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Ancient Monuments Laboratory  
Report 67/93

ASSESSMENT OF METALWORKING  
MATERIAL FROM STOUR STREET,  
CANTERBURY, KENT 1986  
EXCAVATIONS

Catherine Mortimer BTech DPhil

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#### Summary

A 25% sample of the ferrous and non-ferrous metalworking debris from Roman and later contexts was examined. Most of the diagnostic material was from ironsmithing during the Roman period; ironsmithing was also carried out in the post-medieval period. Fired clay and vitrified hearth/furnace linings may relate to these or to other high-temperature processes which took place on or near the site. Eight fragments from medieval crucibles were compared with examples from other sites in the town.

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# Assessment of metalworking material from Stour St, Canterbury, 1986 excavations - The Towers Meat warehouse site

Catherine Mortimer

Two areas (A and B) forming a rectangular block 10m by 13m were excavated at this multi-period site. Most of the material discussed here came from Stour St A; only a small amount of material from Stour St B was examined. Roman gravel-quarrying (sub-phase A) was succeeded by a metallised street (B), two phases of 'ovens' (M and N), timber and then stone buildings (O and C). Additional metalling took place giving further phases (D, F and J). The area was subject to silting and various phases were defined as a tile-lined drain was made, repaired and silted up. A further phase of 'ovens' overlay the earlier set (P). Sub-Roman phases included demolition and robber backfill (V), a small group of pits filled with structural debris (Z), dark soil (S and S1) and an Anglo-Saxon sunken-featured building (G). Phases 1-8 are related to early medieval, medieval and post-medieval buildings and include contexts with sixteenth- or seventeenth-century metalworking debris (6). Cellaring has truncated the phasing throughout Stour St B, leaving Roman and immediately post-Roman phases in the main.

The metalworking debris at the site consists of a very small amount of non-ferrous metalworking crucibles and waste, ferrous slags and a large amount of non-diagnostic high-temperature material. The total weight of metalworking debris is c.38kg, and about 25% of the material (by weight) was examined for this assessment, with most attention being paid to the diagnostic material categories.

## Non-ferrous metalworking debris (Table 1)

### Crucibles

The forms of eight crucible fragments of medieval date are comparable to others found in Canterbury and elsewhere (*eg* Long Market (Canterbury) and London), and have been shown to have connections with non-ferrous metalworking (Mortimer forthcoming). They are made of a well-fired, reduced grey fabric. Four of them have an additional ceramic layer, which was added to the outside of the vessel to improve thermal properties; these layers are normal heavily bloated. Vitrification indicates high-temperature processes, but little else can be said without detailed chemical analysis. An example from context 36 has a further ceramic layer added to the inside of the vessel. A shallow dish (context 1) has no direct evidence for metalworking; although it has a typical crucible shape, the outside is sooty and it may have been used as a lamp.

### Non-ferrous metal waste

A small piece of copper-alloy waste was recovered from Roman levels (context 636). Another apparently non-ferrous metal blob was examined from a medieval context (279); although the surface is heterogeneous, the object is very dense and may be lead-based. Non-

destructive chemical analysis of the surfaces of these objects would provide a more precise identification, although their rarity suggests such information would not substantially change our interpretation of the site.

### Ferrous metalworking evidence (Table 2)

About 35% of the total weight of ferrous metalworking material was examined for this assessment, including all the larger groupings. Slags at the site include a large proportion of relatively light and porous ferrous slags, which are likely to be related to ironsmithing, and of other clearly ferrous-related slags of a high variegated nature. The latter may also be from ironsmithing, but do not have any diagnostic characteristics. A small proportion of the examined slags (less than 5%) are more glassy and less vesicular; one glassy piece was attached to highly-fired clay (presumably hearth lining; context 576) which suggests that these are a product of vitrification within the hearth. A number of samples appear to be heavily-corroded iron objects, but this identification needs to be confirmed by X-radiography.

The largest group of Roman ferrous material is a mixed sample, comprising mostly vitrified clay, smithing slags and non-diagnostic ferrous slags, weighing c18kg in total (context 619, phase B). A small, bun-like piece of slag from this context may be a hearth bottom (diameter=c150mm), but most of the material is broken up into smaller pieces. Phase B (early Roman) appears to be a significant period for metalworking, since a number of other contexts also contain ferrous slag. No intact structural evidence (*ie* furnaces, hearths) was discovered within this phase but some fired clay with slag concretions was associated. This suggests that phase B ironworking may have taken place at a metalworking hearth situated outside the excavated area. Fired clay structures (called 'ovens' in the site description) were constructed within the excavated area in the subsequent phases (M and N). These were thought to be related to metalworking but other sampled contexts within these phases yielded only small amounts of slag.

A larger possible hearth bottom (diameter=c.150-200mm) was also found in a later, Saxon context (context 670), although this could be residual. Post-medieval contexts (phase 7) also produced at least 7kg of slag, which includes pieces identifiable as smithing slag. These later examples are more glassy than the Roman pieces, although they are light and porous and include lumps of stone and fuel.

A notable proportion of hammerscale was included in several samples, especially amongst the post-medieval samples. It was picked up by the magnet when checking objects included in sample bags, but two samples were entirely composed of hammerscale (contexts 126 and 121). Another sample (II, from context 132A) was mostly twig-like iron-rich material, which may have been formed when iron-rich water trickled through an organic layer, together with some hammerscale. Some of the non-diagnostic iron-working slags look as if they may be compacted hammer scale (*eg* sample III, context 147).

Ferrous metalworking activity during the Roman period is likely to have included iron smithing, *ie* forming iron objects by hot working them. Large amounts of hammerscale in the post-medieval period suggests that smithing was also carried out at this period.

### Fired clay, furnace lining and other debris (Table 3)

A total of c.18kg of fired clay, vitrified clay (from hearth/furnace linings) and other ceramic

debris was found at the site. Fired clay, with varying degrees of vitrification, reflects the presence of a high-temperature process, although it cannot be said which particular process.

About 8.5kg of fired clay was recovered from contexts relating to the Roman ovens. This material includes the remains of what may be a heavily-slugged tuyère (Fig 1; from context 636). However, this identification is at best tentative since most tuyères of this date are much smaller in diameter than the curved surface of this piece and they are not normally tapered (information J Bayley).

Another ceramic fragment (from context 685) cannot be identified as a crucible or as furnace lining, but is heavily vitrified with a blue-green glazing indicating a high-temperature process.

285g of daub was recovered from various contexts. This is not relevant to high-temperature metalworking processes and requires no further attention from the technological point of view.

A large piece of slightly-burnt stone was found in context 153 (post-medieval). It has carefully prepared surfaces and holes drilled through it (Fig 2). No connection with high-temperature processes could be suggested, and the piece may have architectural origins.

## Assessment

The crucibles from Stour Street may be added to the comparable material from elsewhere in Canterbury to make an interesting study group, but on their own, they do not make a significant contribution to our knowledge. The other non-ferrous metalworking evidence at the site is minimal. Little needs to be done on the fired clay, furnace lining and daub, except quantification of amount per context/phase.

The ferrous metalworking evidence confirms the identification of Stour Street as a iron-working site, during the Roman and post-medieval phases. The amount of slag does not suggest a major metalworking site; further analysis is not required, unless other research priorities indicate. X-radiography is needed to confirm the identification of some samples as iron objects. It would be interesting to discover the origins of the stone artefact from context 153.

## Reference

Mortimer C, Analysis of metalworking debris from Longmarket, Canterbury, forthcoming AML report

30 June 1993

Table 1: Crucibles and non-ferrous evidence

1) Crucibles

**Stour Street A**

<u>Context</u>	<u>Phase</u>	<u>Weight(g)</u>	<u>ID</u>
473	4	25	Crucible with vitrification inside
515	1	5	Crucible with vitrification and added outer layer
643	1	10	Crucible with possible added outer layer

**Stour Street B (all thought to be early medieval)**

1		95	Bowl-like, probable crucible, used as lamp
27		95	Crucible, vitrified, added outer layer
28		5	Crucible
36		20	Crucible rim, with added inner and outer layers

2) Metal debris (all Stour Street A)

<u>Context</u>	<u>Phase</u>	<u>Weight(g)</u>	<u>ID</u>
279	4	95	Non-ferrous waste, possibly lead; heterogeneous sample
636	B/M	10	CA waste

Total weight                      360

Table 2: Ferrous metalworking evidence

**Stour Street A**

<u>Context</u>	<u>Phase</u>	<u>Weight(g)</u>	<u>ID</u>
77	7?	1510	Slag, ?concreted hammerscale
81	7	810	Smithing slag and glassy slag
86	7	2100	Smithing slag
111	7	525	Fe object?
120	7	2260	Smithing slag
121	6	100	Hammerscale
126	6/7	90	Hammerscale
132	7	220	Twig-like fragments and hammerscale
147	7	685	Compacted hammerscale
334	J/U/D	270	Smithing slag
452	B	415	Slag, ?concreted hammerscale
486	B	395	Slag, with ?calcareous lump
495	O	595	Slag, ?concreted hammerscale
558	B	175	Slag
576	M	170	Glassy slag, attached to furnace lining
615	B	45	Slag ?smithing
619	B	515	Smithing slag within heterogeneous sample
636	B	100	Smithing slag
655	S1	215	Fe object? and slag
670	S1/1	1140	Smithing slag (d=c.150-200mm)
709	J	820	?Smithing slag
721	Q	170	Slag, ?Concreted hammerscale

Others                                      6200                      Small slag samples

Table 2: Ferrous metalworking evidence, cont

**Stour Street B**

<u>Context</u>	<u>Phase</u>	<u>Weight(g)</u>	<u>ID</u>
9	mid/late med	125	Fuel ash slag?
22	modern	115	Smithing slag
24	?early med	115	Fe object?, with mixed accretions
27	early med	35	Fe object?, smithing slag
36	early med	185	Glassy slag
Total		20100	

Table 3: Fired clay, furnace lining and ceramic debris

**Stour Street A**

<u>Context</u>	<u>Phase</u>	<u>Weight(g)</u>	<u>ID</u>
254	P	845	Fired clay
314	P	900	Fired clay
337	U/D	5	Fired clay, some vitrification
340	N	1100	Fired clay
523	B/M	800	Fired clay
619	B	c50	Fired clay, vitrified clay
636	B/M	8000	Fired clay, vitrified clay, ash
685	I?	5	Fired clay, heavily-glazed, green/blue
654	Q	75	Fired clay and daub
717	K	385	Fired clay
Others, various		4545	Fired clay and daub

**Stour Street B**

<u>Context</u>	<u>Phase</u>	<u>Weight(g)</u>	<u>ID</u>
1	modern	35	Vitrified fired clay
6	l med/e pm	15	Fired clay
27	early med	50	Fired clay
36	e med	325	Tile and fired clay ?with hammerscale concretions
55	e med	15	Fired clay
88	e Roman	25	Vitrified fired clay
127	Roman	530	Fired clay
128	v e Roman	40	Vitrified furnace lining

Total weight 14.05 kg

Codes

e med= early medieval

l med = late medieval

pm = post-medieval

Not to scale

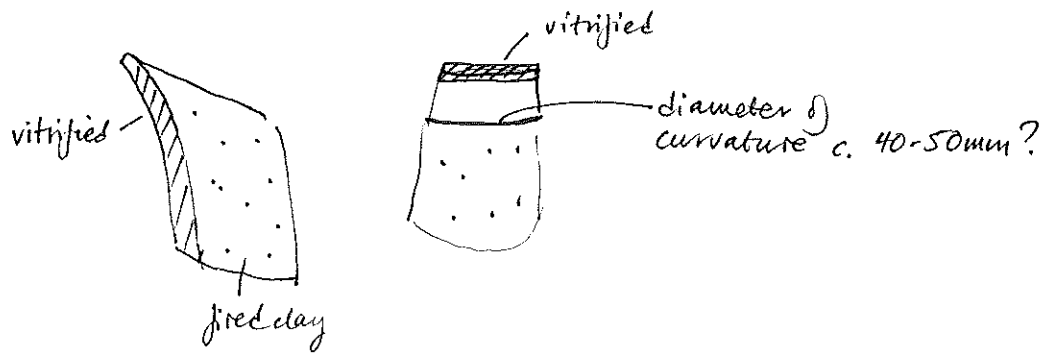


Fig 1: Heavily-slugged tuyère, context 636

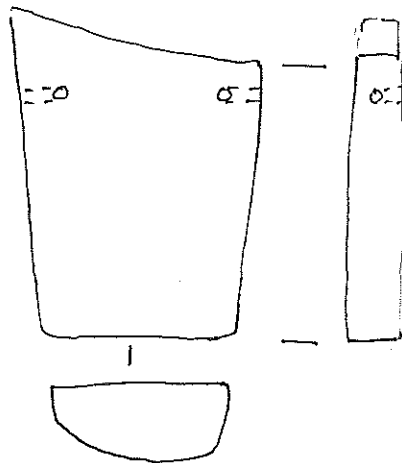


Fig 2: Slightly-burnt stone object, context 153