

## Summary

Crucible furnace cellar. c1797. Built of brick and millstone grit stone, with stone steps.

### Reason for Listing

The crucible furnace cellar at 2 Top Side, Grenoside, of c1797, is listed at Grade II for the following principal reasons:

- \* Technological innovation: the highly distinctive cellar, necessary to achieve the high temperatures required for the process, identify its use in the manufacture of high-quality, homogenous steel, which was crucial in transforming Sheffield into a major metal-working centre of innovation;
- \* Regional specialism: research has confirmed that this type of specialist industrial building was associated particularly with Sheffield and its environs and the crucible steel and steel alloys produced contributed greatly to the city's International pre-eminence of reputation in the manufacturing of quality metal goods;
- \* Date: the crucible steel process was only invented in the early 1740s, by Benjamin Huntsman in nearby Doncaster, and documentary evidence places the date of this crucible furnace at c1797, which is earlier than any other known surviving example;
- \* Rarity: though Sheffield produced thousands of tons of crucible steel during C19 using a fundamentally small-scale craft process, the severe decline of the metal trades industries in the late C20 resulted in the demolition of large numbers of its associated buildings, and the Grenoside crucible furnace is one of around only eighteen furnaces known to survive;
- \* Location: the Grenoside furnace is significant in understanding the development of the crucible steel trade in Sheffield as it is early in date and built in a rural location, while the majority of the other remaining furnaces are urban and later C19 or even early C20 in date, with Abbeydale built in c1829 as an intermediary, being rural in location, but part of a larger, more sophisticated industrial complex;
- \* Architecture and process: the Grenoside cellar is a remarkably intact example of a crucible furnace cellar, which was an integral component of this specialist building as, together with the tall chimneys, they enabled the extremely high temperatures which were required for the process, and also the necessary ability to closely regulate the heat.

### History

The invention of crucible steel, the first method of producing a homogenous high-quality steel, was crucial in transforming Sheffield into a major metal-working centre of innovation. It is traditionally thought to have been invented in the early 1740s by Benjamin Huntsman, a Doncaster watchmaker, to manufacture better quality springs and pendulums. A late-C19 writer claimed that by 1835 there were 56 crucible furnaces in Sheffield and by 1847 there were 97. Only around eighteen crucible furnaces are known to survive. Probably the earliest is the furnace at Abbeydale Industrial Hamlet of c1829, and of the remaining listed examples the majority are post-1850 in date, or even early C20.

The land at 2 Top Side, Grenoside, was acquired by Richard Bayley and Jonathan Tingle from Benjamin Allott in 1797; a map of 1785 shows that at that time there were no buildings on the east side of Top Side. It appears that the crucible furnace was built shortly afterwards as by 1801-4 Jonathan Tingle is mentioned as making a record output of 2.5 tons of steel per week at Top Side Furnace. In 1805 he voted as a Freeholder in the Yorkshire elections, at a time when only a person of substance and standing was eligible to vote. The poll book for 1807 listed him as a cast steel maker, and later trade directories listed him as a cast steel refiner. (Cast steel was the name then used for crucible steel as the process required the pouring or teeming of the molten metal from crucibles into casts).

Jonathan Tingle died around 1836-7 and his business was taken over by one of his sons, Benjamin. The 1841 census described Benjamin as a file and steel manufacturer, and an 1855 advertisement in Slater's Northern Trade Directory describes him as 'BENJAMIN TINGLE (late Bayley and Tingle est 1796) manufacturer of steel in all its branches, Files, Saws, iron and steel wire, shuttle makers' tips, springs etc, and being the 'Inventor of the Improved cast steel frame and core-annealed steel, Grenoside Steel Works, near Sheffield'.

Benjamin Tingle died in 1865 and the firm continued under the name of Benjamin Tingle and Co with his son, William Henry, and son-in-law, Joseph Ashton as partners. By this period large-scale steel making was thriving in the Don Valley and elsewhere in Sheffield, and four years later this small-scale business was bankrupt. On 24th August 1869 the site was auctioned upon decree of the chancery court. It was described as 'Lot 1 All that Freehold STEEL FURNACE situate at Grenoside in the said parish of Ecclesfield, containing five holes, with Coke Shed and other building and Yard, situation fronting Back Lane, near Hilltop Lane, the site whereof contains ten perches or thereabouts'. The accompanying plan showed the furnace melting shop and the house, together with other buildings which do not survive. The property was sold to Joseph Oates, who subsequently lived at 2 Top Side. The house and other outbuildings later passed to different ownership, though in 1945 a will described 'the building and yard adjoining formerly used as a Steel Furnace now used as a store and in the occupation of the said John William Oates'.

In the early 1980s a two-storey extension was built to the house, and the melting shop, which had most recently been used to house animals, was reconstructed using stone from the original building to form a double garage. A photograph of the east elevation prior to alteration shows it to have had two wide window openings, then blocked. No evidence for the distinctive, wide rectangular crucible stack, which must have run east-west, remains, and the row of melting holes set in the floor have been concreted over. In the early C21 a link was built between the house extension and the garage.

## **Details**

**PLAN:** cellar running east-west containing five melting holes, with curved flight of steps at east end rising to ground-floor level and exiting outside in the garden.

**EXTERIOR:** the cellar is accessed by an external flight of stone steps located on the east side of the garage, formerly the site of the melting shop. The steps have stone retaining walls to both sides and descend in a southerly direction before curving round to the west to enter the cellar.

**INTERIOR:** the furnace cellar is 13 metres long, 1.94 metres high at its highest point, and 0.34 metres wide. It has a barrel vault built of brick. On the south side, this springs off a roughly coursed stone wall. The west, end wall is also of stone, with a well-formed recess, the top of which was open in the verge outside the building (now covered by a monolithic stone slab). On the north side, the entire wall is built of brick. There are ash-pit recesses for five furnace chambers. The recesses are located beneath the individual melting holes, which would have been set into the melting shop floor. The fire bars upon which the crucible pots rested remain, as does the metal reinforcing strapping holding the structure together. At the back of each ash-pit are small openings into the stack flues which could be used to regulate the air-flow being drawn beneath the melting holes from the cellar, and thus the temperature. On each side of the furnace chambers is a wider opening or recess, perhaps formerly hearths, which are now blocked. At the left-hand, west end of the wall is an approximately square opening with a monolithic stone lintel. The opening itself is blocked with stone. At the right-hand, east end there is a possible former hearth with a brick segmental-arched lintel, which is also blocked with stone. The floor is stone paved, with a shallow, central runnel, which during wet weather feeds water into a circular well or sump at the east end to prevent the cellar flooding.

The former melting shop building over the cellar has been rebuilt as a double garage and is not of

special interest. Nor is the house and extensions to the south of the garage.

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