

Tin Smelting in Devon in the 18th and 19th Centuries

Tom Greeves

Abstract

The study of the last two hundred years of tin smelting in the county of Devon, in the 18th and 19th centuries, is almost as neglected and as challenging as the study of pre-medieval tin smelting. It is little known that at least seven tin smelting houses operated within the county after 1786, and that the last tin smelting house in Devon closed as recently as 1890. Moreover, both blast and reverberatory furnaces were in use for much of this period. This paper draws attention to these important sites of metallurgical activity and puts them in an historical and limited archaeological context.

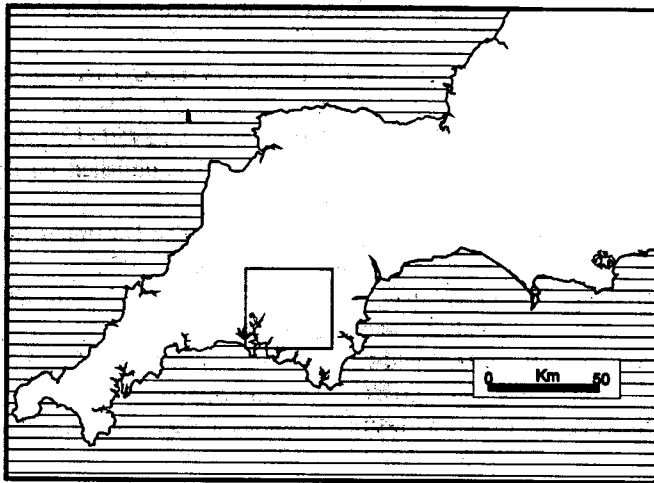


Fig. 1. 18th & 19th century tin smelting in Devon. Study area.

The early 18th century witnessed a revival in the fortunes of the Devon tin industry after some 50 years of decline. Coinage figures (recording tin assayed and taxed) suggest that output, although small by Cornish standards, was similar to that of the early years of the 17th century with nearly 124,000 pounds (c.56 tonnes) of tin metal being produced in the peak year of 1706 (Greeves 1981, 34-5). This was in the form of 471 ingots, averaging 262 pounds (119 kg) apiece (DuCo London/Stannaries/Tin Rolls 1706-12). This probably represents nearly 500 smelting days, which clearly indicates that more than one smelting house must have been in operation.

By about 1750 the industry was again failing but had revived within 25 years, and remained relatively prosperous until the 1830s. Unfortunately, separate production figures for Devon as distinct from Cornwall for about 100 years from c.1750 - c.1850 have not yet been calculated, and may be virtually unobtainable. From 1852 production figures of tin ore from Devon have been published (Burt *et al* 1984, xx). Peak recorded output in Devon after this date was 307 tons (312 tonnes) of dressed ore in 1864.

The last phase of occupation of the tin smelting site at Upper Merrivale on western Dartmoor, the subject of excavation by the Dartmoor Tinworking Research Group since 1991, probably just lasted into the 18th century. The pottery found suggests that it was abandoned in about AD 1700 (Greeves 1994). Certainly it seems to have gone out of use by AD 1719 when official Duchy of Cornwall sources record only two tin blowing houses in Devon, one in the parish of Plympton (St Mary) and the other in the parish of Sheepstor (DuCo London/Inrolment Book 3, 1702-1715, 220). The last furnace at Upper

Merrivale was, as far as we can tell, a 'classic' Dartmoor tin blast furnace, of a type found at many other mills of presumed 16th and 17th century date, and probably little changed in basic design since the 13th century. The site is therefore that of a blowing mill or blowing house, with no hint of a reverberatory furnace in use there. Two separate blowing houses in the parishes of Plympton and Sheepstor are listed again in 1730 (DuCo London/Biographical Note of Duchy Officials, p.397). The historic parish of Plympton St Mary included much of Crownhill Down and the Bottle Hill area (SX 5658) which might be the most likely location for a blowing house, but no site has yet been identified. In 1751 this Plympton site was described as 'one Blowing & Smelting House' which suggests that there was both a blast and reverberatory furnace there. The Sheepstor site was also mentioned again in 1751, as a blowing house (DuCo London/Misc.Papers prepared for binding by Richard Gray). A strong candidate for its location is the site at Longstone (SX 56076880), now below the waters of Burrator reservoir except in times of drought. Two tin mouldstones were recovered from here in the 1930s and moved to the vicinity of Burrator Lodge (Worth 1938, 451), but have since been lost. One was unusually large (top measurements of 510 x 390 mm) and would have held 569 pounds (258 kg) of tin metal if full. Its dimensions are more akin to Cornish moulds and is comparable to mouldstones from Bradford and Postbridge in Devon, each of which has a Cornish connection and/or late date (Greeves 1992, 6). Possible support of a late date for the last phase of the Longstone mill is an inscription on a nearby boulder, with the letters IL and the apparent date 1740, though this is actually closer to the site of a probable corn mill than the definite tin mill itself (Greeves 1993). Surface finds of tin slag from this site have been subjected to electron probe microanalysis and found to contain nearly 22% SnO. The slag contains metallic tin prills with no detectable impurities. It has a relatively high lime (CaO) content (3.1%) but not enough to suggest use as a flux (Tylecote *et al* 1989, 438-9). A further analysis by Malham, revealed 33% SnO and low CaO (Aylett 1996, 65).

Two other smelting houses likely to have been for tin, but just possibly for copper, are recorded in the mid-18th century. One was by Impham Quay, above Morwellham on the Tamar. 'Old Smelting House' is marked here on a map of 1758 (DR0/T1258M/E16C, 27-8; Hoskins & Finberg 1952, 168), and an indeterminate terraced structure survives at SX 43987055. This site was smelting tin in 1724-5, and tin slag has been recovered from it (J. Brook *in litt* 20th Jan 1997). The other smelting house is marked on Benjamin Donn's map of 1765 for

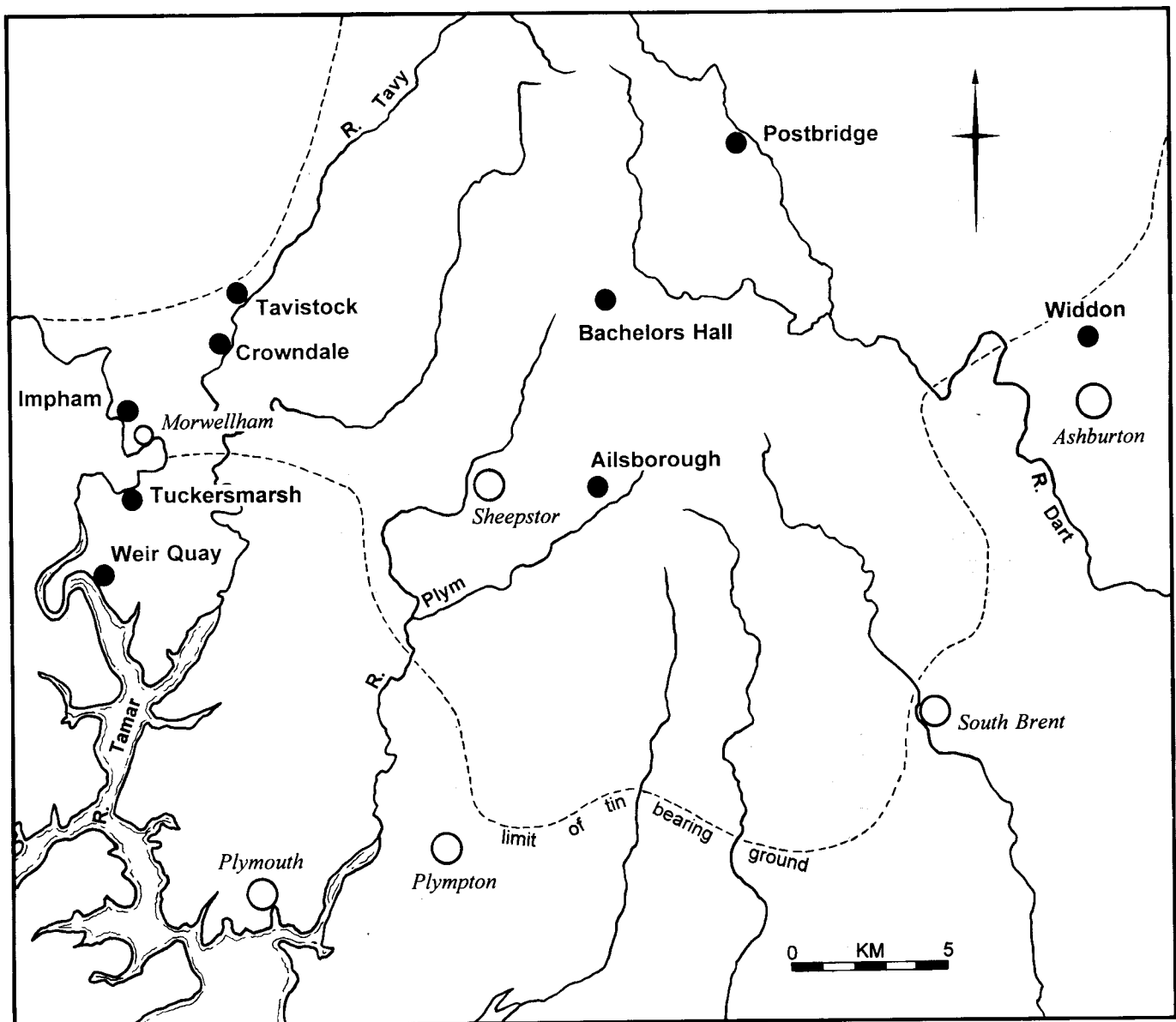


Fig. 2. Location map of documented tin smelting houses in Devon AD 1700 - 1890.

which five years of fieldwork were completed in 1763. The site is at Whiddon Mine near Ashburton and is marked as 'Widdon Smelting House Tin and Copper Mine' (Donn 1765, Sheet 10a). The area is very overgrown but a substantial structure survives at the lower end of workings, at SX 75457217. Further fieldwork is required to establish whether this relates to smelting.

In about 1790-1791 it seems that no tin smelting house was operating within Devon. This was certainly stated to be the case in November 1791 (DuCo London/ Dartmore Applications for Grants from Messrs Carpenter, Frazer & Cole 1789-93, 20.11.1791), and in June of that year the Coinage Account Books of Calenick Smelting House, one mile south of Truro, had recorded receiving and smelting ore from the 'Dartmoor Mining Co., Vytyfer', producing some 5.29 tons (5.38 tonnes) of tin metal (CRO/DDRG 1/128-141, June 23 1791). The year before, in July 1790, Whiteworks mine, on western Dartmoor, had also sent tin ore to Calenick. The account books for the Midsummer coinage of that year record that Calenick produced 16 cwt 2 qr 19 lbs (1,867 pounds/847 kg) of tin metal for 'Matthew Rowse of Widecombe White Works' (CRO/DDRG 1/128-141, 7 July 1790).

In c.1795 the Rev. John Swete visited Vitifer Mine and learned that dressed ore 'was conveyed in carts, to the distance of eighteen miles on the banks of the Tamar, where it was to be

smelted, and coals for the Smith's forge were to be brought back in return' (DRO 564/Vol.15, p.179). This is perhaps most likely to have been a smelting house on the Devon side of the river, but could have been on the Cornish side. Two years later Swete visited the area again, and discovered 'that the Ore was no longer smelted where it used to be, on the Tamar's banks - but that it was conveyed from thence in vessels to Penzance for that purpose' (DRO 564/ Vol. 16, p.1). The smelting house on the Tamar was still operating then, but Swete noted that it was cheaper to send the ore by sea to Penzance:

The smelters on the Tamar would in return for a ton of Black Tin allow but 1100 and a quarter of White, ...those at Penzance on the same quantity had covenanted to return half hundred more. The general price of tin (though fluctuating at times) was from 50s. to £3 10s per 100 and as the carriage to Penzance was not more than 5s. per 100 it is evident that from this change, the Proprietors of the Mine had derived no small benefit,..(DRO 5641 Vol. 16, p.2).

In April 1798 the 'Dartmoor Mining Co., Vytyfer' were once again sending ore to Calenick Smelting House, which produced 3.3 tons (3.38 tonnes) of tin metal (CRO/DDRG 1/128-141, 6 April 1798).

Despite these links with Cornish smelters, both documentary and archaeological evidence confirms the existence of tin smelting houses within Devon from the 1780s onwards. At least seven concerns were operating in Devon between 1786 and 1890. All are located in west Devon, in a band 15 miles wide, extending from Postbridge on central Dartmoor to the River Tamar (Fig. 2).

The earliest and shortest-lived was at Postbridge itself, a short distance below the famous clapper bridge, on the right (west) bank of the East Dart River. It was constructed by William Warren on behalf of the Dartmoor Mining & Smelting Co. which was actively involved at Vitifer Mine, some 2½ miles to the north-east. Described as a 'Tin Smelting House' and also sometimes as a 'Blowing House', which suggests that it might have had both a blast and a reverberatory furnace, it was said to have been built 'at great expense'. It is recorded as having smelted tin twice in 1786 (DuCo London/ Dartmoor Proceedings 1786, 14.9; 15.9; 14.10; 15.10; 13.11). Soon after, the Company was in a state of crisis, with the other adventurers trying to oust William Warren. By December 1791 the building was thought to have been 'entirely taken down' (DuCo London/Dartmore Applications for Grants from Messrs Carpenter, Fraser & Cole, 1789-93, 9.12.1791).

The subsequent history of the site is not well-recorded, though it is locally known as 'The Barracks'. In the late 1790s John Swete noted the existence of 'the front shell of a large House' (ruined) which had been built by Warren to its first storey, and which had had 'a Smelting House and other necessary buildings' 'contiguous' to it. A 'tenement' behind the house was occupied by labourers at the time of his visit (DRO/564, Vol. 15, p.180). The site has suffered from quarrying and other activity (including use as a pig-sty) and no certain parts of the smelting complex can be identified. However, two identical granite mouldstones were first recorded here by Robert Burnard in the late 1880s (Burnard 1889, 240), and subsequently by Worth (1938, 452-3). One mouldstone survives at SX 64817880. The top measurement of its cavity is 600 x 360mm, and the mould could have held up to 7 cwt (83.5 kg) of tin metal. A photograph taken more than 100 years ago shows substantial ruins but it is unclear whether any of these formed part of the smelting house (Somers Cocks & Greeves 1983, plate 15, p.26).

William Warren printed a pamphlet in 1788 (a copy signed by himself has the date changed to 1787) promoting the formation of the Devon Tin Mining & Smelting Co. Interestingly, he gives examples of smelting Grain Tin with wood or peat charcoal in a Blast Furnace/Blowing House (the traditional method) and of Common Tin being smelted in a reverberatory furnace smelting house with pit coal. He advocates all tin should be smelted in a blast furnace with 'proper Apparatus' with 'charred or coated peat' on the principle of Lord Dundonald's process of 'coaking coal for extracting tar' (Warren 1788).

In November 1786 William Simpson had proposed to the Duchy of Cornwall that a tin smelting house should be erected on each Quarter of the Forest of Dartmoor (DuCo London, Dartmoor Proceedings 1786-8/William Simpson's Survey of Dartmoor). One that was eventually established, though unconnected with Simpson's proposal, was at Bachelors Hall near Princetown and was in operation 1798-1804 and again in 1807.

This important smelting house was erected by Thomas Gray and partners probably soon after the discovery of tin while digging the Dock (Devonport) Leat in 1795. John Swete

visited the mine in the late 1790s but unfortunately did not have time to visit the smelting house which he said was, with stamping mills, 'in the bottom beneath, on the banks of a small stream which emptied itself into Blackabrook' (DRO/564, Vol.16. 49-50). The Swedish traveller, Eric Svedenstierna, also made passing reference to 'a small smelting works' here in 1803 (Svedenstierna 1804, 29). Fortunately, Duchy of Cornwall records have a continuous record of ingots smelted from 1798 until 1804. The most productive year was 1798 when 91 'blocks' were produced weighing a total of 25,260 pounds (an average of 278 pounds each). The total for that period was 223 blocks weighing 60,500 pounds (27.43 tonnes) and averaging 271 pounds (123 kg) per ingot. A further 2,362 pounds (1.07 tonnes) are listed for 1807 (DuCo London/Bachelors Hall Mine - An account of Coinage Duty... under the lease granted to Mr. Thos. Gray in Febry 1795...). In 1828 sale particulars and a plan (surveyed by W. Shillibeer) of Tor Royal Estate recorded that 'the Smelting-house has since been converted into a Brewery' which was described as 'extensive' and which, 'during the War' (i.e. Napoleonic Wars) 'supplied Prince Town and the Prison' (Westcountry Studies Library, Exeter). The site of the Brewery and hence the smelting house is shown on the plan as being right beside the left (west) bank of the stream on land formerly belonging to the late Mr Joshua Rowe (SX 60137360). Buildings (now in agricultural use) are still on this site. No known relics of the smelting house are known, but it may be that the buildings, which have not been examined in any detail, contain clues and possibly some of the original fabric.

Overlapping in date with Bachelors Hall was a smelting house at Tuckersmarsh (Tuckermarsh on modern maps), on the Devon side of the River Tamar, north of Bere Alston, more or less opposite Calstock and in Bere Ferrers parish. In September 1806 it bought 5 cwt 2 qrs 6 lb (482 kg) of white (sic) tin from 'Torwitt Stream Work', which may have been part of Bachelors Hall Mine (DuCo London/Bundle/Bachelors Hall Mine 1799-1825, 19.9.1806). Mr James Simpson was connected with it in 1807 when a moiety of the profits arising from smelting of tin were advertised (*Exeter Flying Post*, 19.2.1807, p.3 col.1). Another advertisement appeared in October of that year (*EFP*, 22.10.1807, p.3 col.2) and a further one in December, placed by the executors of James Warne, was for 'A Leasehold Smelting-House and Wharf, called Tucker's Marsh, with all the fixtures and implements; eligibly situate on the Devonshire bank of the navigable river Tamar' (*EFP*, 31.12.1807, p.3 col.4). It is last noted on 1st January 1808 when a similar advertisement appeared in the *Royal Cornwall Gazette*. No known archaeological reconnaissance has been done for this site, but its likely location was at approximately SX 442681.

A group of smelting houses in the immediate vicinity of Tavistock, only four miles from the River Tamar, form a significant cluster. As early as 1796 tin from Wheal Jewell mine, near Mary Tavy, was said to be going to a small smelting house near Tavistock owned by Mr. Lane, but this has not yet been identified (Hamilton Jenkin, 1981, 37).

The Devon Metal Company, Tavistock, held a creditors' meeting in March 1804 (*EFP*, 1.3.1804, p.1, col.4), but there is not yet confirmation of its likely involvement in tin smelting. The most important of the Tavistock tin smelting houses was that operated by the Devon Smelting Co. (also known as Gill & Co), which was in work from 1815 until at least 1837. In June 1819 it was described in a sale notice as being situated 'near the Iron Foundry... with one furnace now at work' (Barton



*Eylesburrow Blowing House - March 17. 88.
Remains of the furnace. Stone marked is "slagged"*

Plate 1. Remains of reverberatory furnace, Ailsborough, SX 59196765, photographed by Robert Burnard, 17th March 1888.



Plate 2. Tin smelting house at Weir Quay, SX 434651, 3.4.1996 (photo author).

1967, 49). These 'Tavistock Iron-Works' had been advertised for sale on 6 October 1815. The notice included the information:

On the Outside [of the 'Inclosed Yard'] but contiguous, is a STABLE and WAGGON HOUSE; adjoining is a SMELTING HOUSE for TIN, which, with a small Plot of Ground behind the Foundry, and the Use of Water for driving their Stamps, is Let on Lease for NINETEEN YEARS unexpired, at a Rent of £21 per Annum. (DRO/ Bedford Papers Misc Bundle - Mary Freeman inf.)

The site of this smelting house seems to have been close to the north (right bank) of the River Tavy, a short distance east of Vigo Bridge (SX 48457462). In the 1820s and 1830s several thousand (at least 7,487) blocks of tin were smelted here (Barton 1967, 53, 63, 72, 98n). A proportion of this may have been Cornish tin, and Barton suggests that some of this may have been smelted at Calstock (Barton 1967, 62n).

The Tavistock Smelting Company was apparently established at Crowndale (SX 473727), about one mile south-west of Tavistock, in the 1830s (Booker 1967, 132; Hamilton Jenkin 1974, 65), though a company of this name appears in the Tavistock coinage records as early as 1817 (DuCo London/ Tin Coinages, Comptroller's Returns). Its location was favourable, being beside the Tavistock Canal (opened June 1817), which ran to the port of Morwellham on the Tamar. In 1832 this smelting house was responsible for smelting tin ore taken from an old 'Jews House', i.e. blowing mill, near Dartmeet on central Dartmoor (Bray 1879, 2, 376), perhaps that at Week Ford (Newman 1993). A receipt survives for tin bought and smelted by the Crowndale Smelting House in May 1835 on behalf of Captain James Phillips of 'Wheal Barrenton Mine' [? = Wheal Boringdon] (WDRO/69/M/6/448). No archaeological reconnaissance for the exact location of the smelting house at Crowndale has yet been carried out.

The most accessible tin smelting house in Devon is that on open moorland at Ailsborough Mine in Sheepstor parish (SX 59196765). It is important as the last operating tin smelting house on moorland Dartmoor and also as likely to have been the site of the last tin blast furnace in operation in Devon. The



Fig. 3. Firebrick from site of Ailsborough smelting house, SX59196765 (Drawn by John Head).

site has been the subject of quite detailed study, from a documentary point of view (Cook *et al* 1974) and, relatively speaking, archaeologically both by Worth (1940, 222-3) and by an Edinburgh University survey team in the mid-1980s, directed by Roger Mercer. Robert Burnard photographed the site in the late 19th century, including the remains of the reverberatory furnace in March 1888 (Plate 1). Good records survive from 1822-1831 of the quantities of tin smelted and also of the different grades of tin - grain, common and refined, which support the field evidence of both a blast and a reverberatory furnace.

Archaeologically, the site is interesting for the evidence of the two furnaces, for the existence of a flue leading from the blast furnace, and for discovery of slagged stone and tin slag (some of it used in repairing the mine road from Sheepstor). An incomplete wedge-shaped firebrick (150 x 100 x 64 mm - the latter measurement being the complete width of the base) has also been recovered from the site, which perhaps hints at earlier activity as the brick is impressed with certain letters and the number 1700, which may be a date (Fig. 3). Several surface finds of tin slag have been made. R.H. Worth described the samples he found as being quite different to any other 'blowing house' slag owing to lime having been used as a flux (Worth 1940, 223). However, slag from the site which has been subject to XRF analysis still contained 15.5% SnO and is broadly similar to earlier slags (Tylecote *et al* 1989, 436). The low readings for CaO (0.57%) from this sample may indicate it was derived from the blast furnace.

The tin smelter's name was Walter Wellington. Over a ten year period from 1822-1831 the smelting house produced 276 tons (280 tonnes) of tin metal, in the form of 1,807 'blocks' averaging 3 cwt (152 kg) in weight apiece. Among mines sending their ore to it were Vitifer Mine (ten miles distant as the crow flies) and Bottle Hill Mine (six miles distant) (Cook *et al*, 1974).

In 1833, two years after the last record of tin smelting here, a prospectus for a new tin smelting house in Plymouth was apparently prepared, by some of the Bottle Hill adventurers. It stated that the Ailsborough smelting house was the only one then operating in Devon (Rendell 1991, 3-4). The new company was to be called The Devon Stannary Mining & Smelting Company, but nothing more is known of it. It may well be that the Ailsborough smelting house remained in relatively good order for some time, for as late as 1847 it was claimed that it was capable of smelting all tin raised in the county (Cook *et al* 1974, 171).

In August 1835 it was reported to the Duchy of Cornwall that there was only one smelting house in Devon, though no location was given (DuCo London/Bundle: Misc, 1830-1835, Freeth to Sir Geo. Harrison, 12.8.1835). A further apparently abortive scheme was that reported in the *Mining Journal* in 1850 which noted that smelting works were about to be erected at South Brent, adjoining the South Devon Railway 'for the purpose of reducing iron, copper, lead and tin, by the use of peat' (*MJ* 16.3.1850, p.127). Nothing more is known of this enterprise.

The last tin smelting house operating in the county was at Weir Quay near Bere Alston. The quay and foreshore itself are littered with slag, probably mostly from the Tamar Smelting Co. silver-lead works, which adjoined the tin smelting works. In 1849 the Union Tin Smelting Co. began operations on the higher part of the latter's premises. The company was wound up in 1854 but work continued under J.G.Tyrie until 1863 (Barton 1967, 97, 127).

In 1871 it was re-established as the Tamar Tin Smelting Co. and survived for five years before temporary closure (Barton 1967, 153). The Ordnance Survey 1:2500 Sheet CXI.SW, which was surveyed in 1881-2, shows the Tamar Smelting Works as 'Disused'. The Tamar Tin Smelting Company Limited was registered on 3 December 1884, taking over 'All that tin smelting house commonly called The Higher Tamar Smelting Works'. The managing director was John Fletcher Pagen.

A final episode of work lasted from 1884-1890. In June 1890 a resolution was passed to wind up the company. However, a new company titled 'The West of England Smelting and Refining Company Ltd,' was registered on 18 March 1891, with J. F. Pagen as managing director and secretary, 'to acquire and undertake the property and liabilities of the Tamar Tin Smelting Company Limited'. This company was dissolved on 17 June 1898, apparently never having sold more than seven shares. The Tamar Tin Smelting Co. Ltd was not officially dissolved until 24 July 1923 (PRO/BT31/14784/20518). The site subsequently became a jam factory.

Remarkably, much of the fabric of this site survives at SX434651, on the north side of the road between Weir Quay and Bere Alston, in the form of substantial buildings, including the tin smelting house itself (Plate 2), but also apparently including the count house, store rooms and assay office. Apart from a report by Frank Booker in 1977 (Booker 1977) no known archaeological work or record of the building fabric has been carried out. In 1855 the smelting house was described as being 60ft x 56 ft (18.3 x 17m) with two large furnaces able to smelt 42 tons (42.7 tonnes) of tin ore per week. There was also a Bar Tin House 42ft x 18ft (12.8 x 5.5m) and a 'Black Tin Smelting House', 23ft x 18ft (7 x 5.5m) (MJ 1.12.1855, p.778). Ingots produced in this smelting house were recently recovered from the *S.S. Cheerful* wrecked off Land's End on 20th July 1885. A cast-iron ingot mould from the works is now at Morwellham, with two of the tin ingots. Two of the smelting house marks are recorded by Barton (1967, 77-8).

Much work still needs to be done, both on the ground and in record offices, to shed further light on this period of Devon's tin industry, which marks the end of a metallurgical tradition stretching back hundreds if not thousands of years. Some of the earliest documented smelting activity in Devon, albeit of silver-lead ores, occurred at Bere Ferrers in the 13th century (Claughton 1992). Little more than one hundred years ago the smelting tradition of the county had moved full circle and, in its last manifestation as a tin smelting house, had once again reached its most westerly location.

ACKNOWLEDGEMENTS

My thanks are due to my wife Elisabeth for provision of material from the Public Record Office relating to Weir Quay, to Mary Freeman for material and discussion relating to smelting in Tavistock, to Bob Le Marchant for information on ingots from Weir Quay, and to Lady Sylvia Sayer for permission to reproduce Robert Burnard's photograph of the furnace at Ailsborough.

ABBREVIATIONS

CRO Cornwall Record Office, Truro
 DRO Devon Record Office, Exeter
 DuCo London Duchy of Cornwall, Buckingham Gate, London
 EFP Exeter Flying Post
 MJ Mining Journal
 PRO Public Record Office, Kew, London
 WDRO West Devon Record Office, Plymouth

BIBLIOGRAPHY

- Aylett, J. 1996. *Medieval Tin Smelting and the Characterisation of Tin Slag from Crift Farm, Cornwall* (unpub B.Sc dissertation, University of Bradford).
- Barton, D.B. 1967. *A History of Tin Mining & Smelting in Cornwall* (Bradford Barton, Truro).
- Booker, F. 1967. *The Industrial Archaeology of the Tamar Valley* (David & Charles, Newton Abbot).
- Booker, F. 1977. *Union Tin Smelting Works, Weir Quay, Bere Alston* (unpublished typescript, August 1977).
- Bray, A.E. 1879. *The Borders of the Tamar & the Tavy*, 3rd edn, 2 vols (W. Kent, London).
- Burnard, R. 1889. On the Track of the "Old Men", Dartmoor, Part 2, *Trans. Plymouth Institution* 10, 223-242.
- Burt, R, Waite, P. & Burnley, R. 1984. *Devon & Somerset Mines - Metalliferous & Associated Minerals 1845 - 1913* (Exeter University Press).
- Claughton, P. 1992. Medieval Silver-Lead Smelting in Devon, in Willies, L. & Cranstone, D. (eds) *Boles & Smelting Mills*, 12-15.
- Cook, R. M. L, Greeves, T.A.P. & Kilvington, C.C. 1974. Eylesbarrow (1814-1852) - a Study of a Dartmoor Tin Mine, *Rep. Trans. Devonshire Ass.* 106, 161-214.
- Donn, B, 1765. *A Map of the County of Devon 1765* (1965 edn).
- Greeves, T.A.P. 1981. *The Devon Tin Industry 1450-1750: an archaeological and historical survey* (unpublished Ph.D thesis, University of Exeter).
- Greeves, T. 1992. Adventures with Fiery Dragons - the Cornish Tinner in Devon from the 15th to the 20th Century, *Journal of the Trevithick Soc.* 19, 2-17.
- Greeves, T. 1993. A Burrator Centenary - an Historical Context, *Dartmoor Magazine* 31, Summer 1993, 6-8.
- Greeves, T. 1994. Stamping & Smelting at Upper Merrivale Tin Mill: Preliminary Results 1991-1993, in Ford, T. D. & Willies, L. (eds) *Mining Before Powder: Bull. PDMHS* 12, 3, 76-80.
- Hamilton Jenkin, A.K. 1974. *Mines of Devon* Volume 1: The Southern Area (David & Charles, Newton Abbot).
- Hamilton Jenkin, A.K. 1981. *Mines of Devon: North & East of Dartmoor* (Devon Library Services, Exeter).
- Newman, P. 1993. Week Ford Tin Mills, Dartmoor, *Proc. Devon Archaeol. Soc.* 51, 185-197.
- Rendell, P. 1991. Bottle Hill Mine, *Plymouth Mineral & Mining Club Journal* 20. 3, 3-5.
- Somers Cocks, J. & Greeves, T. 1983. *A Dartmoor Century 1883-1983. One Hundred Years of the Dartmoor Preservation Association* (DPA, Postbridge).
- Svedenstierna, E. 1804. *Tour of Great Britain (1802-3)* (trans. E.Dellow, 1973).
- Tylecote, R.F, Photos, E. & Earl, B. 1989. The composition of tin slags from the south-west of England, *World Archaeology* 20.3, 434-445.
- Warren, W. 1788. *A State of the Tin Mines on Dartmoor in the County of Devon, for Forming a Company to work the same.*
- Worth, R. H. 1938. Dartmoor blowing-houses, Stray notes 3, *Rep. Trans, Devonshire Ass.* 70, 451-4.
- Worth, R. H. 1940. The Dartmoor Blowing-house, *Rep. Trans, Devonshire Ass.* 72, 209-50.

Dr Tom Greeves

APPENDIX

Summary of documented tin smelting houses and companies in Devon 1700-1890

Date	Location	Company name	Comments
1719	Plympton [St Mary]		blowing house
1719	Sheepstor		blowing house
1724-5(pre-1758)	Impham		smelting house
1730	Plympton		blowing house
1730	Sheepstor		blowing house
1751	Plympton		blowing & smelting house
1751	Sheepstor		blowing house
c.1760	Whiddon		smelting house(tin/copper)
1786	Postbridge	Dartmoor Mining & Smelting Co	smelting/blowing house
1787/8	?	Devon Tin Mining & Smelting Co	operation doubtful
1795-7	R. Tamar		possibly in Cornwall
1796	near Tavistock	?	Mr Lane, proprietor
1798-1807	Bachelors Hall	?	smelting house
1804	Tavistock	Devon Metal Co	smelting premises not known
1806-8	Tuckersmarsh	?	smelting house
1815-1837	Tavistock	Devon Smelting Co (Gill & Co)	smelting house
1817-?	?	Tavistock Smelting Co	smelting house
1822-1831	Ailsborough	J H Deacon & Co	blowing & reverberatory furnaces
18305	Crowndale	Tavistock Smelting Co	smelting house
1833	?	Devon Stannary Mining & Smelting Co	operation doubtful
1850	South Brent	?	operation doubtful
1849-1863	Weir Quay	Union Tin Smelting Co	smelting house
1871-1876	Weir Quay	Tamar Tin Smelting Co	smelting house
1884-1890	Weir Quay	Tamar Tin Smelting Co	smelting house
1891-1898	?	The West of England Smelting & Refining Co Ltd	operation doubtful