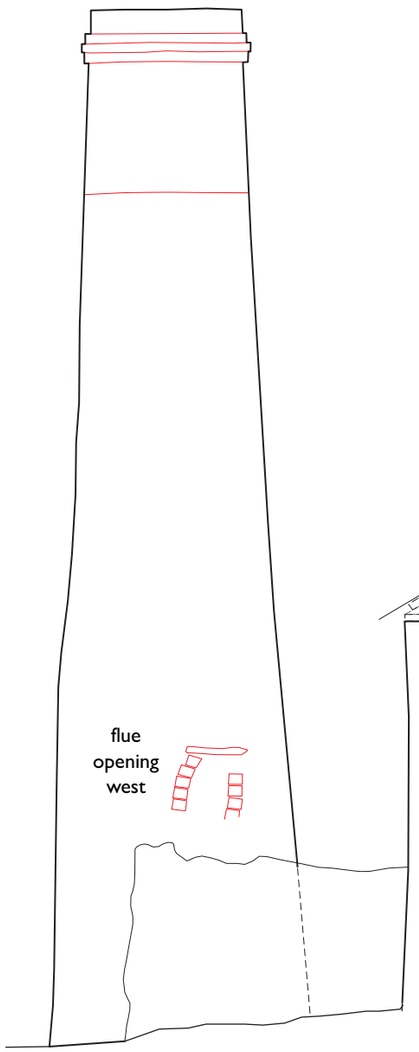
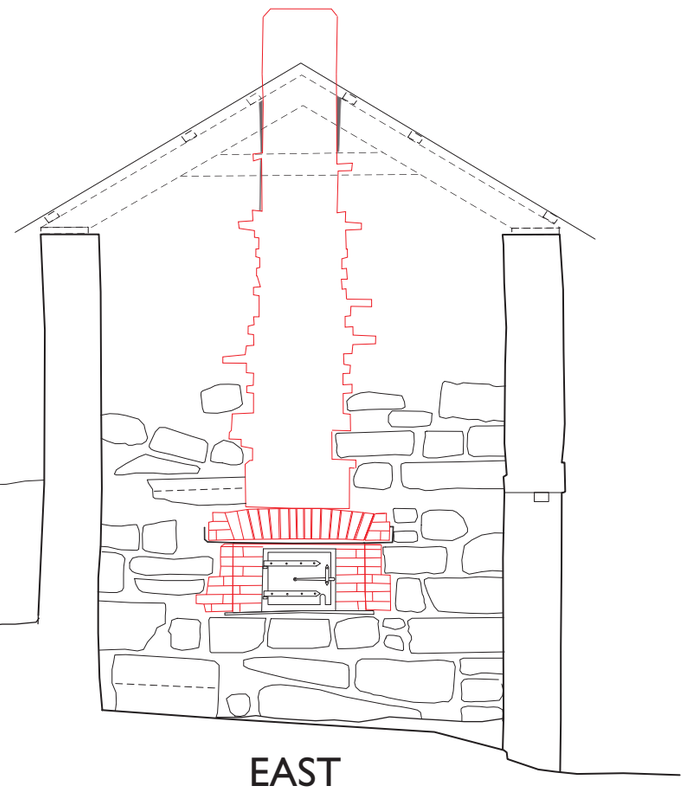
INTERNAL ELEVATIONS, EAST and WEST





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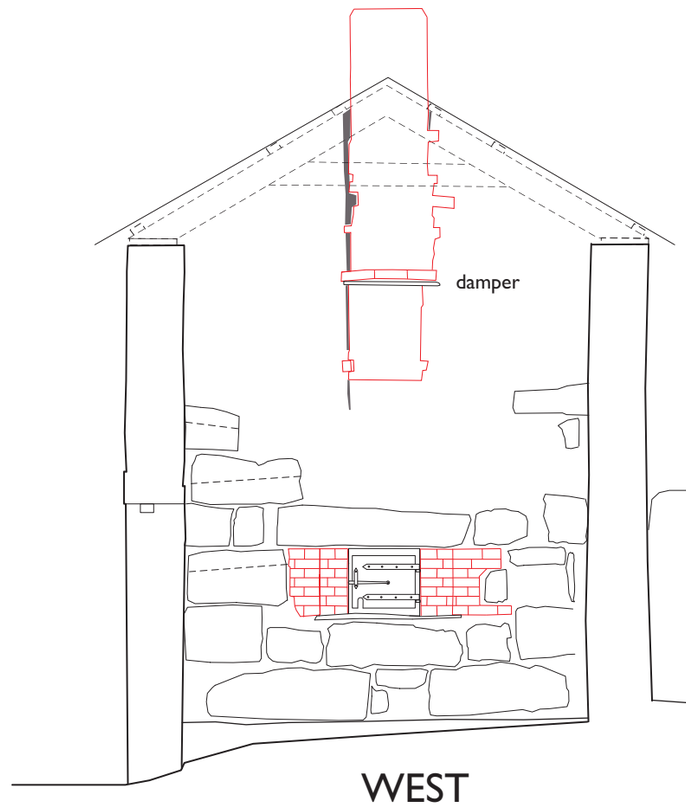

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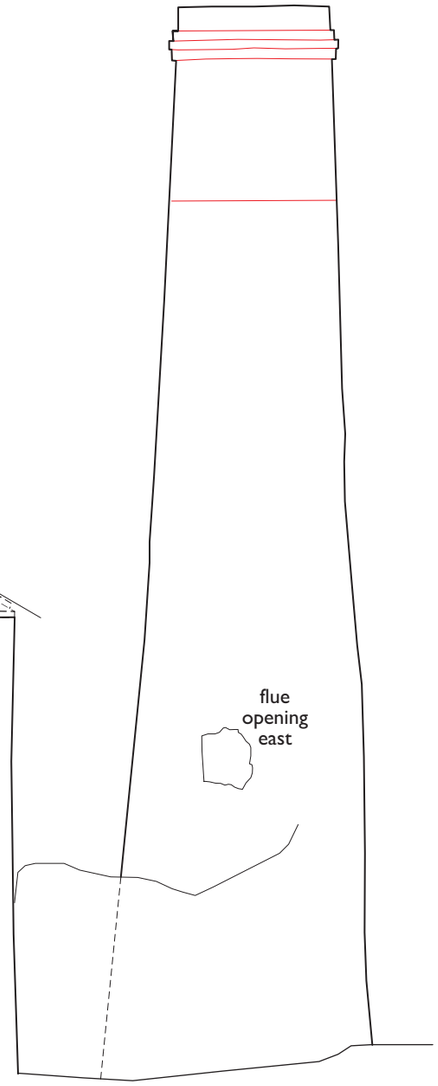

0 5m

brickwork

structural cracks

tramline wearmarks in granite blocks

THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

SURVEYOR: Phil Newman	CLIENT: Mrs G Roberts
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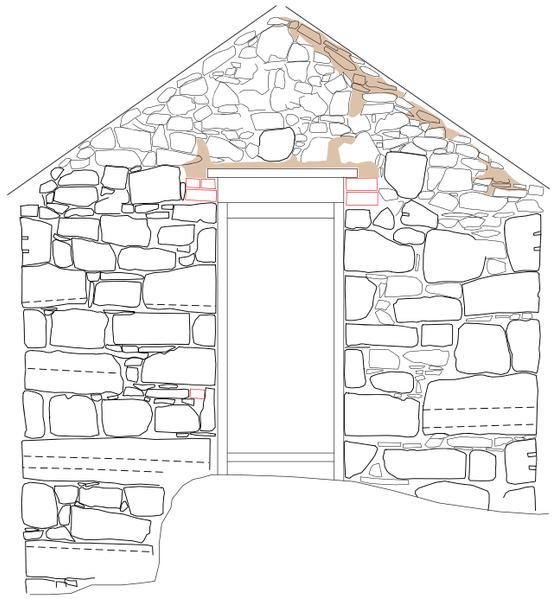
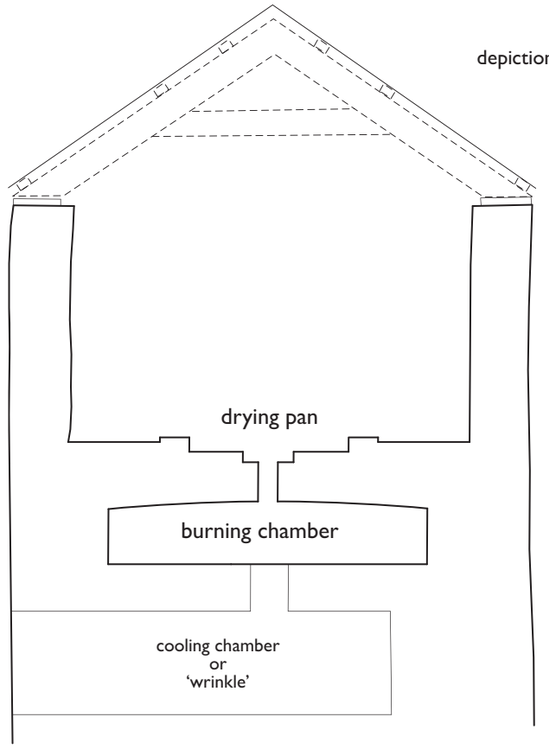
ELEVATION and FABRIC SURVEY
WEST END



CALCINER (WEST)
SECTIONAL
VIEW



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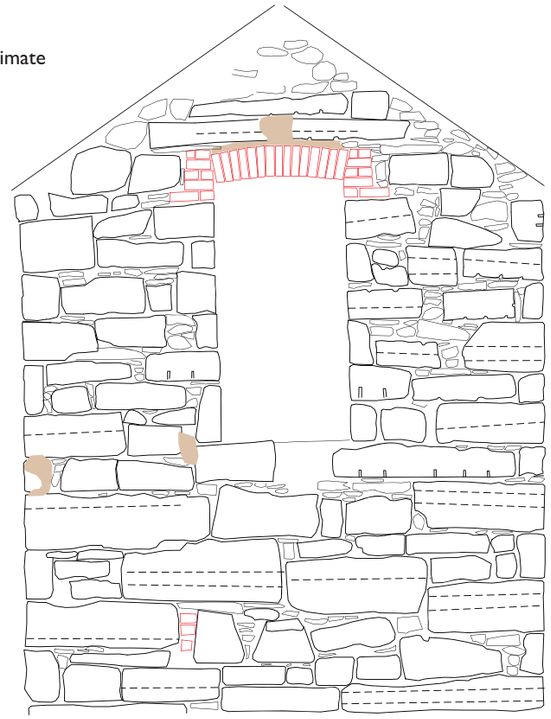

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patched cement repairs

tramline wearmarks in granite blocks

brickwork

THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

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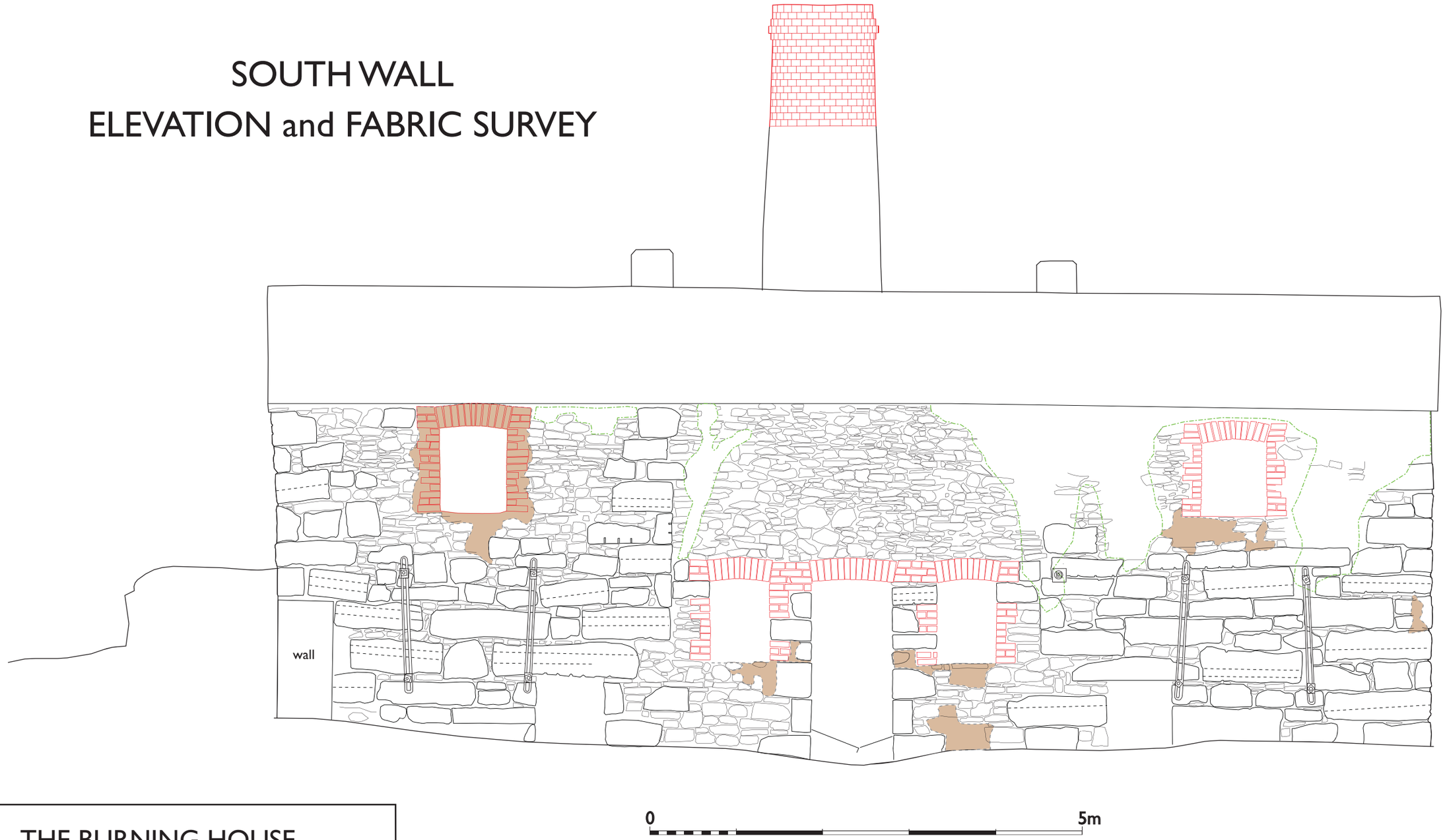
SOUTH WALL
ELEVATION and FABRIC SURVEY



surface obscured by ivy Feb 2009

patched cement repairs

tramline wearmarks in granite blocks

brickwork

THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

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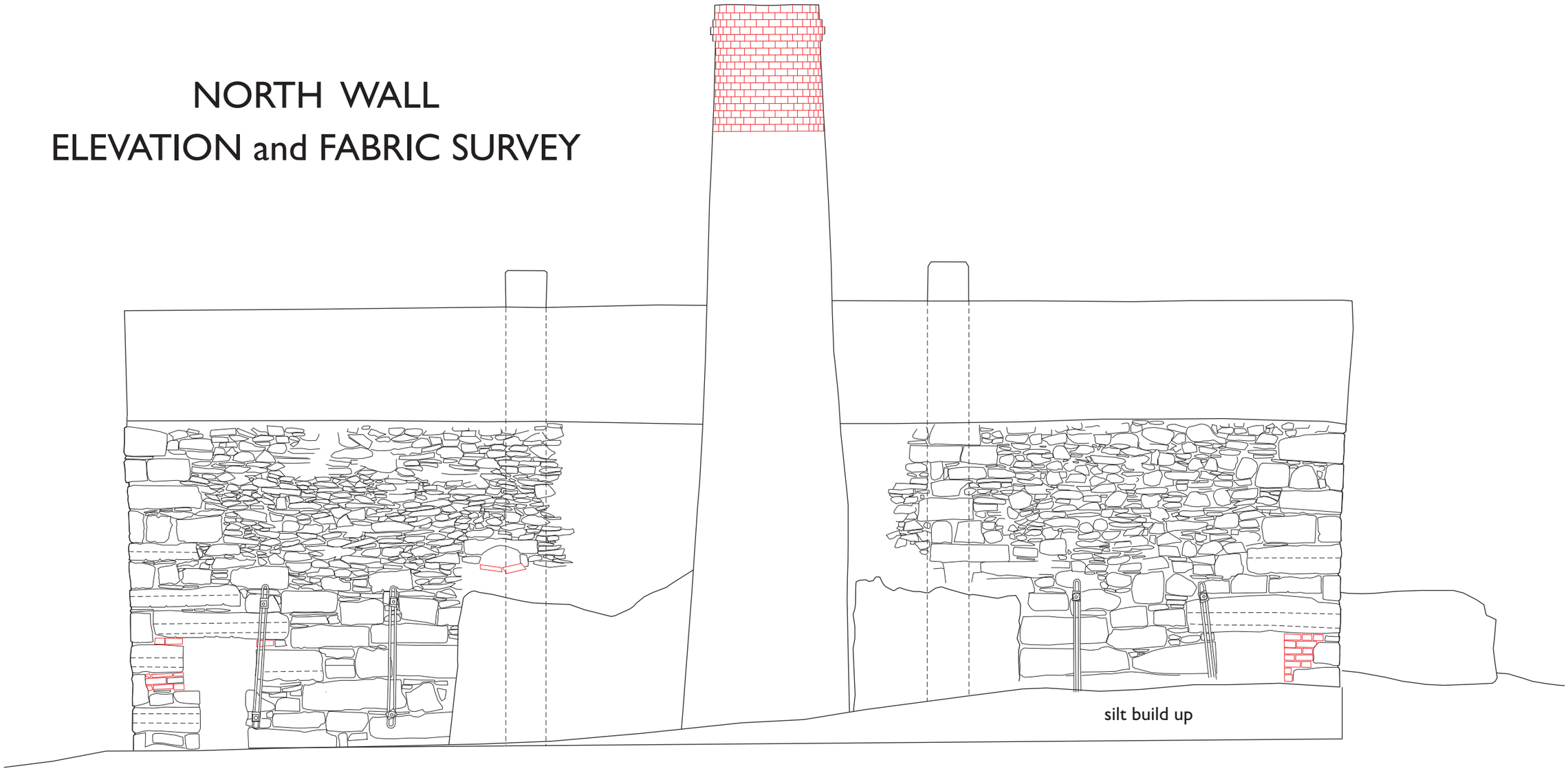
NORTH WALL
ELEVATION and FABRIC SURVEY



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surface obscured by ivy Feb 2009

tramline wearmarks in granite blocks

brickwork

THE BURNING HOUSE, ATLAS TIN MINE, ILSINGTON, DEVON

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