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LINCOLN
EVIDENCE FOR METALWORKING ON FLAXENGATE AND OTHER SITES IN THE CITY

TECHNOLOGY REPORT

Justine Bayley

with contributions by Paul Budd, Kate Foley, Mike Heyworth, Moira Laidlaw, Jon Webb, Robert White and Paul Wilthew

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SUMMARY

The mainly non-ferrous metalworking finds from 17 sites are catalogued and discussed. Two-thirds of the finds are from the Flaxengate site with a further 20% from the Saltergate and Silver Street excavations. The vast majority of the material is of early medieval date (late 9th-12th centuries), with a few Roman and late/post medieval finds. It is a large collection, comprising crucibles, heating trays (cupels), parting vessels, ceramic and stone moulds, scrap and waste metal, slags, litharge cakes and unfinished objects. There is evidence of copper alloy, lead and silver melting, gold and silver refining, and iron working.

CONTRIBUTORS

Kate Foley and Rob White, conservators for the then Lincoln Archaeological Trust, contributed to the project and included some of their work in their dissertations (Foley 1981, White 1982). Assistance and advice was provided by staff of the Technology Section of the Ancient Monuments Laboratory: Leo Biek, Paul Budd, Mike Heyworth, Moira Laidlaw, Jon Webb and Paul Wilthew, and many more of the students who worked there with me over the years.

ACKNOWLEDGEMENTS

Other staff of LAT and its successors (Trust for Lincolnshire Archaeology and City of Lincoln Archaeological Unit), Lauren Adams Gilmour, Jenny Mann, Jane Young, and later Jane Cowgill, were most helpful in finding objects and in providing context information. In 2007 Jenny Mann provided the updated phasing and context information which has allowed some conclusions to be drawn from the work that was previously undertaken; without her help it would not have been possible to produce this report.

ARCHIVE LOCATION

The archive of the scientific investigations is currently held by the Technology Section at Fort Cumberland. The excavation records and finds have been, or soon will be, deposited with 'The Collection' in Lincoln.

DATE OF RESEARCH

The work reported here was undertaken intermittently over a considerable number of years in the 1970s and 1980s by the author and the other contributors. The data was assembled into this report during 2007-08.

CONTACT DETAILS

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1 INTRODUCTION

The metalworking debris reported on here (Table 1) comes from 14 sites (Fig 1), mainly in the lower city at Lincoln, excavated between 1972 and 1984. Two-thirds of the finds are from the Flaxengate site with a further 20% from the Saltergate and Silver Street excavations. The vast majority of the finds are of early medieval date[*] (late 9th-12th centuries), with a little Roman and later medieval material. It is a large group, comprising crucibles, cupels, parting vessels, moulds of ceramic and stone, metal scrap and waste, slags, and unfinished and mismade objects.

Table 1: The metalworking finds catalogued and discussed in this report

Site	Site code	crucibles	heating trays	parting vessels	object moulds	ingot moulds	part manuf	scrap metal	waste metal	litharge cakes	metal analyses	Total finds
Flaxengate*	F72	499	45	13	51	8	yes	yes	yes	14	120 +38	630
Danes Terrace I	DT74i	11					yes	yes	yes		22	11
Danes Terrace II*	DT74ii	12						yes			35	12
Grantham Place	GP81	8		2		1					1	11
Swan Street	SW82				2				yes	1?	15	3
Hungate*	H83	19			28			yes	yes		40	47
Silver Street LIN A	LIN73si										2	0
Silver Street LIN B	LIN73si	15	1								3	16
Silver Street LIN C	LIN73si	1		?						1	3	2
Saltergate LIN D*	LIN73sa	32		4		1				4	8	41
Saltergate LIN E	LIN73sa	14									6	14
Saltergate LIN F	LIN73sa	153	1	3						6		163
Broadgate East	BE73										14	0
Chestnut House, Michaelgate*	MCH84	67							yes		18	67
Spring Hill/ Michaelgate	SPM83	1									10	1
Steep Hill*	SH74	2	?								16	2
West Parade	WP71	22										22
The Park	P70	3	?		1							4
Lucy Tower*	LT72	5			2							7
Holmes Grain*	HG72					2						2
Total		864	47	21	84	12	yes	yes	yes	25	351	1053

Key: * = definite or possible evidence for high-lead glassworking (see Bayley 2008a)

[*] 'Early medieval' is used in the text of this report to refer to the 9th-12th centuries AD, rather than with the specific meaning it has in the catalogue entries (see Appendix 1).

When scientific study of the metalworking finds commenced in the 1970s they were far less well-understood than is now the case, so initially the focus was on establishing the metallurgical processes carried out in Lincoln in the early medieval period, and on separating out the crucibles and other waste that related to the working of high-lead glass (see Bayley 2008a). Most of the work was undertaken in the Ancient Monuments Laboratory (AML) by Justine Bayley, either directly or by others working with her (see Acknowledgements, above). Kate Foley (1981) and Robert White (1982) based their dissertations on some of the Flaxengate finds, and Paul Wilthew examined all the finds from the Saltergate and Silver Street excavations (Wilthew 1982); the data they gathered has been incorporated into this report. Nigel Blades (1995) analysed copper alloy finds from 16 sites within Lincoln (Table 1) and some of his results are noted below.

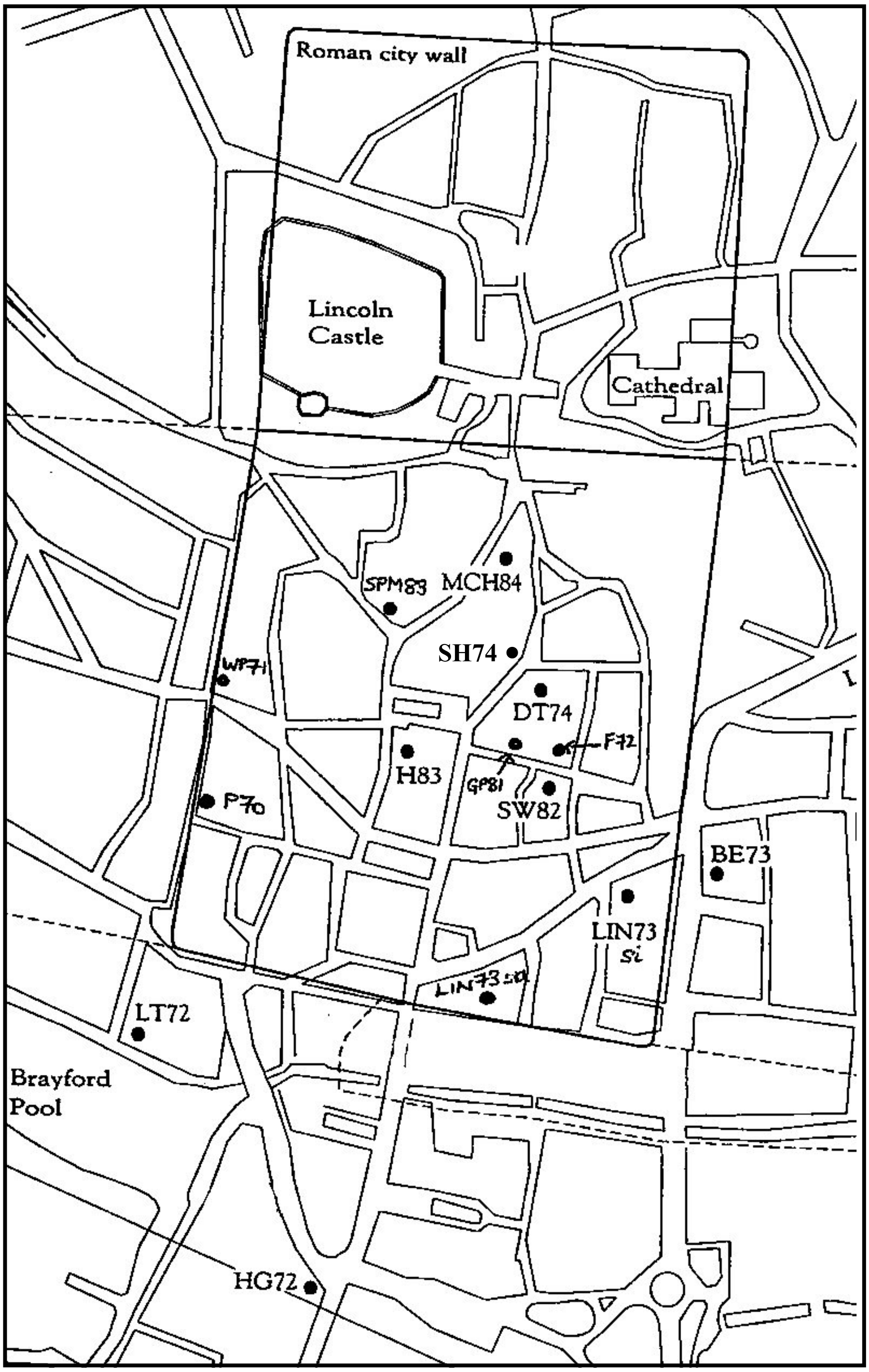
It had originally been planned to publish the evidence for metal and glass working on the Flaxengate site in the *Archaeology of Lincoln* series, and references to various forthcoming titles by Bayley *et al* occur in the published fascicules; however changing priorities meant this never happened. This report is therefore collating all the work carried out on the metalworking finds from Lincoln, mainly in the 1970s and 80s, so it can serve as an accessible archive that makes the information available by placing it in the public domain.

Because most of the work reported here was undertaken so long ago, it should be judged by the standards of its day rather than those of today. It is commendable that so many analyses were carried out, though most were qualitative analyses that identified the presence or absence of particular metals, rather than the fully quantitative analyses that are now common. X-ray fluorescence (XRF) spectrometry was chosen as the major method of analysis, partly because it was available in the AML but also because it is a rapid and non-destructive technique, at least in the way it was used on the Lincoln finds. The speed of analysis allowed most of the finds to be analysed, while its non-invasive nature preserved the finds so they are still available for further research in the future. Details of all the scientific techniques used to study the finds are given in Section 7.

This report is divided into sections, each dealing with a specific process or group of processes, and the related finds. Within each section the general characteristics of the finds are discussed, and the assemblages for each site are briefly described. Full details of each object or fragment are given in the appendices. Section 1 comprises this introduction and Section 2 deals with the metal-melting crucibles, which were mainly used to melt silver or copper alloys. Section 3 describes the moulds and other evidence for copper-alloy working. Section 4 contains the information on precious-metal refining and Section 5 deals briefly with lead and iron working. Section 6 then draws together the information for each site, relating the finds to their contexts, and also compares the assemblages from different sites and sets them in a wider context, briefly summarising what is now known from other contemporary sites in the British Isles and northern Europe.

Some of the finds catalogued and reported on below were given individual AML numbers when they arrived at the AML. Other groups of finds were given a single AML No, and some collections of finds were later given group AML Nos when they were moved, even when parts of the group already had individual AML Nos. All these AML Nos are listed with details of the relevant objects in the concordance in Appendix 1.

Figure 1: Map showing the location of Lincoln sites mentioned in the text (see Table 1 for key to site names).



2 METAL-MELTING CRUCIBLES

Introduction

Most crucibles are used to melt metals. They contain the metal, protecting it from loss and contamination, and provide a means of transport for it when molten, so it can be moved from the hearth and poured into a mould. Some, however, are used to melt glass (see for example Bayley 2008a).

Table 1 shows that crucible sherds were the most common type of metalworking finds on almost all the Lincoln sites studied here; Flaxengate alone produced almost 500 fragments. A catalogue of these crucible sherds appears in Appendix 2, Tables 10-16. Nearly 80% of these are of Stamford ware (Table 2; Adams Gilmour 1988) the majority of which are globular wheel-made crucibles (Figs 2 and 3). The remainder of the crucibles consisted mainly of local fabrics including handmade globular and coil-made crucibles (Fig 4). Note the totals given by Vince (2003, 285) are incorrect; they derived from an incomplete draft catalogue.

Table 2: Summary of metal melting crucibles catalogued in Appendix 2

Site	brass and ?brass	other copper alloys	silver	other	used	?unused	not analysed	total	Stamford ware	Other fabrics
Flaxengate	185	20	68		144	5	77	499	390	109
Danes Terrace I	1	2			5	2	1	11	6	5
Danes Terrace II	3	1			7	1		12	6	6
Grantham Place			2		6			8	8	
Hungate			5		12	2		19	17	2
Silver Street Trench B			4		11			15	13	2
Silver Street Trench C					1			1		1
Saltergate Trench D		1	1		17		13	32	14	18
Saltergate Trench E		4			5		5	14	11	3
Saltergate Trench F		2	8		28		115	153	148	5
Michaelgate - Chestnut House	35				31	1		67	62	5
Spring Hill - Michaelgate	1							1	1	
Steep Hill		1	1					2		2
West Parade				pewter	20	1		22	15	7
The Park	1			gold			1	3	1	2
Lucy Tower					4	1		5	5	
Total	221	36	89	2	291	12	213	864	697	167

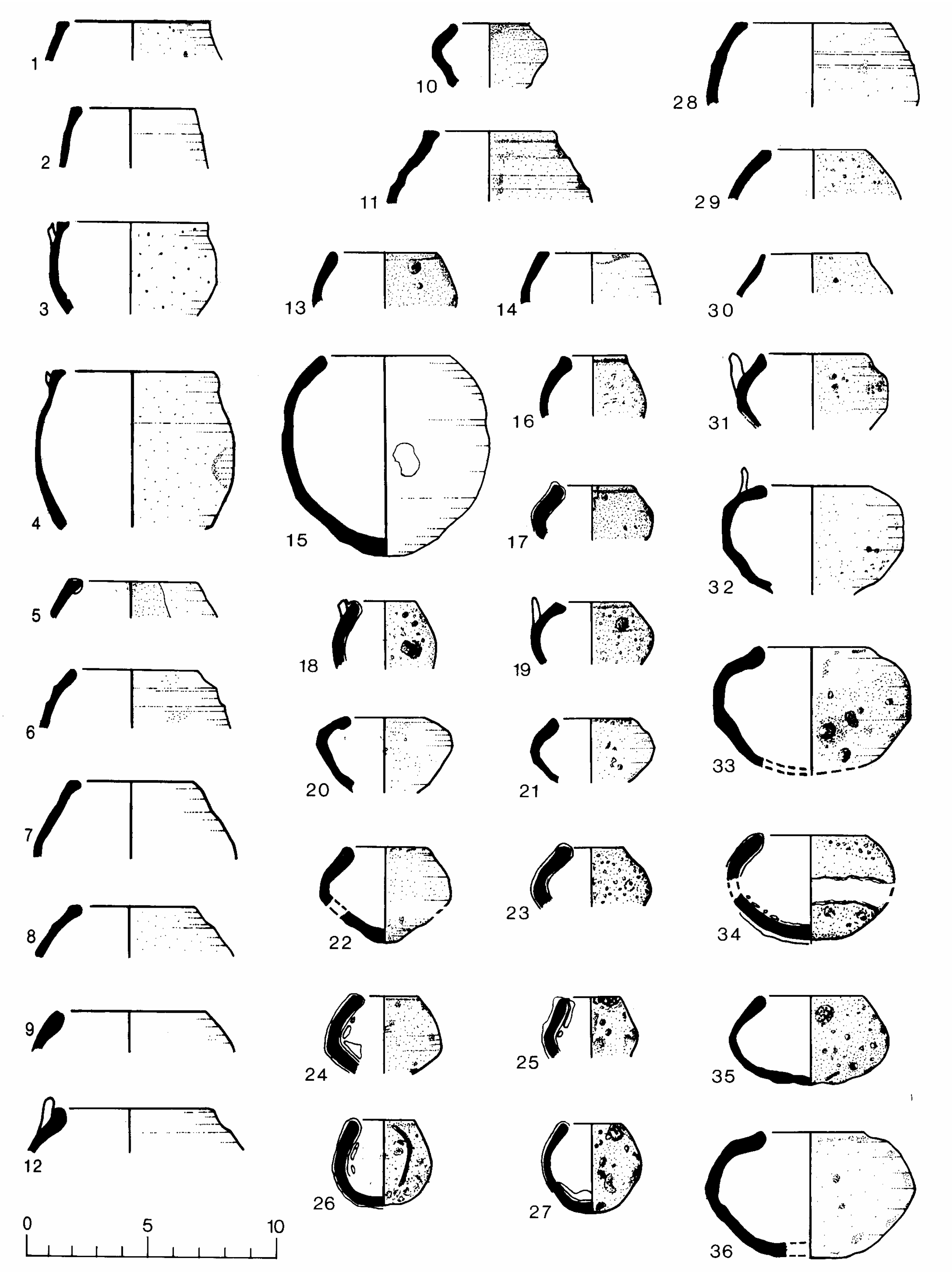


Figure 2: Flaxengate: Metal-melting crucibles (after Adams Gilmour 1988, fig 8). Scale bar 10cm. Note nos 6 and 15 are not crucibles.

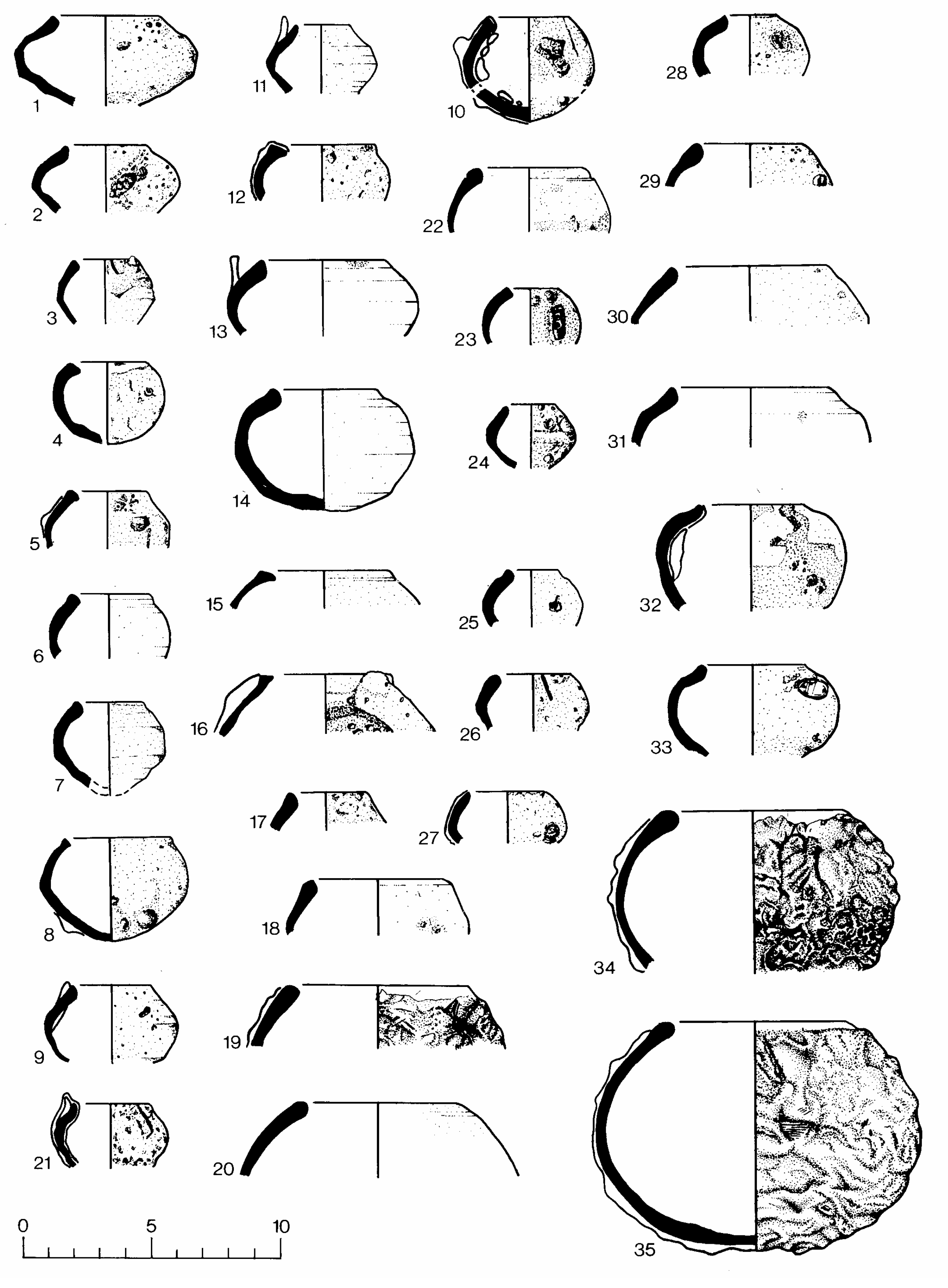


Figure 3: Flaxengate: Metal-melting crucibles (after Adams Gilmour 1988, fig 9). Scale bar 10cm. Note no 20 is not a crucible.

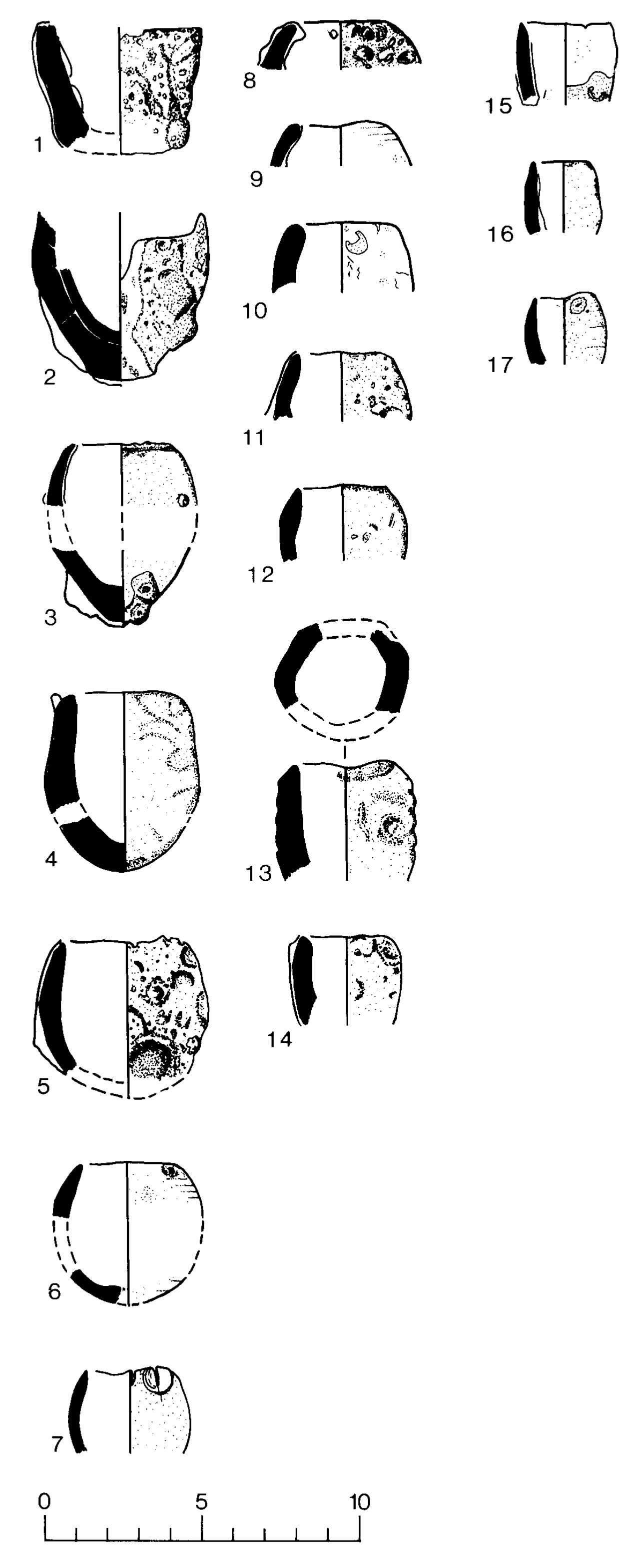


Figure 4: Flaxengate: Metal-melting crucibles (after Adams Gilmour 1988, fig 7). Scale bar 10cm. Note no 9 is not a crucible.

Properties of crucibles

The properties of crucibles that are either necessary or desirable for them to function efficiently have recently been reviewed by Bayley and Rehren (2007). The most important properties are strength and refractoriness (the ability to withstand high temperatures). Strength is vital as the walls of the crucible must be able to support the weight of the molten metal, especially when it is lifted or tipped into a mould. The behaviour of a crucible at high temperatures is mainly a function of the fabric of which it is made (*ibid* 2007). The ideal fabric must be refractory as crucibles have to withstand temperatures up to 1200°C. The melting points of pure gold, silver and copper are respectively 1063°C, 960°C and 1083°C; some of their alloys have melting points as low as 900°C but for copper- and gold-based alloys they are usually over 1000°C.

Stamford ware is an almost ideal fabric as it is made of clays with low levels of fluxing impurities (iron oxides and alkalis) which in high concentrations drastically reduced the temperature at which the fabric begins to soften. A high proportion of silica is normal in crucible fabrics, and in addition Stamford ware contains high levels of alumina (Bayley *et al* 1991) which further improve its refractoriness. Crucible fabrics must also resist more than superficial dissolution by the melt they contain and be resistant to thermal shock.

Most crucibles that have been used show some signs of vitrification. Slight vitrification takes the form of a 'gloss' or 'glaze' on the surface, produced by the silicates in the vessel's fabric reacting with the ash from the fuel in the fire. Where the vessel has been heated more strongly, or is of a less refractory fabric, the vitrification can penetrate more deeply, destroying the fabric's normal structure and producing a vesicular (bubbly) texture. The distribution of the vitrified areas on the vessel can suggest how it was heated. Usually the rims are least affected, showing the crucibles were heated from below.

On 16% of the crucibles an extra layer of less refractory clay was applied to the outer surface before use (eg Fig 3: 34-35). This helped protect them from the fire so their strength was not reduced by the vitrification eating into the fabric, and it had other functions too. These include insulating the crucible from sudden changes in temperature, perhaps stopping it from cracking, and increasing their thermal capacity, keeping the metal they contained hotter as they were removed from the fire, so giving the craftsman a slightly longer time to pour it before it re-solidified. This extra outer layer is normally deeply vitrified and was obviously very soft when at high temperatures as impressions of wood or charcoal and possible tong marks were sometimes left on the surface (Fig 2: 34; Fig 3: 10, 25, 32-33; Fig 4: 7 and 13). In some cases the outside of the crucible appears unused because the added clay layer has cracked cleanly off, leaving a completely unvitrified surface.

There are very few crucibles which have traces of an inner clay re-lining, which is positive evidence for their re-use (eg Fig 4: 2). This rarity suggests that most crucibles, even with only slight damage, were discarded as presumably their value was low compared to that of the metal which could be lost into the fire if a crucible broke in use. There is no evidence to suggest how many times a crucible was used before it was discarded, though it is unlikely to have been more than a few times at most, as repeated heating and cooling put stresses on the structure, making it more likely to fracture.

Metal traces on crucibles

Traces of the metal being melted are often contained in the fuel ash 'glazes' or slags and the vitrified added clay layers, either physically bound as discrete droplets or chemically combined with the slag layer itself. Most noticeable in this second group is the bright red colour produced by copper, seen on nearly half of the Flaxengate crucibles. It should be stressed, however, that this colouration can be caused by even minor amounts of copper in precious metals and does not indicate that copper was necessarily a major constituent of the melt. On the inner surface the reaction between the metal oxides from the melt, fuel ash, and the crucible fabric produces vitrification sometimes described as a crucible slag (Tylecote 1982). Analysis of these slag layers can indicate the nature of the metal or alloy being melted. However, some metals react more readily than others to form these slags and therefore the proportions of different metals in the slag do not directly reflect their proportions in the original alloy being melted. In particular lead and zinc are enhanced as they can act as glass- or slag-forming elements and so are chemically bound into the crucible slag. Zinc also has a very high vapour pressure and so tends to diffuse into the crucible walls and thus be well represented when the crucible is analysed, even if it was only present in minor amounts in the melt (Dungworth 2000). More noble metals such as silver and tin tend to be under-represented as they are normally only present as metal droplets.

The metal-rich deposits on crucibles are never uniformly distributed as less-reducing conditions and the proximity of metal oxides and fluxes which favour their production tend to occur at the surface of the melt and around the lip as the melt is poured. It is thus possible for a single vessel to have some areas with massive metal-rich deposits and other areas where little or no trace of metals survive (see Section 7).

Table 2 shows that 75% of the crucible sherds were analysed by XRF, and Appendix 2 tabulates the non-ferrous metals detected on them. Nearly 45% of the analysed sherds have been classified as 'used'. This means that the levels of metals present were so low that the analytical results could not be interpreted with any degree of confidence; although the crucibles had definitely been used to melt metal, its composition could not be determined. The distribution over the site of the 'used' sherds from Flaxengate is similar to that of the crucibles where the metal being melted can be identified – so it is likely that they are just parts of vessels where only slight metal-rich deposits formed.

The remainder of the sherds were sufficiently metal-rich that the metal or alloy melted in them can be suggested with some confidence (though see Section 7). 14% of the analysed sherds had detectable levels of silver, and so were almost certainly used to melt silver – though it may not have been very pure. The remainder of the crucible sherds (~40% of those analysed) were apparently from vessels used to melt copper alloys, 85% of them zinc-rich ones such as brasses (see Section 7 for a glossary of alloy names). It is notable how few crucibles had detectable levels of tin present; it was found mainly in Roman and late- and post-medieval crucibles. This is not unexpected, given what we know of the re-introduction of brass in the late Saxon or Viking period (eg Bayley 1992a: fig 357 and Blades 1995). The analyses of the scrap and waste metal presents a broadly similar picture (see Section 3). The lack of significant amounts of lead in the crucibles is also not unexpected as much of the production of the metalworking industries was wrought objects, where the presence of lead would have had a detrimental effect on the performance of the objects (see Section 3).

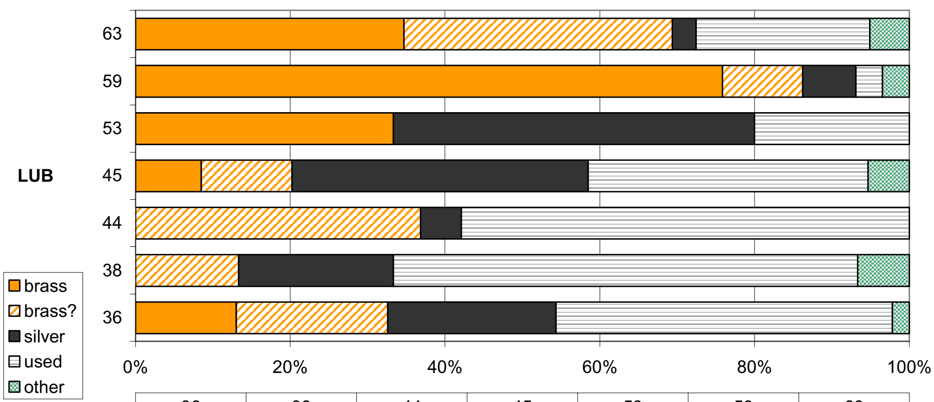
Crucibles from Flaxengate

The crucible sherds from Flaxengate are nearly 60% of the total included in this report and make up 50% of those analysed by XRF; the results are presented in Appendix 2, Table 10. They are thus the major group considered here, with other sites only demonstrating the widespread distribution of metalworking in early medieval Lincoln.

The earlier Stamford ware crucibles which could be confidently reconstructed were of the same form as the Stamford ware lamps, which were also used as crucibles (Fig 2: 1-9, 11-15, 28-30; Fig 3: 15-20, 22, 29-31, 34-35). They had an average rim diameter of 40-60mm compared to the smaller bi-conical form with an average rim diameter of 30-40mm which came mostly from later contexts (Fig 2: 10, 16-27, 31-36; Fig 3: 1-14, 21, 23-28, 32-33). It is likely that nearly all the forms, both lamp types and small bi-conical vessels, had a single pouring lip (Adams Gilmour 1988).

About 10% of the total crucible sherds from Flaxengate were in local fabrics and included both coil-made crucibles of a large size with a distinctive fabric and hardness, and the slightly more frequently-found, smaller handmade crucibles or 'pinch pots' with an average diameter of 40mm (Fig 4). Other non-Stamford fabrics included one Torksey ware sherd from a domestic vessel (but used as a crucible) and four Roman sherds.

About half of the Flaxengate crucibles have some signs of vitrification, either on the outer or inner surface or on both. They are typical of those from the lower city and nearly half appear to have been used for melting of copper alloys, mainly zinc-rich ones. The crucibles used for silver melting make up 16% of the total analysed, though these are not evenly distributed across the site, as Figure 5 shows. See Section 6 for a full discussion.



	36	38	44	45	53	59	63
other	1	1	0	5	0	1	5
used	20	9	11	34	3	1	22
silver	10	3	1	36	7	2	3
brass?	9	2	7	11	0	3	34
brass	6	0	0	8	5	22	34

Figure 5: Flaxengate: Normalised bar chart of metals melted in crucibles for land use blocks (LUBs) with more than 12 crucible sherds

Crucibles from other sites in the lower city

Other sites in Lincoln have produced metal working crucibles, most of which are broadly contemporary with those from Flaxengate. They are catalogued in Appendix 1, Tables 11-16.

At Danes Terrace Area I (DT74i and DT78) and Area II (DT74ii) were investigated. They produced 23 crucible fragments, the majority of them Stamford ware or other early medieval fabrics (Table 11). Where analyses identified the metal being melted it was brass or ?brass, as on Flaxengate. Five sherds were identified as late medieval, two of them from graphitic crucibles dated by the associated pottery to the early-mid 16th century (Jenny Mann, pers comm). Three of these crucibles had been used to melt bronze and one probably brass.

The eight crucible sherds found at Grantham Place (Table 16) are all Stamford ware; two have traces of silver on them but the low levels of metals other than zinc suggest the remainder may also have been used to melt silver. Most of them were from early 11th century contexts [LUBs 12 and 13].

All but two of the 19 crucibles from Hungate were Stamford ware and five of them had been used for silver melting (Table 12). One sherd from a post-medieval context was from a tall, flat-bottomed vessel quite unlike the Late Saxon crucibles but typical of those of the late and post medieval periods (Bayley 1992b).

After Flaxengate, the largest numbers of crucibles were found in Saltergate Trench F where a total of 154 sherds were recovered, 96% of which were of Stamford ware and the rest Lincoln Sandy ware (Table 13). They thus belong to the late Saxon or early medieval periods though no close dating of their find contexts is available. Of the metal working crucibles analysed, a few had been used for melting silver and a few more appear not to have been used, either because no metal traces were detected or the fabrics were not reduced fired; the majority are 'used'. The other Saltergate trenches, D and E, also produced crucibles though only half were Stamford ware, the rest being local fabrics. Both silver and copper alloy working were positively identified though the majority of the crucibles were 'used'.

Trench B on the Silver Street site produced 15 crucible sherds; most were Stamford ware and four had been used to melt silver. Trench C produced only one, intrusive Lincoln ware variant crucible from a late 3rd century Roman context (Table 13).

The next largest group of crucibles came from Michaelgate Chestnut House (Table 14). It produced 67 crucible fragments of which 5 sherds were of local fabrics, the rest being Stamford ware. No silver was detected and all the metals identified were copper alloys. Apart from one sherd with bronze on it, the rest were zinc-rich copper alloys with varying amounts of lead.

The Spring Hill/Michaelgate site produced only a single Stamford ware crucible sherd (Table 16).

Steep Hill has two early medieval crucible sherds (Table 16). The relatively high lead levels on them suggest they may have been used as heating trays rather than for metal melting (see Section 4). If they are from metal-melting crucibles, they were used for silver and probably leaded bronze.

West Parade produced 22 crucible fragments, virtually all of Stamford ware (Table 15). Levels of metals are too low for positive identification of use, though one sherd may have been used for melting pewter or a lead-tin solder as the fabric was not very reduced-fired and XRF analysis detected only lead and tin.

The only notable sherd from The Park, which must be residual in its post-medieval context, is of Stamford ware and has gold droplets visible on the inner surface (Table 16). It may be evidence for gold melting or may be a crucible sherd re-used as a heating tray (see Section 4).

Crucibles from other sites in the city

Small numbers of crucibles have also been found in Wigford. In addition to the five Stamford ware crucible sherds from Lucy Tower, which had no diagnostic metalworking deposits on them (Table 16), there are at least seven from Holmes Grainwarehouse (hg72) (Steane *et al* 2001, 117-9) and smaller numbers from Brayford Wharf East (bwe82) (*ibid*, 76), Waterside South (ws82) (*ibid*, 174), St Benedict's Square (sb85) (*ibid*, 160) and St Mark's Station East (ze87) (*ibid*, 296). Most appear to be Stamford ware and thus date to the 9th-12th centuries.

Over 80 Stamford ware crucible sherds have been recovered from late 10th to mid 11th century contexts at St Paul-in-the-Bail in the Upper City, but none of them have been analysed; other metalworking debris associated with them carried traces of both copper alloys and silver (Steane *et al* 2006, 164-168; Vince 2003, 285).

3 MOULDS AND COPPER ALLOY WORKING

Introduction

Metal objects were made in two main ways. In the first metal was melted and poured into a closed mould, which produced an object in almost its final form. Once it had cooled the casting was cleaned up (fettled) and any surplus metal removed. This metal waste provides evidence that metalworking was being carried out even if the more direct evidence – crucibles and object moulds – are absent.

The alternative fabrication method was to take a piece of solid metal and cut and hammer it to shape, annealing it when necessary to make it malleable enough for further working. The initial piece may have been a large mass of metal, but when making small objects the usual starting point was a bar ingot up to about 10mm across which had been cast in an open mould or in a temporary groove in the floor. Some ingots would have been cut up and remelted if smaller amounts of metal were required. Others were worked directly into bars which were then further worked down into rods, wire and sheet, the raw materials from which a craftsman would make objects.

The evidence for metalworking is thus not only crucibles (discussed in Section 2) but also open and closed moulds, tools and ingots, scrap and waste metal; these are discussed below. The finds from several of the sites listed in Table 1 included scrap and waste metal (Jenny Mann, pers comm) but only that from Flaxengate has been studied in any detail. It is all copper alloy, but similar processes would have been carried out using silver and gold – though the higher value of these metals meant that the metalworkers would have been careful not to lose any, which is probably why none has been recorded.

Both open and closed moulds were made of fired clay and stone, although ceramics are predominately used for closed (object) moulds. These ceramic moulds are usually made of a single fabric but they often appear to have multiple layers as the part nearest the modelled surface where the metal solidified is usually reduced fired (blackened) while the rest is oxidised fired and looks red or brown. In a similar way open ingot moulds are often darkened round the cut matrices, a clear indication that they have been used repeatedly.

Piece moulds

Ceramic piece moulds were the normal form of mould for casting small objects in early medieval times (Bayley 1991a). They were labour-saving and permitted a fair degree of mass production, not because the moulds could be reused but because one original pattern could be used to make many moulds, each of which was probably only used once as the mould fabric was not strong so the detail was usually damaged when the casting was removed.

The moulds generally consisted of two parts or valves. The bottom valve was flat, formed by pressing a lump of clay onto the work surface and impressing it with a model of the object to be cast, which was made of a hard material such as wood or metal. It was allowed to dry slightly and a second piece of clay, to make the top valve, was pressed over the model and tended therefore to be slightly more rounded or concavo-convex in cross-section. The two valves were taken apart so the model could be removed, and then reassembled and the joins sealed with another thin layer of clay, known as luting. The mould was then dried and baked before the molten metal was poured into the funnel-shaped sprue cup or in-gate, which was in some cases integral with the mould valves or sometimes added when they were luted together. Only one possible integral in-gate was recovered from Flaxengate (F74 P326).

There are 60 fragments of fired clay from Flaxengate (see Appendix 3, Table 17) which are probably from ceramic piece moulds, although many lack most specific diagnostic features. However, 25 of them are well enough preserved to be illustrated (Figs 39-40). These include fragments of 12 possible top valves (eg Fig 6-7), 13 possible bottom valves (eg Figs 8-9), two possible in-gates, ten fragments with luting, and three with runners (the channels in the mould that lead from the in-gate to the object). A few fragments were analysed by XRF but only weak signals for copper, zinc and/or lead were detected. The low metal concentrations do not allow identification of the alloy(s) being cast in the moulds.

Figure 6: Flaxengate: part of upper valve of clay mould F75 P135

Figure 7: Flaxengate: part of upper valve of clay mould F72 P17

Figure 8: Flaxengate: part of lower valve of clay mould F72 P18

Figure 9: Flaxengate: part of lower valve of clay mould F74 P241

There is also one decorated stone mould fragment (F72 M85; Fig 10) which has been made from a very fine-grained calcareous mudstone (lithographic stone). The most likely source is the Plattenkalk from the Kimmeridgian at Solnhofen in Bavaria, although similar rock is found elsewhere in Europe (Anderson 1981). The clean appearance suggests this mould may not have been used for casting metals although XRF analysis positively identified some lead. On the basis of this analysis, the mould could have been used for casting either lead or pewter objects as the relatively low melting point of the metal would not have affected the calcareous mould in the way that molten copper alloys or precious metals would have done. However, the mould lacks the locating pegs (or the holes to take them) normally found in the corners of stone trinket moulds (eg Shoesmith 1985: 19-20, figs 12-15), and so may have been used as an open mould – and thus probably not for shaping molten metal.

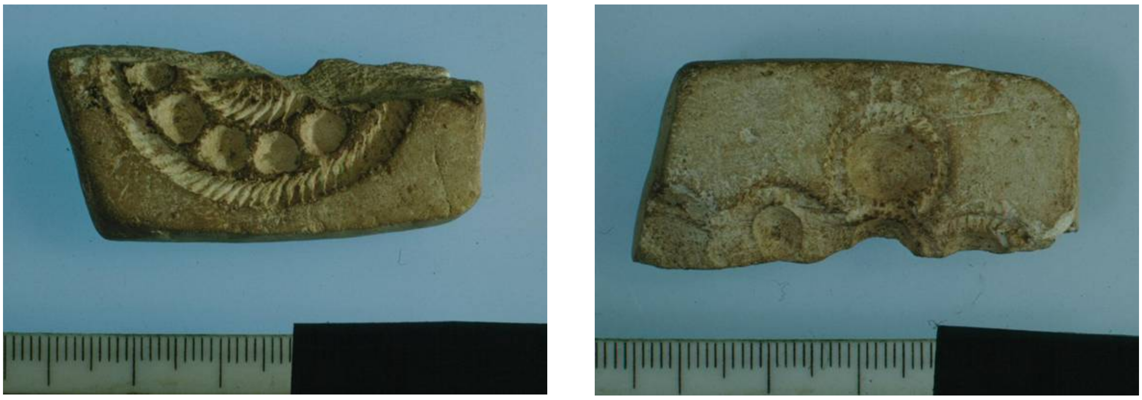


Figure 10: Flaxengate: two sides of stone mould F74 M85

Large clay moulds

Four other sites produced fragments of clay moulds for far larger objects than the piece moulds described above; they are mostly 20-55mm thick (Appendix 3, Tables 18-19). They all came from late or post medieval contexts and are not thought to be residual. These moulds were probably for objects such as bells or cauldrons and are similar to those known from many late and post medieval foundries (eg Blaylock 2000). The fabric is organic tempered which gives it a high degree of permeability, so air is not trapped within the mould, and flexibility, which allows the large castings to contract as they cool without cracking. The fragments from Hungate include pieces of both the outer (cope) and inner (core) moulds, as well as fragments showing luting and others possibly from in-gates. On a few of the fragments copper alloy traces are visible while XRF analysis detected slight traces of metal on most of the pieces (Table 18). Although zinc was widely detected, it is not necessarily a major component of the alloys being cast (Dungworth 2000). The presence of tin, together with some arsenic and/or antimony, is a more reliable indicator, and suggests that the objects being cast were most likely to have been cauldrons or skillets (Dungworth and Nicholas 2004).

In addition to the finds from Hungate, there are a few fragments of large clay moulds from Lucy Tower, The Park and Swan Street (Table 19) as well as from 17th-18th century contexts at Castle Gate West in the Upper City (Miles 1988). As large-scale casting produces large quantities of mould fragments, it is unlikely that the process was being carried out on all the sites, but the evidence points to one or more foundries active in Lincoln in the late and post medieval periods. Similar mould fragments also came from late 11th-12th century bell-casting pit at the Lawn, in the Upper City (Steane *et al* 2003, 96).

Ingot moulds

Ingot moulds are open, one piece moulds with simple shaped depressions, usually long thin bars or more occasionally discs, cut into them. Most ingot moulds are of stone as this allows the moulds to be repeatedly used, although re-used brick or tile which has been carved to shape as though it were stone are also found. Some of the stone can be quite coarse textured but the rough surface finish this produces does not matter on ingots as they are subsequently worked to produce wrought metal objects.

Flaxengate produced eight ingot moulds, six of stone, one of fired clay and one tile that may have been re-used as a mould (Appendix 3, Table 20; Figs 11-16 and 41). Five had only one bar matrix but one, F74 ST15 (Fig 11), has two bars and one disc-shaped matrix and another, F74 M45 (Fig 12), has two discs and one bar-shaped matrix. The complete bar matrices would have produced ingots ranging from 45 to 200mm long, mainly with widths of 11-16mm, although that on F74 M45 is only 6mm wide (Fig 12) and F72 M190 is wider (20-35mm; Fig 13). This last mould could , however, be unused as there is no darkening around the poorly-cut matrix and no metals were detected by XRF. The depths of the matrices range up to 14mm, though they were not necessarily filled to the top.

Figure 12: Flaxengate: both sides of stone ingot mould F74 M45

Figure 11: Flaxengate: stone ingot mould F74 ST15

Of the four that were analysed the most positive results came from F76 ST2 (Fig 16) and F75 ST15 (Fig 11) where XRF detected copper, zinc, lead and silver, and in the former case bromine too. The relative intensities of the XRF signals suggest that the metal being cast in the moulds was silver, the copper, zinc and lead being either accidental or deliberate additions best described as impurities, alloying and/or debasing elements. The bromine is probably present as silver bromide, a commonly occurring silver corrosion product. Another mould (F74 ST8; Fig 14) gave weak XRF signals for copper and bromine. These can also be interpreted as suggesting the mould was also used for casting silver as bromine is usually only detected where silver is present, and the copper signal, which itself was barely detectable, is normally stronger than the silver signal even when silver is the major element present. All the positive evidence from the Flaxengate ingot moulds suggests they were used to cast silver.

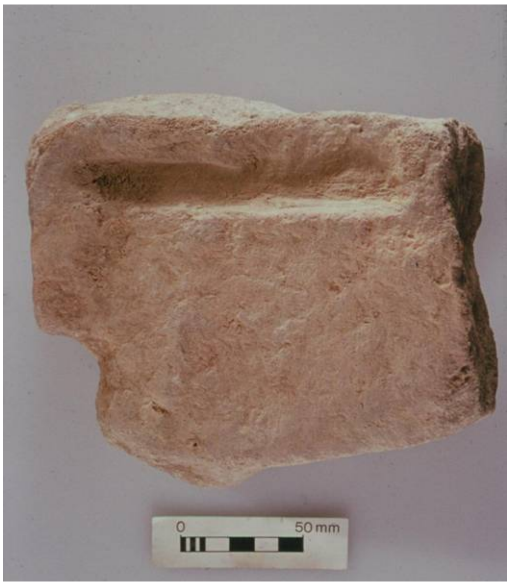


Figure 13: Flaxengate: stone ingot mould F72 M190

Figure14: Flaxengate: stone ingot mould F74 ST8

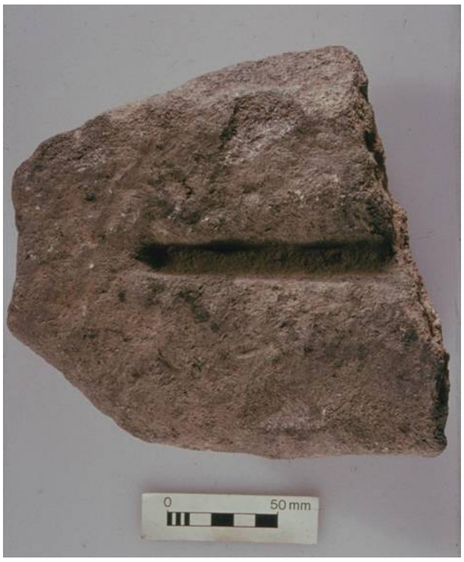


Figure 15: Flaxengate: stone ingot mould F74 ST6

Figure 16: Flaxengate: fired clay ingot mould F76 P46

Other sites in Lincoln have also produced ingot moulds (Appendix 3, Table 21). A fragment of a stone bar ingot mould similar to those from Flaxengate came from Grantham Place (Fig 17), while from Saltergate Trench D came a soapstone vessel sherd into which had been cut a rectangular ingot matrix (Fig 18). Four small soapstone vessel sherds were found on Flaxengate (Mann 1982, 20-21). Soapstone was imported to England by the Vikings, either from the Shetland Islands or direct from Norway (Bayley 1992a, 773-776) and is normally only found in areas with a strong Anglo-Scandinavian culture. The vessel from which the sherd came may have reached Lincoln with the first settlers. Its re-use as a mould may indicate a Scandinavian craftsman at work in Lincoln, though any metalworker would appreciate its good properties. Two further ingot moulds came from the Holmes Grain Warehouse site, south of the River Witham in Wigford. One was made from a stone cobble (Fig 19) like some of the Flaxengate ingot moulds, but the other had a bar matrix carved into a ?Roman brick (Fig 20). Only weak XRF signals were obtained from the Holmes Grain ingot moulds so nothing conclusive can be said about the composition of the metal cast in them. Another Wigford site, St Benedict's Square, also produced part of a burnt micaceous sandstone ingot mould associated with pottery dated to the late 10th to late 12th centuries (Steane *et al* 2001, 162).

Figure 17: Grantham Place: stone ingot mould GP81 183. The left hand image shows the shape of the stone block with the broken matrix for a bar to the bottom; the right-hand one the blackening in the bar matrix.

Figures 18-20: Left to right, Saltergate Trench D: soapstone vessel sherd re-used as an ingot mould LIN73 DI 62 2690; Holmes Grain: stone ingot mould HG72 M20; Holmes Grain: Roman brick/tile re-used as an ingot mould HG72 P28

Waste and scrap metal

The terms 'scrap' and 'waste' are often applied indiscriminately to any metal that has no obvious shape. Here the terms are given distinct meanings: scrap is the debris from working solid metal – such things as filings and offcuts – while waste is used to describe the by-products of metal casting. Broken objects can also be regarded as scrap metal and in the past they would have been collected, melted down and the metal re-used. If either scrap or waste is found in quantity they probably indicate the location of a workshop. The finds of scrap and waste are listed in Appendix 7, Table 30. There are 173 recorded finds, though some comprise more than one fragment. About half are droplets and dribbles of spilt molten metal that are likely to be produced in the areas where metal was being melted and cast (Fig 21). A lot of this waste would have been collected and remelted, however some would remain. Ten droplets/spillages (Table 31) were among the 120 metal samples from Flaxengate analysed by White (1982); see 'Copper alloys' below for discussion of the results. A metallographic section taken from one (F73 Ae299) showed, as expected, that the droplet retained its as-cast structure as it had not been worked. Another type of waste consists of metal that has solidified in a closed mould but was not part of the object being cast. This includes runners, which formed in the channels in the mould leading to the object matrix, and sprues (Fig 21) which are the metal that solidifies in the funnel-shaped in-gate or sprue cup. If the metal fails to completely fill the clay piece mould, the result is known as a failed casting. None have been found on Flaxengate, probably because the metal has been recycled.

Figure 21: Flaxengate: waste metal: copper alloy sprue; spillage F76 Ae124 , droplets (L to R) F76 Ae202, F76 Ae127, F76 Ae82

The rest of the scrap and waste are mainly offcuts, though there are 14 pieces described as 'copper pan', probably formed by corrosion binding together small fragments of metal such as filings (Table30).

Ingots and part-manufactures

The starting point for the wrought metalworking industry on Flaxengate was bar ingots, cast either in moulds like those found on the site (see above) or in temporary grooves in the floors of the workshops. These ingots were worked directly into bars which were then further worked down into rods, wire and sheet, from which a range of objects were made.

Four pieces of copper alloy with a range of compositions have been identified as parts of ingots (F74 Ae151, F74 Ae260, F74 Ae288 and F74 Ae363; Table 32); they are roughly square in cross section. Metallographic sections of two of them (F73 Ae151 and F74 Ae363) showed cored dendritic structures, indicative of as-cast metal with no further working.

A total of 31 other fragments were categorised as bars, defined as having definite flattened sides with a square or rectangular section (Table 32). If the section was polygonal or circular, the piece was classified as rod or wire.

The next group of part manufactured metal is the pieces of rod and wire of various lengths, all with an approximately circular or polygonal section (Table 33). The polygonal sectioned pieces probably represent an intermediate stage in the work down to wire, which is small and almost circular in section. The thicker rods, however, may equally be an early stages in the manufacture of pins or some other form of more substantial object (White 1982). Some of the pieces in Table 33 are parts of broken objects as they are clearly decorated, but other pieces have file marks visible (eg F74 Ae266) and so are unlikely to be from finished objects. A metallographic section taken from F75 Ae501 revealed quite a high degree of working with a notable absence of porosity and inclusions.

Most of the sheet metal was too heavily corroded to be sampled for analysis. This was both because it was thin, and because it had been heavily worked to reduce it to this state, which makes it more susceptible to corrosion. Sixteen pieces (Table 34) were analysed by ICPS. One or two examples of what seem to be neatly folded thin sheet metal (eg F73 Ae157) are present amongst the analysed pieces. These suggest the metal was being collected to be remelted (White 1982).

The manufacture of hooked tags

Hooked tags were made on Flaxengate, probably in Structure 20. They have previously been referred to as 'garter-hooks' (Perring 1981) and are obviously some form of decorated fastening device. They are all very similar in size but vary in shape. Those examined (Table 35) are all unfinished and probably scrapped tags (Fig 22). The finished articles have a rounded or triangular shape, usually with two holes punched through them, and the narrow end has a semicircular looped point. All but one of the five completed tags from Flaxengate are decorated with simple punched lines, and in one case by the application of niello. Five other sites in the city have produced a total of seven completed

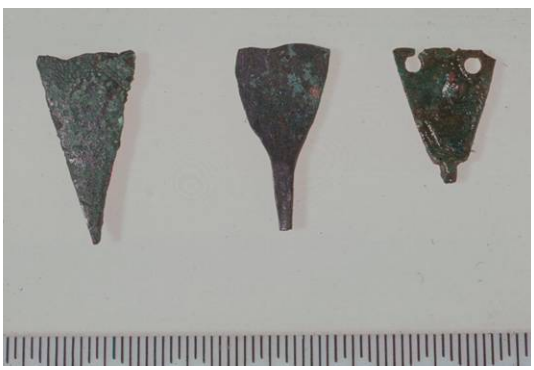


Figure 22: Flaxengate: hooked tags in various stages of manufacture

tags (Jenny Mann, pers comm). The unfinished tags have the correct shape and size but no holes punched through them, no looped narrow ends and no decoration. Those analysed by White (1982) came mainly from Pit 36 in Structure 20. A metallographic section taken from F74 Ae164 illustrates the high degree of working that tags underwent; notable is the very small grain size and the lack of porosity and inclusions. Some directionality seems to exist towards the ends of the section indicating possibly a flattening out or finishing process toward the edges of the tag (White 1982). There is also some evidence that similar tags were made from iron sheet at Flaxengate (Jenny Mann, pers comm).

Metalworking tools

No attempt has been made to find and study the tools that would have been used by the craftsmen working on Flaxengate. They must however have included iron or steel hammers, punches, chisels, shears and files, and the many hones and whetstones (Mann 1982, 27-30) from the excavations probably served more than a domestic function. The bone clamps (*ibid*, 30-31) could have been used for holding small objects as they were worked; the haematite found in pots (Adams Gilmour 1988, 77) was used to polish them.

One object provides evidence of a very specific type of metalworking; conservation of a 'large lump' of iron proved it to be an 11th-century coin die (Mann 1991). Blackburn and Mann (1995, 206-8) have suggested it could have been associated with a die-cutting workshop or was intended for recycling, but when taken with the plentiful evidence for silver working on the site it is suggestive of a moneyers workshop. 10th- and 11th-century dies are also known from London (Archibald *et al* 1995), Thetford (Blackburn and Davies 2004) and York (Pirie 1986).

Alloy composition

The composition of the copper alloys being worked at Flaxengate was investigated by analysing small samples removed from pieces of scrap and waste metal (White 1982). More recently Blades (1995) has carried out further analyses. There was an expectation that a clear picture of the alloys selected for casting and wrought working would emerge, and to a certain extent this was achieved. However, there are a number of factors that led to lack of clarity which have to be considered when discussing the results.

The first issue is how the samples were described. White divided the objects he chose to sample into five groups: spillages, bars, wire, sheet and tags (Appendix 3, Tables 31-35). The spillages are all droplets or larger masses of molten metal, which he assumed were the by-products of casting – a technologically coherent group (though the possibility of accidental melting of metal objects, eg when a house burns down, should be considered). The tags are also a coherent group that require good working properties of the metal; it must be both malleable and ductile to permit the high degree of working that the final shape of the objects demands. The other three groups lack the same degree of coherence, and indeed the descriptions of individual pieces demonstrates they include both part-manufactured metal stock and fragments of finished and perhaps unfinished objects. The 'bars' include bar ingot fragments but also any square- or rectangular-sectioned length of metal and so include strips of sheet metal as well. The 'wire' is equally varied, encompassing any circular or polygonal length of metal, including needles, pins and hook-shaped pieces. It might be though that the 'sheet' would be more homogeneous, but it includes both thin, heavily worked pieces and thicker pieces which could well be cast – as some of their compositions suggest.

The second problem is with the sampling. Some objects were deeply corroded and the sampling has not been able to avoid these areas so the analytical totals are very low. It is not possible to reconstruct an original composition as corrosion processes do not affect all components of an alloy equally.

The third problem is with the analytical method. Although nowadays ICP is a very standard procedure that can give good and reliable results, at the time White's analyses were being made it was less well understood. There may have been problems with choosing appropriate dilutions for the sample solutions and the standards used for calibrating the results may not have covered the whole range of compositions found – which may explain why many of the analytical totals are so far from 100%.

The final problem is the residuality of some of the finds. Although all the pieces analysed came from Late Saxon or early medieval contexts, some may have been Roman as a number of typologically Roman artefacts were identified from these same contexts.

There are also problems with some of Blades' analyses. Many of his samples are described as coming from spillages or droplets (Table 36) but the descriptions of the same objects in Table 30 suggest some may be scrap rather than waste. However, his analyses are more likely than White's to accurately reflect the true composition of the objects as the analytical totals are mainly far closer to 100% (see Section 7).

The best way to see the variation in copper alloy composition is to plot the data on a ternary diagram as this shows the relative amounts of zinc, tin and lead simultaneously (Fig 23). The nearer a point is to a corner of the diagram, the higher the proportion of that element it contains. Figure 23 shows the names that can be assigned to alloys with different compositions (see Section 7; Bayley and Butcher 2004, 14).

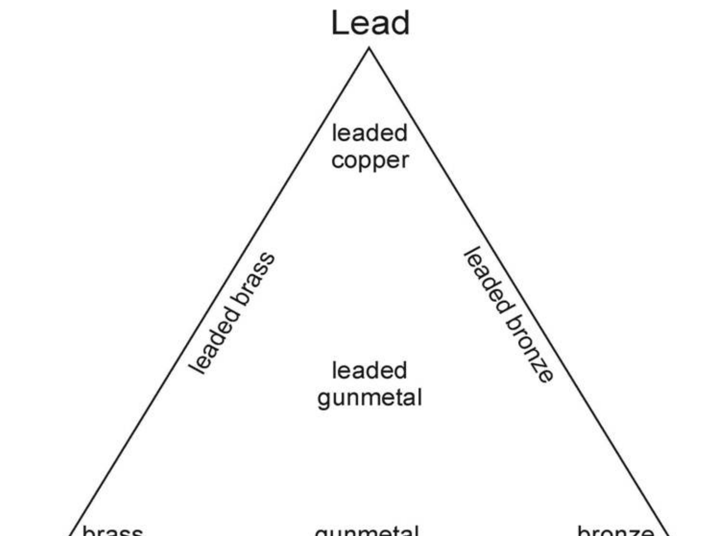
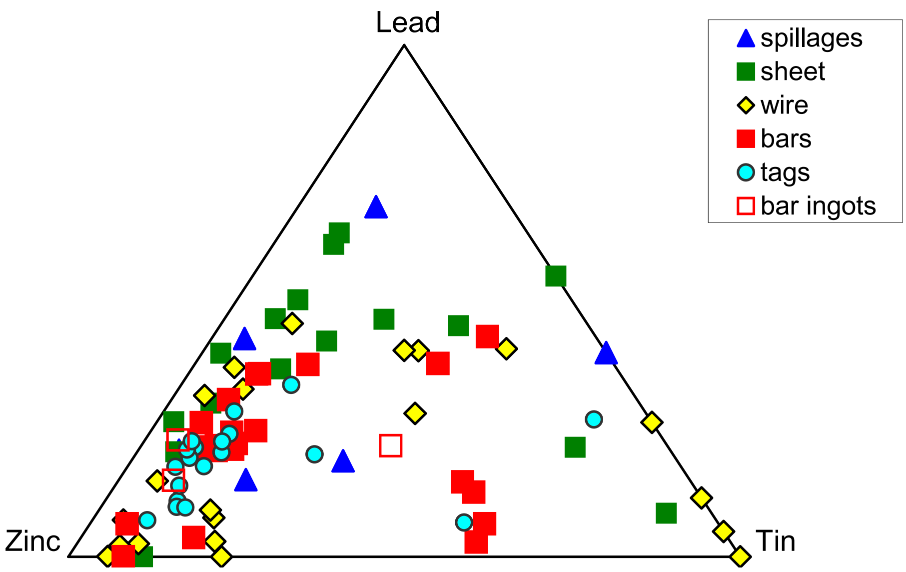


Figure 23: Ternary diagram showing the relationship of composition to the names given to copper alloys



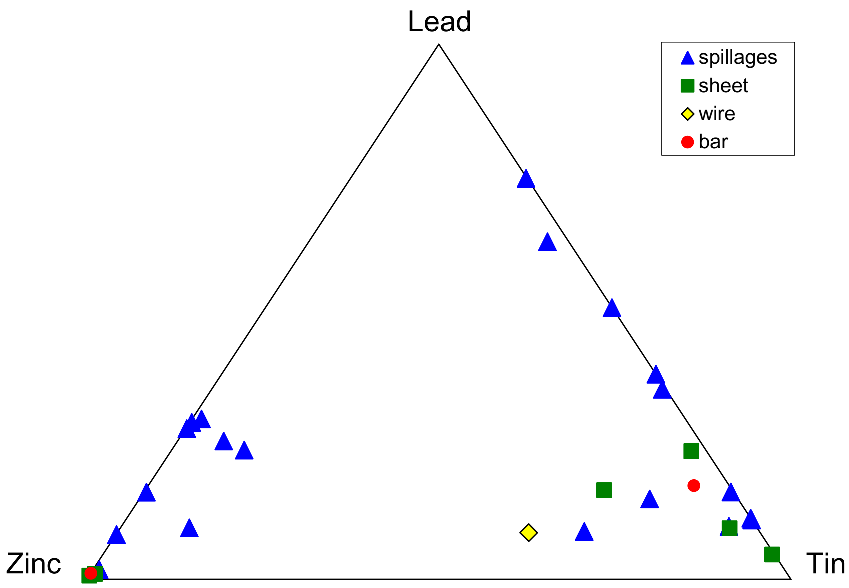


Figure 24: Flaxengate: analytical data for copper alloy scrap and waste; above from Tables 31-35, below from Table 36

Not all the analytical data in Tables 31-35 has been plotted in the upper diagram in Figure 24. Analyses with totals lying outside the range 90-110% have been omitted, as have results with low levels of alloying elements. These impure coppers have an almost random distribution on the ternary diagram, and there is no correspondence with the alloy names given in Figure 23. It can be seen from the upper diagram in Figure 24 that the majority of the metal is brass or leaded brass, though it should be noted that lead levels are not as high as they appear; less than a quarter of the objects contain over 5% lead and only four have over 10% lead.

Blades' data (Appendix 7, Table 36), filtered as described above, is plotted in the lower diagram in Figure 24 and presents a rather different picture of alloy use on Flaxengate. A far higher proportion of the pieces analysed are tin-rich alloys, though there is still a convincing cluster of brasses; the overlapping points reduce the apparent number of these zinc-rich alloys. The differences between the two figures may be due, at least partly, to the different nature of the type of material analysed; Blades had very few pieces of sheet, wire and bar. One other, minor point that comes from comparison of the two data sets is a striking difference in the silver content of the copper alloys. White's average silver content is 0.7% but Blades found only a tenth of this on average. This difference may be due to differences in the calibrations used; Blades' values are certainly more in line with other analyses of metalwork of this period, but without re-analysing a sub-sample of the objects it is not possible to say whether one or the other or both analysts' figures for silver are accurate.

Blades also analysed over 300 metal finds of various dates from other sites in Lincoln (see Table 1). This data is reproduced in Appendix 7, Table 37.

4 PRECIOUS METAL REFINING

Introduction

Before precious metals, gold and silver, could be melted, cast and smithed to shape they had to be refined and then, if necessary, mixed with a controlled amount of base metal to produce an alloy of the desired degree of fineness. Pure gold was used but silver often contained more than minor amounts of other metals. Evidence for two distinct refining processes, cupellation and parting, was found on several of the Lincoln sites. Cupellation separated precious metals from base metals such as copper while parting separated silver from gold. There are medieval texts that provide good descriptions of these processes (Hawthorne and Smith 1979; Hoover and Hoover 1950) and Bayley (2008b) has compared these texts with a range of archaeological finds.

In cupellation the impure metal was melted with an excess of lead, and air was then blasted on to the surface of the melt, turning the lead to lead oxide which in its turn oxidises any other base metals present. These other metal oxides either volatilise or dissolve in the lead oxide (litharge) and are therefore separated from the melt. Silver and gold do not react with lead oxide and so are left behind when all the base metals have been oxidised and removed. Cupellation can be carried out on both large and small scales, depending on the quantities of metal involved.

Small-scale cupellation

Cupelling a sample of precious metal to test its purity is known as assaying. A small amount of metal is accurately weighed, cupelled and the resulting metal droplet reweighed. The proportion of the original that remains is a measure of the precious metal's original purity or fineness. Sometimes the cupellation process was used to purify small amounts of metal, rather than specifically to test their purity. The vessel in which the process was carried out is known as a cupel.

In medieval and earlier times assaying was carried out on small shallow ceramic dishes, or even on potsherds. Archaeological finds of these vessels were often described as heating trays, for example by Roesdahl (1977), before their function was fully understood. All heating trays are reduced-fired and many have a vitreous surface, coloured red in parts by copper in a reduced form (Fig 25). It was therefore believed that heating trays could not have been used as cupels because cupellation is an oxidising process. This paradox has been explained as there is a range of redox conditions where lead is oxidised but copper (and iron) are in a reduced state (Bayley 1988, fig 3). The term 'heating tray' has been retained here, as describing the objects as cupels implies a specific use that cannot always be demonstrated.

Flaxengate produced 43 fragments of heating trays, including some that were purpose made discs (Fig 26) while others were re-used sherds of crucibles or pots (Appendix 4, Table 22). Various fabrics were used including Lincoln Late Saxon Sandy ware (LSLS), Lincoln Saxo-Norman Sandy ware (SNLS) and Stamford ware. According to Foley (1981) the reused sherds, unlike the purpose-made discs, contained relatively little quartz, so presumably they were chosen for their shallow concave surfaces rather than for their refractory qualities.

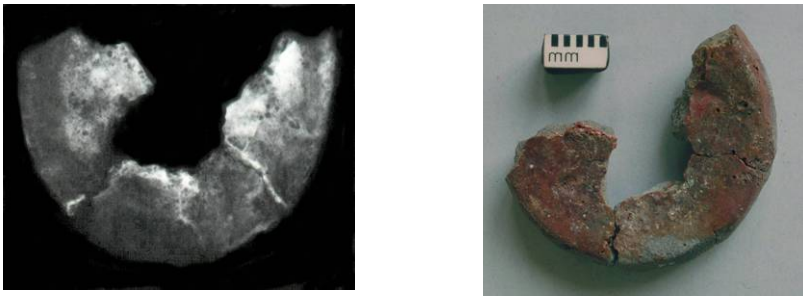


Figure 25: Flaxengate: heating tray F74 P419. The bright areas in the X-radiograph (left-hand image) are particularly lead-rich

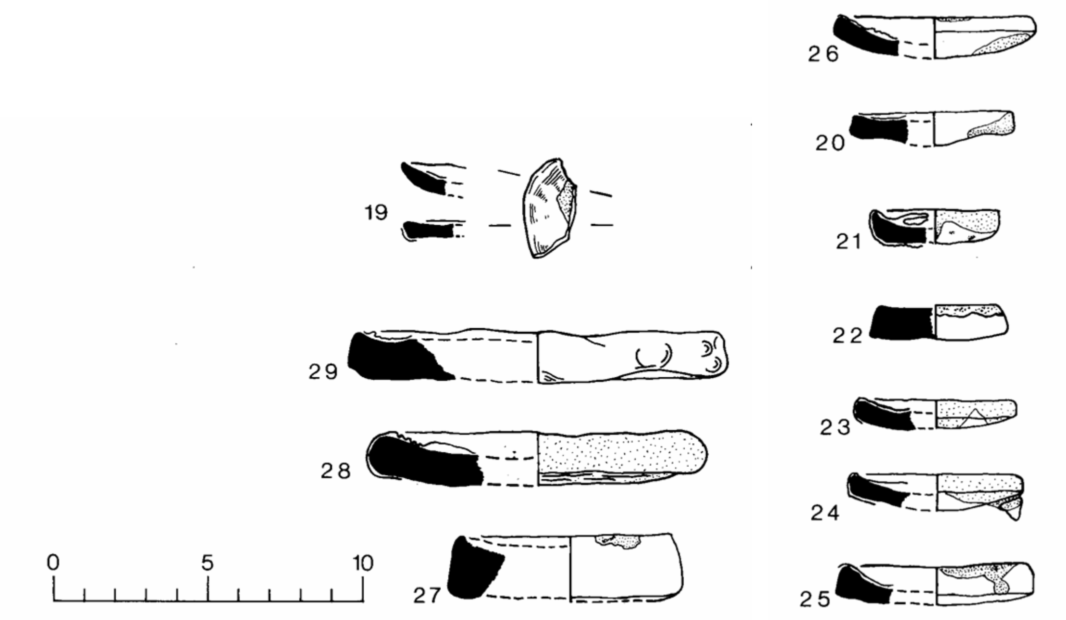


Figure 26: Flaxengate heating trays (after Adams Gilmour 1988, fig 7). Scale bar 10cm

The diameters of the purpose-made discs vary from 30mm to over 100mm although most are 30-40mm across. XRF analysis detected a high lead content in the vitreous (glassy) layer present on the upper surfaces of the heating trays, due to the reaction of the litharge formed during the cupellation process with the fired clay. The presence of lead can also be seen as bright areas on X-radiographs (Figs 25 and 42-43). The vitrification occurs on the inner/upper surface and sometimes on the rim and down the edge of the fragments. Copper, zinc and traces of tin were also detected, as well as silver on twelve of the Flaxengate fragments (Table 22). The colour range of the glassy waste was comparable to that on some of the metal melting crucibles where black, green and red areas were visible. Some of the waste also showed lustrous areas, and some flecks of metal. In some cases a circular depression was visible near the centre of the vitrified surface which is the imprint of the solidified silver droplet. Replication experiments carried out by Foley (1981) reproduced this feature, confirming its interpretation.

A total of five sherds that may have been re-used as heating trays have come from Saltergate trench F, Silver Street trench B (Fig 27), The Park and Steep Hill (Appendix 4, Table 23). They were identified on the basis of their appearance and the XRF analytical data. The ones from The Park (which may be from a metal-melting crucible rather than a heating tray) and Silver Street are the only Lincoln examples with traces of gold. Most are undated or in later medieval contexts where they are almost certainly residual.

Figure 27: Silver Street: fragment of a potsherd reused as a heating tray. Note the circular imprint of the refined metal drop (bottom right) and the tiny gold droplets trapped in the glassy surface. LIN73si BI (RN1278)

Larger-scale cupellation

Evidence for larger scale cupellation is provided by fragments of what are known as litharge cakes, which are the porous linings of hearths where cupellation was carried out that became impregnated with litharge and the base metals it separated from the silver that was being refined. The hearth lining was either crushed, burnt bone (bone ash) or a calcareous clay as silica-rich materials would have reacted with the litharge, forming a glassy surface which would have stopped the absorption of further litharge.

Figure 28: Flaxengate: joining litharge cake fragments F76 M22 and F76 Fe290. Note the thickened rim to the left and the thinner centre of the cake to the right

Fragments of 15 litharge cakes were found on the Flaxengate site (Appendix 5, Table 24; Fig 28). There are no complete examples and most of the pieces are small and friable. it appears that they are all from cakes that were roughly sub-rectangular or circular in plan with diameters of about 60-100mm. The upper surface was slightly concave or had a thickened rim. Overall thickness ranged from 10-20mm, although one cake was 30mm thick. The fragments vary in appearance with colours ranging from grey to buff, green and red. Most colours are due to the lead oxides which make up the bulk of the material, though the green is due to the corrosion of copper removed from the silver and trapped in the litharge. XRF analysis detected lead as the major element, though with variable amounts of copper also present. Some silver was detectable on the upper surfaces of the cakes, especially round the edge of the depression marking the place where the refined silver solidified. One of the Flaxengate examples (F76 M4) was included in a preliminary survey of litharge cakes (Bayley and Eckstein 2006), and all the examples have been sub-sampled for full micro-structural and quantitative analysis as part of an ongoing study. This has already shown that most of the hearth linings were of bone ash though two (F76 Ae269 and F76 M14) were probably calcareous clay as their calcium to phosphorus ratios are far higher.

Ten of the twelve fragments of litharge cakes from other sites in Lincoln came from Saltergate trenches DI and F (Appendix 5, Table 25). As at Flaxengate most of the pieces are small, and all but two formed in hearths lined with bone ash. Most are poorly dated but probably come from late Saxon or Saxo-Norman contexts. However two fragments, from Silver Street trench C and Swan Street (Appendix 5, Tables 25 and 26), are dated to the later 3rd and very late 4th centuries respectively. This raises the possibility that the rest of the litharge cake finds may also have been produced in the later Roman period; see Section 6. It is hoped that the ongoing study referred to above may be able to resolve the issue of dating as the initial work (Bayley and Eckstein 2006) suggested that there may be subtle changes in the cupellation process, and hence in litharge cake composition, which will allow a production date for individual pieces to be suggested.

Parting

The process of separating silver from gold is termed parting; archaeological evidence for it has only been recognised relatively recently (Bayley 1991b). Before the introduction of strong mineral acids such as nitric acid in the later medieval period parting was a solid state process. It involved interleaving thin sheets of the impure metal with a 'cement' made of crushed brick or tile mixed with an equal weight of salt and moistened with urine in a ceramic vessel. The pot was then sealed with clay, acting as a lid. When heated to around 800°C (below the melting point of the metal) the salt reacted with the silver in the metal, forming silver chloride which is volatile and was absorbed by the cement and the walls of the vessel. When the vessel cooled the gold could be removed and re-melted and the silver could be recovered from smelting the cement (for further details of the process see Bayley 2008b).

Flaxengate has produced thirteen fragments of parting vessels, eleven of which were examined and analysed (Appendix 6, Table 27; the PV numbers from the Table are used to identify individual sherds as the finds numbers duplicate). Six sherds (F76 P91, PV7-12; Figs 29-30 and 33) are from flat-bottomed wheel-thrown dishes with diameters of 200-250mm and walls 35-40mm high. All seem to be of Roman Black Burnished type ware, probably imported from the Dorset area, presumably as domestic vessels (Maggi Darling and Jane Young, pers comm), but were used – or reused – as parting vessels. Lids, made from sheets of local clay, were added and sealed onto the rims of the dishes (F76 P90, PV2-6; Figs 31-32).

Analysis of the inner surfaces of most of the sherds by XRF (Table 27) has detected both silver and gold. Even where gold was not detected analytically it was often visible as tiny flat particles. Note it was not present as droplets, showing the vessels had not been at a high enough temperature to melt the gold.

Figure 29: Flaxengate: sherds of dishes used as parting vessels; inner surfaces. Clockwise from top left: PV 10, 12, 7, 9, 11

Figure 30: Flaxengate: sherds of dishes used as parting vessels; outer surfaces. Clockwise from top left: PV 10, 12, 7, 9, 11

Parting vessels are visually striking, having an unusual pink to purple hue, especially on their inner surfaces, often with deposits of specular haematite. All these effects are by-products of the parting process as the salt not only reacts with the silver in the gold-silver alloy but also with the iron in the ceramic of the parting vessels and their lids, forming ferric chloride which, like silver chloride, is volatile and so leaves the ceramics, giving the inner surface a bleached appearance (eg, Fig 29, PV9). Once the ferric chloride meets air it is oxidised to haematite which is deposited from a gaseous phase and so can grow into relatively massive specular crystals, eg the dark grey deposits on PV 7, 9 and 10 in Figure 29 (identification confirmed by X-ray diffraction by Steve Wyles, Laboratory of the Government Chemist). The outer surfaces of the dishes all showed some vitrification, as is to be expected on ceramics exposed to high temperatures for considerable periods of time.

Figure 31: Flaxengate: sherds of clay lids from parting vessels; inner surfaces. Clockwise from top left: PV 2, 4, 3, 6, 5

Figure 32: Flaxengate: sherds of clay lids from parting vessels; outer surfaces. Clockwise from top left: PV 2, 4, 3, 6, 5

The lid fragments are mainly small and lack diagnostic forms, though PV2 (Fig 31) has a ridge where it sat over the rim of the dish, and apparently extended it upwards. The bottom edge of the lid was smoothed over the outside of the dish and traces of this clay survives on the outside of PV8 (Fig 33); a similar effect can be seen on PV21 and PV22 from Saltergate (Fig 36). The bright turquoise colour of the lid fragments is due to the presence of small amounts of copper (volatilised from the gold-silver alloy) in a soda-rich 'glaze', as Notton (1974) has shown in his replication experiments. This bright colour, commonly found on Islamic pottery, led to the initial mis-identification of these pieces as Islamic pottery (Adams 1979).

Other sites in Lincoln have also produced fragments of parting vessels (Appendix 6, Table 28-29; Figs 35-38). Two fragments were recovered from Grantham Place, one of which was of Roman grey ware, while Saltergate trenches D and F produced a total of ten fragments. Six of the seven from trench D were from dishes similar to those from Flaxengate; the other is of a local fabric and is almost certainly post-Roman in date. Two of those from trench F were also of post-Roman fabrics; the third is too vitrified to be certain of the fabric but could be Roman. As with the Flaxengate examples, XRF analysis detected silver and gold but with some copper and zinc also present.

Figure 33: Flaxengate: parting vessel with traces of clay lid on outer surface. PV 8

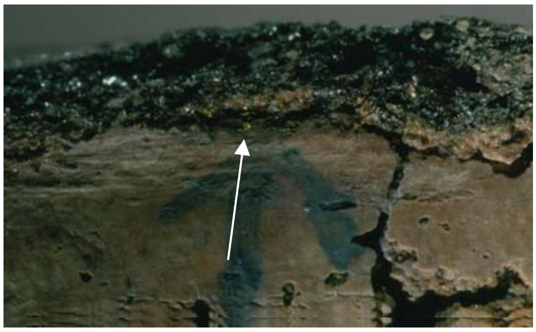


Figure 34: Flaxengate: parting vessel, PV 11, with gold (arrowed) trapped in the vitrified deposit on the rim.

Figure 35: Saltergate: parting vessels sherds; inner surfaces. Clockwise from top left: PV 20, 23, 21, 22

Figure 36: Saltergate: parting vessels sherds; outer surfaces. Clockwise from top left: PV 20, 21, 22. Note the traces of lids on PV 21 and PV 22.

Figure 37: Saltergate: close-up view of adhering lid fragment on outside of PV 21 (cf Fig 36). Image width ~40mm.

Figure 38: Saltergate: close-up view of gold traces (arrowed) on the inside of PV 20 (cf Fig 35). Image width ~30mm.

5 WORKING OTHER METALS

Lead working

It would appear from the lead scrap metal discovered on the Flaxengate site, that lead working was being carried out. A total of 92 fragments of waste metal were recovered including unfinished and miscast lead objects (Appendix 7, Table 37). No lead melting crucibles were identified, probably because domestic cooking pots could have been used. This would have been possible because of the low temperature required to melt lead, which would also have left no identifiable vitreous deposit behind.

As with the copper alloy waste (see casting and smithing waste) the fragments were categorised visually into groups. Lead waste, however, only consisted of four major categories: non-diagnostic pieces, sheet metal, strips, and unfinished or miscast fragments. 58 of the waste fragments were categorised as non-diagnostic; they are mainly lumps and spillages. 16 fragments of sheet metal were identified, one of which was perforated suggesting that some of the pieces may have been used, for example as patches, and were possibly to be recycled rather than being unused raw metal. Three fragments were strips, probably offcuts from the sheet metal. Also found were two unfinished rings, a rough perforated disc and a rod fragment. A total of 34 late medieval weights came from Pits F64 and F65 (Jones 1980, 15-16), ten of which were incomplete or missing suspension loops and are included in Table 38. None of the weights show any sign of wear suggesting that they were manufactured near where they were found. No moulds were found, but due to the low melting point of the metal even wood could have been used.

Other activities on site such as cupellation (see above) and high-lead glass working (Bayley 2008a) would have used lead as a raw material so some of the waste fragments were probably collected for these purposes.

Iron working

The presence of a few pieces of tap slag from the Flaxengate and Silver Street trenches suggest that iron may have been smelted on a small scale near to the sites, though slag is very durable and is often used as hardcore so its presence may just be fortuitous, and its production may well not be contemporary with the contexts in which it was found. There is somewhat greater evidence for iron smithing , with definite evidence in the form of smithing slag and hammerscale (see Appendix 8, Tables 38-39). Other evidence for ironworking in Lincoln has been included in the Wigford (Steane *et al* 2001) and Upper City (Steane *et al* 2006) sites summaries and has been discussed by Vince (2003, 282-284).

In addition to these diagnostic iron slags, fuel ash slag and vitrified clay hearth lining were also recovered. For more details of ironworking processes and the residues they produce see Bayley *et al* (2001).

6 DISCUSSION

The evidence for metalworking is first summarised site by site, comparisons are then made between the various sites in Lincoln, and finally the Lincoln finds are compared with those from other sites in Britain and in northern Europe. The majority of the finds come from contexts of the Late Saxon and Saxon-Norman periods which date to the 9th-11th centuries. The exceptions are the parting vessels and litharge cakes which appear to be mainly Very Late Roman, while the clay moulds for large castings and a few of the crucibles are definitely late or post medieval.

Metalworking on Flaxengate

The largest assemblage of metalworking finds is that from Flaxengate. Most of the intrinsically-datable finds are Late Saxon or Saxo-Norman crucibles, mostly Stamford ware, and these are found in contexts that date from the mid/late 10th to mid/late 11th centuries. This period marks the *floruit* of metalworking on the Flaxengate site. The remainder of the crucibles are mainly re-deposited in later levels; there is no suggestion that their presence there is due to the continuation of metalworking after the 11th century. The only definitely later finds are fragments of two crucibles (F72 P81 and F74 P76; Table 10) and one clay mould (F72 P86; Table 17). The finds come from a total of 54 LUBs, but over 80% of the fragments are from just 15 LUBs (Table 3). The discussion therefore focuses on these LUBs, using them to represent the totality of the finds. Most of them are dumps or levelling layers so it is not generally possible to relate the finds to structures (though see the discussion below).

Table 3: Summary of metalworking finds from selected LUBs at Flaxengate

LUB	Period	crucible	parting vessel	object mould	ingot mould	heating tray	litharge cake	'copper' waste	Total
17	VLR-LS	2	4				3		9
25	LS	5	3				5	3	13
32	LS	13	1				5	9	19
38	LS	21				4		4	25
35	LS-SN	6			1	2		1	9
36	LS-SN	51		6		1		14	58
44	LS-SN	28	1	9		7	1	2	46
45	LS-SN	111	2	5	1	13		12	132
53	SN	17		1				2	18
58	SN	14		3		3		4	20
59	SN	29						4	29
63	SN	111		19	1	1		44	132
66	SN	9		3	1			5	13
71	EM	12				1		13	13
Total		429	11	46	4	32	14	117	536
Total as % of all finds of this type		85.1	91.7	82.1	66.7	76.2	87.5	68.8	84.3

There are a few typologically-Roman crucibles, and some of the scrap and waste metal is most probably Roman in origin, even though it was found in late Saxon or later contexts. The two metallurgical processes that appear to be mainly or perhaps solely Very Late Roman in date are the large-scale cupellation of silver and the parting of gold from silver.

The parting vessels are mainly Black Burnished ware (Maggie Darling, pers comm), and four of the twelve sherds come from LUB17, which contains mainly Roman material. Taken together, this suggests the parting was a Very Late Roman activity, and that the vessels in Late Saxon contexts are residual. It is notable that the litharge cakes are mainly from LUBs 17, 25 and 32, which also produced parting vessels but little other evidence of metalworking. The dating of the litharge as late Roman rather than Late Saxon is thus based on circumstantial evidence, but the lack of correlation of their findspots with those of the heating trays (used for small-scale cupellation) or with crucibles used to melt silver is notable. If metal with a significant content of copper, silver and gold was being refined, both cupellation and parting would be required. The metal would first have been cupelled to remove the copper, and the resulting precious metal would then have been parted to separate the gold from the silver. At least some copper must have been present in the metal being parted as the turquoise blue vitrification on outside of the lids of the parting vessels is coloured by traces of copper.

The fabrics of both heating trays and crucibles date them firmly as Late Saxon or Saxo-Norman. However, within this time range there is considerable variation in the pattern of metals melted. Figure 5 shows that three LUBs (44, 59 and 63) have very low proportions of silver-melting crucibles, two (36 and 38) have slightly above average proportions but two (45 and 53) have between two and three times the average proportion. LUB 45 also contains 13 heating trays (a third of the total), which were used to test the purity of silver. Curiously, there are no heating trays from LUB 53 where seven (out of 17 analysed sherds) had detectable silver while from LUB 44 (where only one of 19 analysed crucibles had silver detectable) there are seven heating trays. These figures suggest either that assaying silver was not always carried out alongside its use, or that debris from silver assaying was disposed of separately from that of silver melting.

The ingot moulds are few in number so little can be inferred from their distribution though they do seem to belong with the Late Saxon/Saxo-Norman metalworking. This is to be expected as examples from other towns are most uncommon except in the Late Saxon/early medieval period (see below). Where metal was identifiable on the ingot moulds it was silver. There are fragments of copper alloys bar ingots from the site (Table 32) that would have been cast in similar moulds or more casually, for instance in a temporary groove made in a workshop floor. As described in Section 3, these ingots would have been the starting point for wrought metalworking. Other evidence for this activity is the many metal offcuts and part-manufactures found (Appendix 7, Tables 30-36).

One type of wrought copper alloy objects undoubtedly made at Flaxengate was hooked tags (see Section 3), but many other small wrought objects were almost certainly made there too. The evidence from metal analyses (Fig 24) suggests that brass was the most commonly used alloy.

The distribution of the clay mould fragments and the copper alloy waste (Table 17 and 30) is generally similar to that of the metalworking crucibles; it is presumed that the objects cast would mainly have been of copper alloys, most probably brass that may have contained small additions of lead. It is interesting, though not necessarily statistically significant, that the largest number of object moulds come from LUBs 44 and 63 where a high proportion of the metals identified on the crucibles were copper alloys (Fig 5).

Only about half the lead waste comes from the LUBs shown in Table 3. Some must represent early medieval lead working, which may have involved stone moulds like F74 M85 (Fig 10, and see discussion in Section 3). Evidence of lead working is also found in late medieval contexts, notably the group of lead weights from pits F64 and F65 within stone building E (see Section 5).

The structures on Flaxengate associated with metalworking

Many of the metalworking finds came from the parts of the site excavated by spits (including LUBs 38, 44 and 45) or from the area of pitting at its western end (LUB 36). Most of the rest came from the levelling deposits (eg, LUBs 25, 32, 58 and 63) which contained much residual and re-deposited material. None of these contexts can be definitely associated with specific structures, but despite these problems Perring (1981, 41) firmly associated non-ferrous metalworking with Structures 13, 17 and 20, which overlay each other in the central part of the site fronting Grantham Street; these structures are now assigned to LUBs 50, 53 and 59 respectively, and the latter two do contain significant numbers of metalworking finds. The area immediately to their west is LUB 45, while LUB 44 lies to the east of them. Overlying all these is a site-wide levelling deposit (LUB 63) followed by Structures 23-26 (LUBS 65-69) and then by further levelling (LUB 71).

The distributions in time and space of silver and copper alloy working can be suggested, though not proven because of the nature of the contexts. Based on the proportions of crucibles with silver on them and the presence of heating trays, it appears that silver working and assaying is more frequent earlier and towards the western part of the site, and is associated with Structure 17 (LUBs 36, 38, 45 and 53) while copper alloy working tends to be later and to the east, and is associated with Structure 20 (LUBs 44, 59 and 63). Certainly the manufacture of hooked tags seems to have been carried out in Structure 20.

Metalworking in early medieval Lincoln – evidence from other sites

Danes Terrace

The finds are scattered across the sites. Most are residual in the contexts in which they were found, which tells more about the site formation processes and limits of excavation than the location of metalworking activities. Two late medieval crucible sherds from DT74ii are from a possible hearth in Structure 21.

Grantham Place

The metalworking finds comprise eight Stamford ware crucible sherds, two of which had been used to melt silver, a fragment of a coarse stone bar ingot mould that may have been used to cast a copper alloy, and two sherds from parting vessels. As on the nearby Flaxengate site, the ingot mould and crucibles are probably contemporary with their contexts and indicate Saxo-Norman metalworking, though not necessarily on this site. One black burnished ware sherd (GP81 202; Table 29) came from a late Roman context and is thought to be from a parting vessel, though no metals were detected by XRF. The other sherd (GP81 201) was from the base of a cuboid vessel made of a fine local clay with both silver and gold present. The form, though not fabric, can be paralleled on the Coppergate site in York (Bayley 1992a, 752) but the find is effectively undated though it was found on a 12th century floor. The parting evidence from here is most likely to be contemporary with that on Flaxengate, just to the east, though the atypical sherd could be later.

Swan Street

This site, just to the south of the Flaxengate site, produced two fragments of late/post medieval moulds for large objects. The metal on one (SW82 8; Table 19) included antimony and is therefore most probably from a large cast domestic vessel (Dungworth and Nicholas 2004). The only other find was a small piece of litharge cake from a Very Late Roman structure – further evidence for late Roman precious metal refining, like that seen on Flaxengate.

Hungate

The finds from this site can be divided into two groups. One is a collection of Late Saxon/Saxo-Norman crucible sherds, and the other some post medieval clay mould fragments. The crucibles are mainly Stamford ware so are likely to be contemporary with the dumps in which most were found. As they came from dumps they were probably used nearby but not on this site. The only metal positively identified (on 5 of the crucibles) was silver.

Fragments of fired clay mould were found within robbing debris (LUB52) and the fill of a pit (LUB 53), while a small quantity of copper-working slag and sheet waste (not catalogued here) also came from these levels. However a few pieces were found within wall construction and make-up deposits (LUB 50) and within dump (LUB 49) so at least some of the mould fragments must have predated Str 12. The relatively small quantity suggests the casting activity was in the immediate vicinity rather than in the excavated area.

Silver Street

Almost all the metalworking finds are from Trench B, in late Saxon to Saxo-Norman levels overlying the late Saxon pottery kiln. All the crucibles were analysed and traces of silver were detected on four of the fifteen sherds from Trench B. The concentration of non-ferrous metalworking evidence in Trench B over a limited timespan suggests that silver melting may have been carried out here, though the relatively small number of finds could just indicate a dump of material from elsewhere in the vicinity.

Table 4: Summary of finds from Silver Street (LIN73si)

Trench	A	B	C
crucible	-	15	1
analyses	-	15; 4=Ag	1; 1=CuA
heating tray	-	1	-
litharge	-	-	1

Finds from the site sent to the Ancient Monuments Laboratory in 1973 included 33 pieces of iron slag (Table 40). Most of this appeared to be tap slag but there were also a smithing hearth bottom (100mm diam), lumps of ?smithing slag and some vitrified clay hearth lining (Wilthew 1982). The majority came from Trench B but smaller amounts of all classes of material also came from Trenches A and C. If one assumes that all the slag on the site was collected by the excavators, the small quantity of material suggests it is likely to be re-deposited. It is therefore likely that iron smelting and smithing were carried on nearby, but probably not in the areas excavated.

Saltergate

This site, and Trench F in particular, produced more metalworking finds representing a wider range of processes than those from Silver Street (Table 5). There are many crucible sherds (Table 13), fragments of two heating trays (Table 23), ten litharge cakes (Table 25), ten parting vessels (Table 28) and an ingot mould (Table 21); a range of base and precious metals were worked. Small amounts of iron slag from Trenches D, E and F were sent to AML in 1974 (part of AML No 742802) but there is no record of the types present.

Table 5: Summary of finds from Saltergate (LIN73sa)

Trench	DI	DII	E	F
crucible	21	1	14	153
analyses	19; 1=CuA, 1=Ag	1	9; 3=CuA	39; 2=CuA, 8=Ag
heating tray	1	-	-	1
litharge cake	4	-	-	6
parting vessel	7	-	-	3
ingot mould	1	-	-	-

Only 11 of the 34 finds from Trench DI can be assigned to LUBs so the relative dating of the different metalworking activities cannot be reliably discussed. It is however notable that the two parting vessels that have been assigned to a LUB are from contexts that span the Very Late Roman to Late Saxon period, earlier than any other metalworking finds from the trench. Their visual similarity to the parting vessels from the Flaxengate site means that it is likely that the Saltergate finds are further evidence for late Roman metal refining, though the chronological link to the litharge cakes cannot be demonstrated here. The crucibles are mainly Stamford ware, and as such must date from the Late Saxon or Saxo-Norman period, even when their contexts cannot be securely dated.

Table 6: Summary of finds from Saltergate Trench DI

LUB	Period	crucible	heating tray	litharge cake	parting vessel	ingot mould
42	EM	3		1		
21	EM	1				1
20	LS-SN	1				
19	LS-SN					
18	LS-SN	2		1		
15	VLR-LS				1	
13	VLR-LS				1	
N/A	?	14	2	5	2	

The only metalworking finds from Trench E are crucible sherds which again are mainly Stamford ware. Five are from Saxo-Norman contexts but the remainder are from late medieval or later contexts where they are clearly residual. No evidence of precious metal working was identified.

Table 7: Summary of finds from Saltergate Trench F (selected context groups)

cg	Date (century) from pottery	crucible	cupel	litharge cake	parting vessel
140	E-M/L 11	5	1	2	
141	E/M-M/L 11	44		2	
144		49			
145		6			
147		7			
150		6			
158		6			
159		10			
others		25		2	3

The context groups from Trench F cannot be assigned to LUBs, but it is notable that nearly two-thirds of the crucible sherds come from only two context groups, which also contained a cupel and four of the six litharge cake fragments. The crucibles are virtually all Stamford ware, and are therefore likely to have been used in the late Saxon to Saxo-Norman period.

The parting vessels are from context groups with relatively low numbers and may therefore be from earlier in the sequence, as was the case with those from Trench D. The litharge cakes could be contemporary with the parting vessels, but it is not possible to demonstrate the association seen on other sites in Lincoln.

Michaelgate Chestnut House

Over half the 67 sherds were from crucibles that had probably been used to melt brass; unlike most of the other Lincoln groups, none had any trace of silver. Most were Stamford ware and so are contemporary with the Late Saxon or Saxo-Norman contexts that some came from. More were from later medieval contexts where they had been re-deposited.

Spring Hill Michaelgate and Steep Hill

Only three crucible sherds were found. None are necessarily associated with activity on the sites; they were almost certainly brought in from the vicinity, among other material that was dumped.

West Parade

The 22 crucible sherds included only five of Stamford ware, the remainder being a Saxo-Norman fabric. XRF analyses were inconclusive, so nothing more can be said of this small group which mainly came from a variety of Saxo-Norman and early medieval pits and dumps.

The Park

A single clay mould fragment and three crucible sherds came from a variety of post-medieval contexts. The mould is probably contemporary with its context but one sherd, with gold droplets trapped in the internal vitrified surface, was of Stamford ware and thus would have been used in the Late Saxon or Saxo-Norman period, either as a crucible or as a cupel. Whatever its function, it indicates a goldsmith at work in Lincoln at that time.

Lucy Tower

The analyses of the five Stamford ware crucible sherds were inconclusive. They could be contemporary with the contexts in which they were found but there is nothing to suggest they must have been used where they were found.

The clay moulds came from a post-medieval context. The group of four fragments (LT72 P11) came from the cope of a large mould, for an object such as a skillet or cauldron. LT72 P5 was a piece mould fragment, possibly from a cauldron foot; all could be contemporary with their context.

Holmes Grain

The only metalworking finds catalogued here are two ingot moulds. One bar matrix was cut into a Roman brick/tile that was found in a Late Saxon context, and the other mould was an unstratified ?sandstone cobble that can be compared with some of the bar ingot moulds from Flaxengate. Both are most likely to have been used for casting copper alloys. Contemporary with the first ingot mould were a few crucible sherds and copper alloy scrap and waste, including two tapering strips interpreted as possible unfinished finger-rings (Steane *et al* 2001, 117-9) suggesting metalworking on a small scale was probably carried out here in the Late Saxon period (Steane *et al* 2001, 131).

Lincoln – inter-site comparisons

The evidence for non-ferrous metalworking activities in Lincoln are summarised in Table 8. Most of the smaller assemblages are unlikely to represent on-site working but some of them add to the list of processes carried out. In other cases the smaller groups reinforce the interpretations or dating of activities on Flaxengate and Saltergate. Most of the finds come from dumps so it has not been possible to reconstruct workshop layouts.

Table 8: Summary of metalworking processes carried out in Lincoln

Site	V Late Roman - Early Saxon	Late Saxon - Saxo-Norman	Late and post medieval
Flaxengate	*cupelling silver parting*	*assaying silver melting silver and 'copper' casting silver (ingots) casting 'copper' (objects) smithing 'copper'*	*casting lead*
Danes Terrace			melting
Grantham Place	parting	melting silver and 'copper' casting silver (ingots)	
Swan Street	cupelling silver		casting 'copper'
Hungate		melting	casting 'copper'
Silver Street		melting silver and 'copper'	
Saltergate	*cupelling silver parting*	*melting silver and 'copper'*	
Michaelgate Chestnut House		melting 'copper'	
Spring Hill Michaelgate		melting 'copper'	
Steep Hill		melting silver and 'copper'	
West Parade		melting ?pewter	
The Park		melting or assaying gold	casting 'copper'
Lucy Tower			casting 'copper'
Holmes Grain		casting 'copper' (ingots)	
Castle Gate West		melting	*casting 'copper'*
The Lawn			casting 'copper'

Note: Entries in italics are processes which were probably or definitely carried out within or close to the excavated areas.

Wherever larger-scale precious metal refining has been identified, the litharge cakes and parting vessels either come from Very Late Roman contexts or, it has been argued, they are most likely to be re-deposited Very Late Roman material. The only cases where this interpretation is questionable is in the case of one of the parting vessel sherds from Grantham Place (GP81 201), and for some of the litharge cakes from Saltergate which are actually or effectively unstratified, and cannot as yet be independently dated.

The vast majority of the crucible sherds are made of Stamford ware or other contemporary fabrics and so date the bulk of the metal melting to the Late Saxon to Saxo-Norman periods. The main metals being melted were brass and silver, with smaller numbers of crucibles with traces of other copper alloys. The heating trays provide evidence of contemporary, small-scale silver assaying, while two sherds have gold on them. The mould fragments from Grantham Place and Saltergate trench D, like those from Flaxengate, appear to be contemporary with the metalworking crucibles from those sites and demonstrate that metal objects were being cast as well as wrought..

There are occasional late or post-medieval crucibles, for instance the two early-mid 16thcentury graphitic sherds from Danes Terrace (DT74ii P2 and DT74ii P15). These demonstrate that copper alloy objects were continuing to be made in Lincoln at this period. The other evidence for late and post medieval metalworking are the mould fragments such as those from Hungate and Lucy Tower which were used in casting large domestic vessels. However the small quantities retrieved indicate the foundries were located elsewhere within the city.

Lincoln in a wider context – comparative data from beyond the city

At least some, and probably most, of two classes of metalworking finds from Lincoln definitely belong to the Very Late Roman period; these are parting vessels and litharge cakes.

Parting vessels

Parting vessels are not common finds but they are being recognised from increasing numbers of sites (Bayley 1991b), however no others are known that are definitely late Roman. There are early Roman examples from Exeter (Bayley 2001), Chichester (Bayley forthcoming) and London (Marsden 1975), 10th-11th century examples from York (Bayley 1992a), Dublin (Bayley in prep) and Winchester (Bayley and Barclay 1990), and a slightly later example from Thetford (Bayley 1999a).

Litharge cakes

The litharge cake fragments from Lincoln mainly have a greenish hue and tend to be small, friable pieces with few examples having a definite shape that can be located within the original complete 'cake'. Finds from elsewhere are often rather more complete, solid examples which tend to have a grey rather than green colour. This difference is almost certainly due to the environment in which the pieces were buried; those from waterlogged sites tend to be better preserved and the copper in them has corroded less, so the green colour is less marked. Litharge cakes are known from a considerable number of English excavations of Roman, Saxon and medieval date; Bayley and Eckstein (1997, fig 2) provide a list that has since expanded as further examples have been identified. The majority of finds are from major urban centres. The dates are those of the contexts producing the litharge cakes as there is no independent dating for them. Scientific investigation of a small number of samples has suggested that variations in composition may be linked to date (Bayley and Eckstein 2006) but a larger study to test this hypothesis is still at an early stage.

The vast majority of the finds described in this report are of Late Saxon or Saxo-Norman date. They include crucibles, heating trays, clay moulds for objects, ingot moulds, waste and scrap metal. All of these can be paralleled on numerous other sites in England, the rest of the British Isles and beyond (Bayley 1991a and 1992c). The comparanda for each class will be discussed in turn.

Crucibles

Considerable numbers of crucibles have been recovered from other sites further afield in England. The crucible assemblage from 16-22 Coppergate, York is directly comparable to that from Flaxengate as it also consists of a major group of metal working crucibles dating to the late 10th and 11th centuries, the majority of which were of Stamford ware and bag-shaped or biconical in form. They were mainly used for melting silver with copper-alloy and gold working also taking place. Other sites in York have also produced smaller numbers of broadly contemporary crucibles (Bayley 1992a).

Several sites in the City of London have produced Saxo-Norman crucibles in Stamford ware that have been almost exclusively used for melting silver. London ware crucibles of similar size were also used for melting silver, with larger sizes being used for copper alloys, as were crucibles of early medieval coarse ware which was another local fabric (Bayley *et al* 1991). In London the superior properties of Stamford ware were recognised and the crucibles used exclusively for precious metals. The picture in York was similar with Stamford ware crucibles appearing earlier than other Stamford ware forms. In Lincoln they were widely used for copper alloys too; presumably the relative closeness to Stamford made this economically viable.

Other Danelaw towns which have produced evidence for non-ferrous metalworking include Northampton, which has a unique form of crucible that is made in a fabric that resembles Stamford ware (Bayley 1979 and 1981), and Thetford were excavations produced handmade and wheel thrown crucibles in a variety of different fabrics including Stamford ware (Bayley 1984; 1999a; 1999b). By way of contrast, in Winchester crucibles were mainly handmade and not of very refractory fabrics (Bayley and Barclay 1990). These three towns have all produced fairly large numbers of 9th to 11th century crucibles, while other towns have produced smaller numbers mainly bag-shaped in form with a pinched out lip.

Contemporary crucibles from major Viking Age towns in Scandinavia, for example Birka, Haithabu and Ribe (Brinch Madsen 1984), are mainly thimble-shaped, roughly cylindrical, round bottomed and sometimes had lug/handles on their sides. Their form is quite different from that found on English sites though the metal technology has many similarities. The same can be said of the crucibles from Viking Dublin which are similar to those from Early Christian sites such as Lagore (Hencken 1950, fig 117, no44).

Heating trays

Heating trays have been reported from Northampton (Bayley 1979 and 1981), Thetford (Bayley 1984; 1999a; 1999b), Winchester (Bayley and Barclay 1990) and York (Bayley 1992a), and further afield from Dublin (Bayley in prep) and Scandinavian sites such as Helgö (Lamm 1980), Birka, Kaupang and Haithabu (Bayley 1992c). Most had traces of silver on them but in a few cases the precious metal was gold.

Clay moulds

Piece moulds for casting small objects are known from few Late Saxon or early medieval English sites, but are normally only found in small numbers, and are mainly so abraded that neither the type of objects being cast nor details of the surface decoration on them can be determined. The exceptions to this are the trefoil brooch mould from Blake Street, York (Macgregor 1978) and the 20 or so unpublished mould fragments from the Buttermarket site in Ipswich. By comparison, the Flaxengate mould fragments are relatively numerous and in reasonable condition (Figs 6-9 and 39-40).

Stone moulds for small objects do not become common until the later medieval period, but a rough parallel for that from Flaxengate (Fig 10) can be found in the limestone mould for a pendant from Thetford (Bayley 1984).

Ingot moulds

The Lincoln ingot moulds tend to be of coarse sandstone, generally with only one matrix cut into each piece of stone. Contemporary moulds from, for example, Chester (Mason 1985) and the Coppergate site in York are of roughly squared, finer textured stone, smaller and with several ingot shapes cut into each piece. Other broadly contemporary ingot moulds are also known from Oxford (Jope 1958), Thetford (Bayley 1984) and Whitby (Wilson 1976). Looking further afield, ingot moulds are known from Ireland where the examples from Lagore are similar to those from Lincoln (Hencken 1950, fig 88) while those from Scandinavian sites such as Lund in Sweden (Blomqvist and Martensson 1963) and Haithabu (Resi 1979) in Jutland are rather more regular in shape and usually have multiple matrices.

Where there is positive evidence for the metal being cast in the Lincoln ingot moulds, they all had contained silver. This is in contrast to the crucibles from the site where the majority were melting copper alloys with less being used for silver. The ingot moulds from the Coppergate site in York were also mainly used for silver (Bayley 1992a). It is possible, however, that stone moulds were only used for the relatively small precious metal ingots, while base metal ingots may have been cast by pouring molten metal into a temporary groove in the ground. Some of the complete copper alloy ingots from other sites, for example Haithabu in Jutland, are over 30cms long; far too large to have come from any known ingot moulds.

Waste and scrap metal

Scrap and waste metal is commonly found wherever metalworking was carried out so the list of parallels that could be offered would be long. It is worth noting the part-made hooked tags from Thetford (Bayley 1984) as they provide parallels for those from Flaxengate.

7 TECHNIQUES USED TO STUDY THE FINDS

All of the objects included in this report were examined using a low power binocular microscope (x10 and x30) and many were also analysed chemically. The techniques used are described below.

Microscopy

For the metal scrap and waste the information recorded included the category into which each object fell, the extent of the corrosion and any technological features which might indicate the method of fabrication or type of decoration. Examples include the presence of file and other tool marks, casting flashes, incised patterns and relief decoration.

For crucible and cupel sherds the fabrics were identified by Lauren Adams Gilmour and Jane Young, and the presence of vitrification on both inner and outer surfaces was recorded, as was its colouration by traces of copper (see catalogue). At the same time the areas with metal-rich deposits were identified for subsequent XRF analysis (see below).

Radiography

Some of the metal scrap and waste was radiographed in a Faxitron cabinet type X-ray machine by Rob White. This showed the levels of porosity and normally invisible fabrication evidence in objects and separated slaggy material from metal. X-radiography also identified objects that were only lightly corroded and thus were suitable for analysis by ICPS (see below). Some of the cupels and glass working crucibles were also X-radiographed (see Figs 42-43 and Bayley 2008a). The results showed some discrete metal globules and patches of relatively high density on the crucibles.

Thin sections

In order to look more closely at the vitreous wastes and to observe their interaction with the clay body of the crucible, several sherds were subjected to thin section analysis by Kate Foley. Samples were mounted on slides, ground to an approximate 30 microns thickness and examined under a petrological microscope in plane-polarized light and with crossed polarizers. Most of the samples were from glass working crucibles because the cupel fragments were very small and it was not considered appropriate to section more than two unstratified samples. Three Stamford ware crucibles were also sectioned though this ware had previously been studied in detail by Kilmurry (1980, 207). For further discussion of the thin sections see Foley (1981).

X-ray fluorescence spectrometry

Most of the analyses were carried out completely non-destructively by X-ray fluorescence (XRF). The XRF spectrometer used was a Link Systems MECA 10-42 energy dispersive system fitted with a rhodium X-ray tube and a lithium drifted silicon detector. Typical analytical conditions were a tube voltage of 35 kV and current of 0.03mA, an air path for the X-rays and a detector live time of 10 or 20 seconds. The range of the detector was 0-40keV with a channel width of 20eV.

The system was set up to analyse a large area (about 1cm^2). This is an advantage when dealing with crucible slags as they are far from homogeneous so an 'average' analysis over a relatively large area is more representative than a small spot analysis could be. If the metal traces are very slight or scattered the chances of them being detected increase with the size of the area analysed. When analysing a particular object many factors such as its shape, size and surface texture, the concentration and distribution of the elements of interest, the major element composition of the object and the analytical conditions used can all affect the strength of the signal (peak height) produced by each element.

Most of the crucibles, parting vessels and cupels had the metalliferous slag deposits on their inner surfaces analysed by XRF. In some cases the outer surfaces were also analysed. The elements detected are listed in the catalogue (Tables 10-23 and 27-29), the number of symbols indicating the relative peak heights which, it should be noted, are not directly related to abundance. Elements written within square brackets were visible but were not detected by XRF. The results are essentially qualitative but can be interpreted to suggest what metal or alloy was melted in the crucible, the ultimate aim of the analysis. The material analysed was sometimes corroded metal droplets trapped in the slag layer but more usually just the crucible slag itself. The relationship between the composition of this surviving material and that of the original metal is very complex so the imprecision introduced by qualitative analysis is only one of several approximations that have to be made in interpreting the XRF results. In practice, qualitative results are a positive advantage as they prevent spurious precision being attached to their interpretation.

The proportions of the various non-ferrous metals present in crucible slags depends not only on their original concentrations in the metal melt but also on their chemical nature. Unreactive elements, such as gold, are not detected unless they are present as discrete metal droplets trapped in the slag. Under the analytical conditions used, silver and tin give weak XRF signals and so tend not to be detected when they are only present in small amounts. The concentrations of other elements, however, can be enhanced in the slag relative to the melt. For example lead and particularly zinc can act as glass forming elements and so are chemically bound into the crucible slag and thus preferentially retained. Zinc has a very high vapour pressure and so tends to diffuse into the walls of the crucible and is therefore well represented when they are analysed, even if it was only present in minor amounts in the metal melt (Dungworth 2000). The amounts of more volatile elements detected may also be affected by the shape of the crucible as a deep form will tend to contain the metal vapour while with an open form it will be quickly lost to the atmosphere and so be present in lower concentrations as the crucible slag forms. Where the major elements detected are the more volatile ones and no specifically diagnostic elements were recorded, the crucible is described in the catalogue as 'used' as any attempt to identify the metal or alloy being melted would be unreliable.

With clay moulds there is far less likelihood than with crucibles that high levels of metals will survive both burial and rediscovery. A good mould was not 'wetted' by the metal cast in it and was not normally subjected to high temperatures for long enough to allow any significant slagging to occur. Thus in a clay mould the only metal entering the fabric was that in the vapour rising from the melt, ie zinc and, to a lesser degree, lead. XRF analysis of object moulds does not therefore normally produce useful results.

Ingot moulds, whether of clay or stone, more often provide evidence of the metals cast in them as they were used repeatedly over a period of time, allowing detectable levels of metals to build up. Volatile elements are not so great a problem here as the open moulds allow their escape to the atmosphere, though experiments by Barnes (nd) and more recently by Kearns (2007), have shown that the major XRF peak detected is for zinc even when it is present at levels as low as 1% in the metal melt. Even in ingot moulds the levels of metals are far lower than in crucibles and they are less firmly bound to the surface and so can be removed by enthusiastic washing.

Inductively coupled plasma atomic emission spectroscopy

Inductively coupled plasma atomic emission spectroscopy (ICP or ICPAES) was used by White (1982) to analyse the waste metal, ingots and part manufactures. This method has a fast sample throughput and has the further advantage of being able to detect major, minor and trace levels of all elements. Small metal samples were removed from the objects and dissolved in acid solutions which were then introduced into the machine. However, because so much of each sample comprised copper (and the standards used to calibrate the results contained no copper) its spectral lines interfered with weaker lines produced by other elements, making the results for them unreliable. These problems also led to the overall totals not always being very close to 100%. Despite these problems, White's data for the major and minor elements are given in Tables 31-35, and the data plotted in Figure 24. The names given to the various copper alloys are indicated in Figure 23 and have been assigned on the basis defined by Bayley and Butcher (2004, 14); note that the alloy names assigned by White (1982) are not always identical. Further ICP analyses by Blades (1995) of copper alloy scrap and waste from other sites in Lincoln used a system that had been specifically calibrated for use with copper alloys so spectral interferences were negligible and the results normally reflect the true composition of the samples. His data is presented in Tables 36-37 and results for samples from Flaxengate are plotted in Figure 24.

Metallography

Metallographic sections were made of some of the analysed metal objects in order to establish the level to which different categories of scrap metal had been worked after casting. White (1982) describes the structures seen, which were mainly as expected. A summary of his results are included in Section 3, above.

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APPENDIX 1 DEFINITIONS AND ABBREVIATIONS

In Appendices 2-7 the column headings have the following meanings:

Finds no: site code followed by finds number
RN: unique number given to all finds (including bulk material like pottery) from Silver Street (LIN73si) and Saltergate (LIN73sa); only selected finds were also given a finds number, with each trench having its own sequence.
Cxt: alphanumeric context code assigned during excavation
cg: context group assigned during post excavation work, combining a number of individual contexts
LUB: Land use block assigned during post excavation work, combining a number of context groups
Period: most LUBs are assigned to a period or range of periods. The abbreviations used (after Steane *et al* 2001, Fig 1.5) are:

LR	late Roman	mid 3rd - late 4th century
VLR	very late Roman	late 4th - very late 4th century
LS	late Saxon	late 9th - late 10th century
SN	Saxo-Norman	early 11th - early/mid 12th century
EM	early medieval	early/mid 12th - early/mid 13th century
HM	high medieval	early/mid 13th - mid 14th century
LM	late medieval	mid 14th - end 15th century
PM	post medieval	beginning 16th - early 18th century
MOD	modern	mid 18th - 20th century

Date: most LUBs have a date range (in centuries AD) which may be further qualified as early/mid/late (E/M/L)
Context description: summary description of the context
For Flaxengate finds, the lower case Roman numerals are the phase number used by Perring (1981). Feature numbers (eg, for pits) for the 'early medieval' (late 9th to late 11th centuries) are those used by Perring (1981), and for the medieval those used by Jones (1980).

Table 9: Concordance of Ancient Monuments Laboratory (AML) numbers and finds numbers

AML No	2nd AML No	Finds No	RN	Material	Cxt
739085		LIN73si AI -	3391	scrapings from crucible	81
739086		LIN73si BI -	57	fired clay?	28
739087		LIN73si BI -	872	hearth lining	54
739096		LIN73si BI -	344	crucible	15B
739097		LIN73si BI -	399	crucible	31
739098		LIN73si BI -	609	crucible	31
739099		LIN73si BI -	610	crucible	41
739100		LIN73si BI -	680	crucible	40
739103		LIN73si BI -	740	crucible	40
739170	891529	LIN73si CI 75	1123	litharge cake	127
7310335		LIN73si CI -	1385	base sherd	81
7310336		LIN73si CI -	869	base pot sherd, reduced fired	63
7310338		LIN73si CI -	959	pot sherd	81
7310344	891532	LIN73si BI -	1278	sherd re-used as heating tray	1C
7310346		LIN73si AI -	20	vitrified ceramic, ? tuyere	8
7310347		LIN73si BI -	134	tap slag	9
7310348		LIN73si BI -	135	tap slag	8
7310349		LIN73si CI -	136	tap slag	11
7310350		LIN73si BI -	220	tap slag	15a
7310351		LIN73si BI -	266	tap slag	21
7310352		LIN73si BI -	267	tap slag, ironstone	15B
7310353		LIN73si BII -	268	porous tap slag	3
7310354		LIN73si BI -	269	iron slag + hearth lining	10
7310355		LIN73si CI -	270	tap slag	249
7310356		LIN73si BI -	339	ironstone	26
7310357		LIN73si BII -	340	tap slag	6
7310358		LIN73si BII -	341	ironstone	4
7310359		LIN73si BII -	403	tap slag	4
7310360		LIN73si BI -	404	iron (? smithing) slag	35
7310361		LIN73si BI -	405	hearth lining	28
7310362		LIN73si BI -	406	porous tap slag	15
7310363		LIN73si BI -	623	ironstone	39
7310364		LIN73si BI -	624	tap slag	31
7310365		LIN73si BI -	625	tap slag	35
7310366		LIN73si BI -	626	?glassy slag	35
7310367		LIN73si CI -	627	ironstone	72
7310368		LIN73si BI -	628	tap slag	39
7310369		LIN73si CI -	686	tap slag	36
7310370		LIN73si BI -	687	Fired clay	40
7310371		LIN73si CI -	688	ironstone	71
7310372		LIN73si BI -	689	tap slag	88
7310373		LIN73si BI -	690	tap slag	15B
7310374		LIN73si BII -	774	hearth lining	8
7310375		LIN73si BII -	775	ironstone	8
7310376		LIN73si BI -	776	tap slag	36
7310377		LIN73si CI -	777	ironstone	68
7310378		LIN73si AI -	856	tap slag	51
7310379		LIN73si BI -	873	ironstone	106

Table 9: Concordance of Ancient Monuments Laboratory (AML) numbers and finds numbers

AML No	2nd AML No	Finds No	RN	Material	Cxt
7310380		LIN73si CI -	952	iron slag + wood/charcoal	89
7310381		LIN73si CI -	953	smithing slag	98
7310382		LIN73si CI -	954	smithing slag	87
7310383		LIN73si AI -	955	smithing slag?	48
7310384		LIN73si CI -	1021	ironstone	82
7310385		LIN73si CI -	1022	ironstone	83
7310386		LIN73si BI -	1023	tap slag	47
7310387		LIN73si BI -	1824	tap slag	41
7310388		LIN73si BI - [	1062	ironstone	50
7310389		LIN73si CI -	1167	ironstone	106
7310390		LIN73si BI -	1168	ironstone	52
7310391		LIN73si CI -	1169	hearth lining	116
7310392		LIN73si CI -	1170	smithing slag	107
7310393		LIN73si BI -	1171	tap slag	15B
7310394		LIN73si CI -	1270	ironstone	92
7310395		LIN73si BI -	1385	tap slag	112
7310396		LIN73si CI -	1386	smithing slag	119
7310397		LIN73si CI -	1387	hearth lining and smithing slag	113
7310398		LIN73si BI -	1388	ironstone	112
7310399		LIN73si CI -	1389	ironstone	83
7310400		LIN73si AI -	1435	hearth lining + wood/charcoal	125
7310401		LIN73si BI -	1537	tap slag, ?smithing slag	52
7310402		LIN73si BI -	1538	ironstone	31
7310437		LIN73si AI -	57	fused green glass	1
7310438		LIN73si AI -	58	fused green glass	1
7310439		LIN73si AI -	59	fused green glass	1
7310440		LIN73si AI -	60	fused green glass	1
742281	891531	LIN73sa DI 62	2690	stone mould	87
742564	891528	LIN73sa F - et al	2503	crucibles - 57 groups	various
742575	891529	LIN73sa F 26	2444	litharge cake	35
742577	891527	LIN73sa F 31	2597	crucible	35
742578	891529	LIN73sa F 69		litharge cake	44
742581	891529	LIN73sa F 87		litharge cake	96
742583	891529	LIN73sa F 507		litharge cake	156
742635	891529	LIN73sa DI 165		litharge cake	105
742660	891527	LIN73sa EI 49	2732	crucible	
742802	891529	LIN73sa DI 84	2852	litharge cake	75
742802	891529	LIN73sa F 75	3072	litharge cake	44
742802	891529	LIN73sa F 48	2659	litharge cake	68
742802	891529	LIN73sa DI 183	3322	litharge cake	121
742804		LIN73sa FI 37	2658	ceramic ?crucible or mould	18
742865		LIN73sa FI 55	2901	glass waste?	88
744995		LIN73si BI -	1707	smithing slag	116
756251		F74 M45		stone mould	AZH
756251		F74 P135		clay mould	B100
756251		F74		23 bags crucibles	various
766858		F76 M14		litharge cake	BDS
766859		F76 Fe280		litharge cake	BDQ

Table 9: Concordance of Ancient Monuments Laboratory (AML) numbers and finds numbers

AML No	2nd AML No	Finds No	RN	Material	Cxt
766959		F		copper alloy spillages	various
766960		F		crucible (11)	various
766961		F76 M40		litharge cake	BVD
766961		F76 M22		litharge cake	BDQ
766961		F73 M125		litharge cake	VQ
766961		F76 M47		litharge cake	BXN
766961		F76 M33		litharge cake	BNF
766961		F73 Ae108		litharge cake	JH
777428		F76		parting vesel - 2 sherds	BNF
777429		F76 P73		heating tray	CDQ
777430		F76 P72		heating tray	BOU
777431		F73 M66		object made of ???	LX
7715071	961892	F76 P91		parting vessel	BXN
7715071	961892	F76 P91		parting vessel	D46
7715071	961892	F76 P91		parting vessel	G10
7715071	961892	F76 P91		parting vessel	BXN
7715072	961892	F76 P90		parting vessel	CAI
7715072	961892	F76 P90		parting vessel	BHU
7715072	961892	F76 P90		parting vessel	BNG
781645		F76 P7		heating tray	BEP
781648		F76 M41		litharge cake	BPH
781649		F74 Ae456		litharge cake	B106
781650		F76 M4		litharge cake	BCU
781651		F76 M6		litharge cake	BDG
781652		F76 Ae163		litharge cake	BPM
781653		F76 M31		litharge cake	BPM
781654		F76 M30		litharge cake	BPM
781655		F76 M38		litharge cake	BDS
781656		F76 Ae269		litharge cake	BXN
785232		F73		decayed lead-glazed potsherd	XU
785233	961892	F76 P91		parting vessel	BDQ
785235		F74 ST6		stone mould	AOU
785236		F M132		sharpening stone	G49
785237		F76 ST2		stone mould	BEA
785238		F72 M190		stone mould	ABS
785239		F74 ST15		stone mould	E11
785240		F74 ST8		stone mould	ACK
785241		F72 M85		stone mould	F5
785242		HG72 P28		ceramic mould	EL
785243		HG72 M20		stone mould	+
790273	961892	F76 P90		parting vessel	BCU
790274	961892	F76 P90		parting vessel	BDS
790275	961892	F76 P90		parting vessel	BCU
790940		F		crucible (fabric 10)	
790941		F		crucible (fabric 19)	
800727		F		'Chinese' rim sherd	
800728		F		'Chinese' body sherd	

Table 9: Concordance of Ancient Monuments Laboratory (AML) numbers and finds numbers

AML No	2nd AML No	Finds No	RN	Material	Cxt
801510		F		all the crucibles and heating trays	various
820180		F72 M3		stone mould	CX
891512		DT74i		crucible (8)	various
891513		DT74ii		crucible (12 incl 1 glassworking)	various
891514		DT78		crucible (3)	various
891515		SH74		crucible (3 incl 1 glassworking)	various
891516		SPM83 49		crucible (1)	101
891517		MCH84		crucible (71 incl 3 glassworking)	various
891518		GP81		crucible (10 incl 2 parting)	various
891519		GP81 183		stone mould	192
891520		SW82		clay mould (2)	various
891521		H83		crucible (21 incl 2 glassworking)	various
891522		H83 181		clay mould	1
891522		H83 15		clay mould	2
891522		H83 16		clay mould	2
891522		H83 17		clay mould	2
891522		H83 18		clay mould	2
891522		H83 5		clay mould	10
891522		H83 182		clay mould	13
891522		H83 85		clay mould	43
891522		H83 165		clay mould	83
891522		H83 141		clay mould	93
891522		H83 139		clay mould	95
891522		H83 162		clay mould	95
891522		H83 164		clay mould	95
891523		H83 363		clay mould	500
891523		H83 364		clay mould	500
891523		H83 365		clay mould	500
891523		H83 366		clay mould	500
891523		H83 367		clay mould	500
891523		H83 368		clay mould	500
891523		H83 359		clay mould	503
891523		H85 372		clay mould	500
891523		H85 450		clay mould	500
891523		H85 374		clay mould	503
891523		H85 451		clay mould	503
891523		H85 379		clay mould	509
891523		H85 390		clay mould	511
891523		H85 398		clay mould	511
891524		P70		crucible (3) + clay mould (1)	various
891525		LT72		crucible (6) + clay mould (1)	various
891526		WP71		crucible (23)	various
891527		LIN73sa DI		crucible (30) + heating tray	various
891527		LIN73sa DII	2716	crucible	5
891527		LIN73sa DIII		crucible (2)	various
891527		LIN73sa EI		crucible (14)	various
891527		LIN73sa FI		crucible (62)	various

Table 9: Concordance of Ancient Monuments Laboratory (AML) numbers and finds numbers

AML No	2nd AML No	Finds No	RN	Material	Cxt
891528		LIN73sa FI		crucible (90)	various
891529		LIN73sa DI 28	2059	litharge cake	1
961891		H86 1963		glassy slag?	2020
961891		DT74 Ae200		glassy waste?	KF
961891		SW83 674		litharge cake	386
961892		F76 P96		parting vessel	BDS
961892		F76 P97		parting vessel	BDS
961892		F76 P98		parting vessel	BDS
961892		F76 P88		parting vessel	BJZ
961892		F76 P96		parting vessel	BDS
961892		F76 P97		parting vessel	BDS
961892		F76 P98		parting vessel	BDS
961892		F76 P88		parting vessel	BJZ
961892		LIN73sa DI 327		parting vessel	50
961892		LIN73sa DI 340		parting vessel	113
961892		LIN73sa DI 341		parting vessel	50
961892		LIN73sa DI 342		parting vessel	123
961892		LIN73sa FI 599		parting vessel	96
961892		LIN73sa FI 600		parting vessel	96
961892		LIN73sa FI 601		parting vessel	130
961892		LIN73sa DI 345		parting vessel (4 sherds)	88
961893		H85 353		vitrified mould or hearth lining	500
961893		H85 422		vitrified mould or hearth lining	511
961893		H85 466		clay mould	525
961893		WO89 <19>		slag	535
961893		WO89 <4>		slag + crucible	501
961893		WO89 <5>		slag + crucible	501
Finds without AML Nos					
-		LIN73si BI -	1605	ironstone	31
-		LIN73si BI -	1607	ironstone	52
-		LIN73si BI -	1608	ironstone	75
-		LIN73si BI -	1606	iron (?tap) slag	85
-		LIN73sa F 38	2581	crucible	
-		LIN73sa F 34	2586	crucible	

APPENDIX 2 CATALOGUE OF CRUCIBLES

In Appendix 2 the additional columns are:

Type: of crucible

STCRUC	Stamford ware crucible
LSCRUC	Late Saxon crucible fabrics
EMED	Early medieval
LMED	Late medieval
PMED	Post medieval
MED	Medieval
Roman	Roman fabric
p	pinch
c	coil

See Adams Gilmour (1988, 70-77) and Young *et al* (2005, 64 and 97) for discussion of crucible fabrics.

Use: metal melted, based on interpretation of XRF data

See Section 2 'Metal traces on crucibles' and Section 7 'Alloy names'
Where there is no entry, no analysis was made
unused = no metals detected by XRF
used = slight or non-diagnostic traces of metals detected by XRF

Sh: sherd type

R	rim
B	body
Ba	base
L	pouring lip

Diam: diameter (in mm)

r	rim
m	at maximum
b	base

EOL: extra outer layer of less refractory clay

+	EOL present

Vit: vitrified (glassy) surfaces

I	vitrified layer on part or all of inner surface
IR	patches of red colour in vitrified layer on inner surface
O	vitrified layer on part or all of outer surface
OR	patches of red colour in vitrified layer on outer surface

Cu	copper	)
Zn	zinc	)
Pb	lead	) elements detected by XRF
Sn	tin	)
Ag	silver	)
	+++	strong XRF signal
	++	detected
	+	weak XRF signal

Comments: other notes and references to illustrations

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f76 P40	BID	r42	8	LR	M/L3	Str R3 Make-up for floors	?Roman											missing
f76 P65	BHV	r101	17	VLR-LS	M/L-L9	Dump	LSCRUC c	bronze/gunmetal	Ba	30b	+	IROR	++	++	+	++		
f76 P67	BHU	r105	17	VLR-LS	M/L-L9	Turf	LSCRUC c	bronze/gunmetal	B			IOR	+++	+++		+		
f76 P21	BKJ	r82	19	LS	M/L9-L10	Demolition debris	Roman	gunmetal					+++	+++	+	+		
f76 P38	BKK	r68	25	LS	E/M-M10	Dump & trample	STCRUC	silver	B			IROR	+	++			++	
f76 P27	BDS	r90	25	LS	L9-E10	Levelling dump	STCRUC	used	R	40r		O	+	+	+			Fig 2:1
f76 P28	BDS	r90	25	LS	L9-E10	Levelling dump												missing
f76 P93	BNF	r90	25	LS	L9-E10	Levelling dump	Roman											
f76 P94	BNF	r90	25	LS	L9-E10	Levelling dump	Roman											?crucible
f76 P68	BND	r95	26	LS	M/L9-E10	Boundary wall	Roman											
f76 P13	BDN	t256	31	LS	L9-M10	i Pit F660	STCRUC	brass?	B			O	++	+++				
f76 P4/1	BDN	t256	31	LS	L9-M10	i Pit F660	LSCRUC p	used	B			OR	+	++	+			
f76 P4/2	BDN	t256	31	LS	L9-M10	i Pit F660	LSCRUC	leaded brass	B			IRO	+++	++	+++			
f76 P49	BRT	r103	32	LS	L9-E10	Demolition debris												missing
f76 P57	BRT	r103	32	LS	L9-E10	Destruction debris	STCRUC	brass?	R/L	80r		IO	++	+++				Fig 2:3
f76 P58	BRT	r103	32	LS	L9-E10	Destruction debris	STCRUC	brass?	B		+	O	++	+++				tong mark?
f76 P59	BRT	r103	32	LS	L9-E10	Destruction debris	STCRUC	silver	B	50m		IO	++	++	+		++	
f74 P465	BCL	r104	32	LS	E/M-M10	Dump	LSCRUC c	bronze/gunmetal	B			IOR	+++	++	++	+++		Fig 4:1
f76 P22	BCU	t19	32	LS	E/M-M10	ii Levelling dump	STCRUC	used	B			O	+	++	+			
f76 P1	BDG	t19	32	LS	E-M/L11	ii Levelling dump	STCRUC	used	B			O	+	++				
f76 P14	BDG	t19	32	LS	E-M/L11	ii Levelling dump	STCRUC	brass	Ba			IOR	++	+++				
f76 P15	BDG	t19	32	LS	E/M-M10	ii Levelling dump	STCRUC	used	B			O	+	+++	+			
f76 P5	BDG	t19	32	LS	E/M-M10	ii Levelling dump	LSCRUC c	bronze/gunmetal	Ba	54m	+	IOR	+++	+	+	+		Fig 4:2. inner layer. X-ray 8?, 1980
f76 P70	BDG	t19	32	LS	E/M-M10	ii Levelling dump	STCRUC	used	Ba			O	+	+++				
f76 P71	BRI	t19	32	LS	E/M-M10	ii Levelling dump	LSCRUC	used	B			IO	+	++				
f76 P8	BJL	t270	32	LS	E/M-L10	ii Pit F692	STCRUC	silver	B		+	O	++	+++	+		++	
f74 P126	B101	sp50	35	LS-SN	L10	iii-v Spit Road & dump	STCRUC											
f74 P154	B101	sp50	35	LS-SN	L10	iii-v Spit Road & dump												missing. ?crucible
f74 P155	B101	sp50	35	LS-SN	L10	iii-v Spit Road & dump	LSCRUC p	used										
f74 P124	H17	sp51	35	LS-SN	E/M10-E/M11	iii-v Spit Road & dump	STCRUC	silver	B			IO	+	+++			++	
f74 P162	B102	sp52	35	LS-SN	M10-E/M11	iii-vi Spit Road & dump												missing
f74 P196	F57	sp52	35	LS-SN	M10-E/M11	iii-vi Spit Road & dump												missing
f76 P39	BLG	r87	36	LS-SN	M/L9-E10	Str R3 Pit	STCRUC	silver	B		+	O	++	++	+		++	
f74 P119	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13												missing
f74 P195	E13	sp113	36	LS-SN	E/M-M/L11	v-vi Spit Pit F13	STCRUC	used	B			O	+	+++	+			

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P342/1	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	LSCRUC p	brass?	B			O	++	++	+			Fig 4:6
f74 P342/2	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	LSCRUC p	brass?	R	30r		IOR	++	+++				Fig 4:6
f74 P342/3	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	LSCRUC	brass?	B			IO	++	+++	+			Fig 4:6
f74 P202	BAZ	t267	36	LS-SN	E/M-L10	ii-iv Pit F694	STCRUC	used	B			OR	+	+++				
f74 P211	BAZ	t267	36	LS-SN	E/M-L10	ii-iv Pit F694	STCRUC	brass	R	30r		IO	++	+++				
f74 P339	BAZ	t267	36	LS-SN	E/M-L10	ii-iv Pit F694	STCRUC	silver	B		+	O	++	++	+		+++	
f74 P198	BCM	t268	36	LS-SN	E/M-L10	ii-iv Pit F675	STCRUC	leaded bronze /gunmetal	B			IRO	++	++	+++	+		
f76 P60	BCW	t270	36	LS-SN	E/M-L10	ii Pit F692	STCRUC	used	Ba		+	O	+	+++				
f76 P61	BCW	t270	36	LS-SN	E/M-L10	ii Pit F692	STCRUC	silver	B		+	O	++	++			++	
f76 P62/1	BCW	t270	36	LS-SN	E/M-L10	ii Pit F692	STCRUC	used	B		+	O	+	++				
f76 P62/2	BCW	t270	36	LS-SN	E/M-L10	ii Pit F692	STCRUC	used	B		+	O	+	++				
f76 P63	BCW	t270	36	LS-SN	E/M-L10	ii Pit F692	STCRUC	used	B		+		+	++	+			
f76 P69	BJQ	t270	36	LS-SN	E/M-L10	ii Pit F692	STCRUC	used	B		+	O		++				
f74 P50	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	STCRUC	used	B			OR	+	++	+			
f74 P51	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693												missing
f74 P52	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	LSCRUC p	brass	R	40r		IOR	+++	+++	++			Fig 4:11
f74 P555	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	STCRUC	used	B			O	+	+++				
f74 P64	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	STCRUC	used	Ba			IO	+	++	+			
f74 P66	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	STCRUC	silver	Ba			O	+	++			++	
f74 P69	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	STCRUC	silver	B			O	++	+++			++	
f74 P437	BAA	t282	36	LS-SN	L11-E12	v Pit F671	STCRUC	used	B			O	+	+++	+			
f76 P31	BDA	t289	36	LS-SN	E-M/L11	vi Pit F675	STCRUC	used	R	30r		IOR	+	+++	+			Fig 2:29
f76 P36	BDD	t289	36	LS-SN	E-M/L11	vi Pit F675	STCRUC	used	R	40r		IO	+	+++				Fig 2:30
f74 P408	AXU	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass	L			O	+++	++	+			Fig 2:31
f74 P409	AXU	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	used?	Ba			IO	+	+	++			
f74 P410	AXU	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	used	B			OR	++	+++	+			
f74 P411	AXU	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass?	B			O	++	++	+			
f74 P61	AXU	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass	B			OR	+++	++	++			
f74 P237	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass	B		+?	IO	+++	++	++			
f74 P238	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass?	L			IOR	++	++	+			
f74 P239	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass?	B			IROR	++	+++	++			
f74 P240	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	LSCRUC p	used										Fig 4:14
f74 P315	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass	B			IOR	+++	++	+			
f74 P316	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674												missing
f74 P35/1	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass?	B			IOR	++	++	++			
f74 P35/2	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	used	B			IOR	+	++				

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P40	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	brass?	B			O	++	+++	+			
f74 P43	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	LSCRUC p	used										
f74 P531	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC											
f76 P6	BDB	t290	36	LS-SN	E-M/L11	vi Pit F674	STCRUC	used	R/L			O	+	++	+			
f74 P297	ASH	t297	36	LS-SN	E/M12-E13	vii Pit F699	STCRUC	silver	Ba			OR	+	++	+		++	
f74 P425	ASK	t302	36	LS-SN	M/L9-L10	vii Pit F698												?crucible or mould
f74 P229	ASE	t310	36	LS-SN	L10-M/L11	vii Levelling dump	STCRUC	silver	Ba			IOR	+	+++			++	
f74 P230	ASE	t310	36	LS-SN	L10-M/L11	vii Pits F696-8	STCRUC	brass?	B			IO	++	++				
f74 P284	APQ	t66	36	LS-SN	L11-E12	v-vi Str R3 Robbing	STCRUC	silver	B			IO	++	++	+		+	
f74 P298	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 Robbing	STCRUC	silver	B			O	+	++			++	
f74 P38	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 Robbing	STCRUC	silver	Ba		+	O	++	++	+		++	
f74 P435	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 Robbing	STCRUC	used	B		+			+++				
f74 P249	J9	sp22	38	LS	E/M-M10	ii-iii Spit Dump												missing ?crucible or mould
f74 P452	J9	sp22	38	LS	E/M-M10	ii-iii Spit Dump	STCRUC	used	B		+		+	++	+			
f74 P455	J9	sp22	38	LS	E/M-M10	ii-iii Spit Dump	STCRUC	silver	B		+			+++			+	
f74 P460	J9	sp22	38	LS	E/M-M10	ii-iii Spit Dump	LSCRUC p	used	B			O	+	+++	+			
f74 P130	E50	sp35	38	LS	L10-E/M11	iii Spit Occupation	STCRUC	silver	B		+	IO	++	+++	+		++	
f74 P145	E50	sp35	38	LS	L10-E/M11	iii Spit Occupation	STCRUC	used	B			O	+	++	+			
f74 P121	E52	sp35	38	LS	L10-E/M11	iii Spit Occupation	STCRUC	used	B			0	+	+++				
f74 P148	E70	sp35	38	LS	L10-E/M11	iii Spit Occupation												missing ?crucible
f74 P186	F50	sp36	38	LS	M10-E/M11	iii Spit Dump & occupation	STCRUC	used	B			O	+	+++				
f74 P187	F50	sp36	38	LS	M10-E/M11	iii Spit Dump & occupation	STCRUC	brass?	Ba			O	++	+++				
f74 P188	F51	sp36	38	LS	M10-E/M11	iii Spit Dump & occupation	STCRUC	brass?	R			O	++	+++	+			
f74 P441	F52	sp36	38	LS	L10-E/M11	iii Spit Dump & occupation												missing ?crucible or mould
f74 P207	J12	sp37	38	LS	M-L10	ii-ii Spit Dump & occupation	STCRUC	silver	B			IOR	+++	++	+++		+	
f74 P340	J12	sp37	38	LS	M-L10	ii-iii Spit Dump & occupation	LSCRUC p	used	B			O		++	+			
f74 P216	H10	sp88	38	LS	L10-M/L11	iii Spit Occupation	STCRUC	used	B			OR	+	+++				
f74 P506	H10	sp88	38	LS	L10-M/L11	iii Spit Occupation												missing
f74 P537	H11	sp88	38	LS	L10-M/L11	iii Spit Occupation	STCRUC											
f74 P333	H12	sp88	38	LS	L10-M/L11	iii Spit Occupation												missing
f74 P353	H12	sp88	38	LS	L10-M/L11	iii Spit Occupation	LSCRUC p	leaded brass	R	30r		IR	++	+++	+++			Fig 4:16

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P561	H12	sp88	38	LS	L10-M/L11	iii Spit Occupation	STCRUC	used	B				+	++				
f74 P473	H51	sp88	38	LS	L10-M/L11	iii Spit Occupation	STCRUC	used	B			O	+	++	+			
f74 P204	G70	sp9	41	LS	L9-M10	iii Spit Dump												missing ?crucible
f74 P208	G87	sp3	42	LS	E/M-M10	ii-iii Spit Occupation	LSCRUC	used	B			IOR	+	+++				
f74 P163	E34	sp102	44	LS-SN	E-M/L11	v-vi Spit Dump												missing ?crucible
f74 P250	G54	sp111	44	LS-SN	E-E/M11	v Dump nr Str T18	STCRUC	used	B		+	IO	+	++				
f74 P146	E54	sp114	44	LS-SN	L11-E12	vi Spit Dump	STCRUC	brass?	L			IO	++	++				
f74 P197	F100	sp25	44	LS-SN	E/M-L10	iii-iv Spit Occupation & dump												missing
f74 P136	B100	sp44	44	LS-SN	L10	iii-v Spit Occupation	STCRUC	used	B			O	+	+++				
f74 P138	B100	sp44	44	LS-SN	L10	iii-v Spit Occupation												missing ?crucible
f74 P535	B100	sp44	44	LS-SN	L10	iii-v Spit Occupation	STCRUC?											
f74 P255	B103	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	LSCRUC p	brass?	B			IRO	++	+++	+			
f74 P128	B104	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	LSCRUC p	used	R	30r		IO	++	++				Fig 4:17
f74 P467	B104	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation												missing
f74 P139/1	B105	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	STCRUC	brass?	B			O	++	+++				
f74 P139/2	B105	sp48	44	LS-SN	E/M-M10	iii Spit Dump & occupation	STCRUC	used	B			O	+	++	+			
f74 P140	B105	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	STCRUC											Fig 2:28
f74 P534	B105	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	LSCRUC p											
f74 P143	B106	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	STCRUC	used	B			O	+	++				
f74 P439	F86	sp49	44	LS-SN	L10-E/M11	iii-v Spit Occupation	STCRUC	brass?	B			O	++	+++	+			
f74 P165	E94	sp65	44	LS-SN	E-E/M11	iv-v Spit Occupation												missing ?crucible
f74 P171	E94	sp65	44	LS-SN	E/M11	iv-v Spit Occupation	LSCRUC p	brass?	R	40r		IRO	+++	+++				Fig 4:12
f74 P185	E94	sp65	44	LS-SN	E/M11	iv-v Spit Occupation	STCRUC	used	R	60r?		OR	+	++	+			
f74 P446	E94	sp65	44	LS-SN	E-E/M11	iv-v Spit Occupation	STCRUC	brass?	B				++	+++				
f74 P201	F74	sp73	44	LS-SN	E-M/L11	iv-v Spit Occupation	STCRUC	silver	B			IOR	+	++			++	
f74 P192	F55	sp74	44	LS-SN	E-E/M11	iv-vi Spit Occupation	STCRUC	used	B			IO	+	++	+			
f74 P258	F14	sp76	44	LS-SN	E-M/L11	iv-vi Spit Dump & occupation	STCRUC	used	B			O	++	+	+			
f74 P177	F75	sp80	44	LS-SN	E-E/M11	iv-vi Spit Occupation	STCRUC	used	B			OR	+					
f74 P200	F75	sp80	44	LS-SN	E-E/M11	iv-vi Spit Occupation	STCRUC	used	R	40r		IOR	+	+++				Fig 2:11
f74 P476	B98	sp83	44	LS-SN	L10-M/L11	iii-vi Spit Occupation & dump	LSCRUC p	used	R			IO	+	+++				
f74 P461	B93	sp84	44	LS-SN	L10-M/L11	iv-vi Spit Occupation												missing
f74 P443	F16	sp95	44	LS-SN	E-M/L11	v-vi Spit Occupation	STCRUC	brass?	R	30r		O	++	+++	+			
f74 P79	C8	sp115	45	LS-SN	M/L9-M/L11	vi Spit Dump	STCRUC	used	B			IROR	+	+	+			
f74 P557	F49	sp13	45	LS-SN	L10	iii-iv Spit Dump	STCRUC	silver	B			O	+	+++			++	

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P256	F4	sp16	45	LS-SN	L10-E/M11	ii-iv Spit Dump	STCRUC	silver	B		+	O	+	++			++	
f74 P341	F4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B			O	+	++				
f74 P444	F4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump												missing
f74 P445	F4	sp16	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B	80m		O	+	++				
f74 P560	F4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	R			O	+	+++				
f74 P257/1	F5	sp16	45	LS-SN	L10-E/M11	ii-iv Spit Dump	STCRUC	used	B			O	+	+++				
f74 P257/2	F5	sp16	45	LS-SN	L10-E/M11	ii-iv Spit Dump	STCRUC	used	B			OR		++				
f74 P257/3	F5	sp16	45	LS-SN	L10-E/M11	ii-iv Spit Dump	STCRUC	used	B			IR	+	++				
f74 P334	F5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC											
f74 P423	F5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B			O		+				
f74 P83	F5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B		+	O	+	++				
f74 P179	G28	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	brass?	B			O	++	++				
f74 P558	G28	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	B			O	+	+++	+		++	
f74 P117	G4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	brass?	B		+	O	++	++				
f74 P347	G4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	B		+	OR	++	++	+		+++	
f74 P516	G4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC											
f74 P93	G4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	R	40r	+	O	+	++			+	Fig 3:16
f74 P98	G4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump												missing ?crucible
f74 P176	G48	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump												missing
f74 P178	G48	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	R	30r		IO		++				
f74 P418	G48	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	brass?	Ba		+	O	++	+++				
f74 P105	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	R	40r		IO	++	++			++	Fig 2:8
f74 P344/1	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	brass?	B		+	I	++	+++	+			
f74 P344/2	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	Ba			IO	++	+++	+		+++	
f74 P348	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	B			OR	+	+++			++	
f74 P349/1	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B			O	+	++	+			
f74 P349/2	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	B		+	O	+	++			++	
f74 P349/3	G5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B		+	O	++	++	+			
f74 P343	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	Ba			IO	+	+++			+	
f74 P345/1	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B			O	+	++				
f74 P345/2	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	Ba		+	O	+	+++			++	
f74 P345/3	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	Ba			IO	+	++				
f74 P346	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	B		+	IO	++	++	+		+	
f74 P532/1	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC											
f74 P532/2	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC											
f74 P92	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B		+	O	+	+++				

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P99	G6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	R	40r			+	+++	+		+	Fig 2:9
f74 P106	H4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	R/L	50r 90m		IO		++			+++	Fig 2:4
f74 P246	H4	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump												missing
f74 P559	H5	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B			O	+	++				
f74 P120	H6	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	silver	Ba		+	IO	+	++	++		++	
f74 P101	H8	sp16	45	LS	E/M10-M/L11	ii-vi Dump	LSCRUC p	brass?	R	30r		IRO	++	+++	+			
f74 P355	H8	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	STCRUC	used	B			O	+	++				
f74 P504	G29	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump												?crucible or mould
f74 P100	H9	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump	LSCRUC p											copper alloy?
f74 P104	H9	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump	STCRUC	silver	B			IOR	++	+	+		++	
f74 P338	H9	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump												missing
f74 P463	H9	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump												missing ?crucible
f74 P451	D25	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B			O	+	++				
f74 P159/1	D26	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	B		+	IRO	++	+			+	
f74 P159/2	D26	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	B			IO	++	+++			++	
f74 P132	D47	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B	50m		IO	+	++				
f74 P164	D67	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	B			O	+	++			+	
f74 P169	E27	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B			IO	+	++				
f74 P364/1	E4	sp20	45	LS-SN	E/M-M/L11	ii-vi Spit Dump	STCRUC	silver	B			IO	++	+++	+		+	
f74 P364/2	E4	sp20	45	LS-SN	E/M-M/L11	ii-vi Spit Dump	STCRUC	silver	B			IOR	++	+++	+		+++	
f74 P365	E4	sp20	45	LS-SN	E/M-M/L11	ii-vi Spit Dump	STCRUC	silver	B		+	O	++	++			+++	
f74 P86	E4	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	R	30r		O	+	++			+	Fig 2:2
f74 P182	E46	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	Ba			IO	++	++	++		++	
f74 P180	E47	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	LSCRUC c	bronze/gunmetal	B		+	IRO	++	++	++	+		
f74 P357/1	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B			OR	+	+++	+			
f74 P357/2	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	B			O	++	++			++	
f74 P358	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	silver	R	40r				++			+	Fig 2:7
f74 P450	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump												missing
f74 P458	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump												missing
f74 P556	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B			O	+	+				
f74 P82	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	R	30r		IO	+	++				Fig 2:5
f74 P91	E6	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	STCRUC	used	B			O	+	++				
f74 P209/1	G10	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	STCRUC	leaded brass				IROR	+++	+++	+++			
f74 P209/2	G10	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC p	brass?	B			OR	++	+++				

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P209/3	G10	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC p	used	R	40r		IO	++	+				
f74 P103	G12	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC p											Fig 4:3
f74 P350	G12	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC p	used	R	60r		IO	++	++				Fig 4:5
f74 P480	G12	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC	leaded brass	R	40r	+	IOR	+++	++	+++			Fig 4:15
f74 P95	G12	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC p	used	R	30r		IROR	++	++				Fig 4:7
f74 P122	G31	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC p	leaded brass	R	50r		IROR	++	+++	+++			
f74 P203	G51	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	STCRUC	brass?	B			O	+	+++				
f74 P213	H32	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	EMED											
f74 P102	D29	sp60	45	LS-SN	L10-M/L11	v Spit Occupation	STCRUC	used	B			OR	+	++	+			
f74 P123	E72	sp66	45	LS-SN	E-E/M11	iv-v Spit Occupation/ dump/occupation	STCRUC	silver	B			IOR	+	++	+		+	
f74 P127	F31	sp67	45	LS-SN	E-E/M11	iv-v Spit Dump & occupation	STCRUC	used	B			O	+	++	+			
f74 P153	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	silver	R	30r 60m		IO	++	++	++		++	Fig 2:22
f74 P168	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	silver	R	30r		IOR	+++	++	++		++	
f74 P170	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	silver	R	30r 50m		IO	++	+++	+		+	Fig 2:20
f74 P175	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	silver	R	30r 50m		IOR	+	+++	+		+	Fig 2:21
f74 P356	E28	sp68	45	LS-SN	E/M-M/L11	iv-v Spit Dump	STCRUC	brass	Ba			IO	+++	+++	++			
f74 P161	F28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	brass?	R/L			IO	++	+++	++			Fig 2:12
f74 P362	F28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	brass	R	40r		IROR	+++	+++	+			Fig 2:17
f74 P361	E8	sp69	45	LS-SN	E/M-M/L11	iv-v Spit Dump & pit	STCRUC	used	B			IO	+	++	+			
f74 P457	E8	sp69	45	LS-SN	E/M-M/L11	iv-v Spit Dump & pit	STCRUC	silver	B				+	+	+		+	
f74 P81	E8	sp69	45	LS-SN	E/M-M/L11	iv-v Spit Dump & pit	STCRUC	brass	B			IO	+++	+++	++			
f74 P90	E8	sp69	45	LS-SN	E/M-M/L11	iv-v Spit Dump & pit	STCRUC	brass	R	30r		IROR	++	+++	+			Fig 2:10
f74 P131	E49	sp70	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	brass?	B			IO	++	++	+			
f74 P114	E29	sp71	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	used	B			O	+	+++	+			
f74 P111	F29	sp71	45	LS-SN	L10-M/L11	iv-v Spit Dump	STCRUC	silver	B			IO	+	+++	+		++	
f74 P84	C6	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	brass?	B			O	++	++	+			
f74 P359	C7	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	brass	R/L			IO	+++	+++	++			
f74 P360/1	C7	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	brass	Ba	50b		IOR	+++	++	+			
f74 P360/2	C7	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	leaded brass	B			IOR	+++	++	+++			
f74 P80	C7	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	used	R/L		+	O	+	+++				
f74 P113	D28	sp85	45	LS-SN	L10-M/L11	ii-vi Spit Dump	STCRUC	brass?	B			IO	++	+++	++			
f74 P87	D5	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	used	B			IO	+	++				
f74 P76/1	D8	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	used	Ba			IRO	+	++	++			

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P76/2	D8	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	brass	Ba			IROR	+++	+++				
f74 P88	D8	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	STCRUC	brass	Ba			IOR	+++	++				
f74 P456	E10	sp86	45	LS-SN	L10-M/L11	v-vi Spit Occupation & dump	STCRUC	silver	B			IOR	++	++	+		+++	
f74 P85	C4	sp87	45	LS-SN	E-M/L11	iv-vii Spit Dump	STCRUC	silver	B		+	O	+	++			+	
f74 P30	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	STCRUC	Cu/Pb?	R/L	70m			++	++	+++			Fig 2:32. copper alloy? re-used for lead
f74 P412	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	STCRUC	brass?	B		+	IOR	++	++	+			
f74 P413	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	STCRUC	used	R	40r		IO		+++				Fig 2:14
f74 P414	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	LSCRUC p	unused	B						+			
f74 P44	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	STCRUC	used	B			O	+	+++	+			
f74 P45	AVZ	t38	46	LS	E/M10-M/L11	iv Levelling dump	STCRUC	used	B			OR	+	++	+			
f74 P489	AVZ	t38	46	LS	E/M-M10	vi Levelling dump	STCRUC	used	Ba	70m			+	+++	+			
f74 P354	F11	sp59	52	SN	E-M/L11	vi Spit Dump betw Str T13 & T17	STCRUC	silver	B			IO	+++	+++	+		+	
f74 P160	F32	sp59	52	SN	E-M/L11	v Spit Dump	STCRUC	used	B			OR	+	+++	+			
f74 P304	AUT	t51	52	SN	E/M-M/L11	v Levelling dump	STCRUC	brass	L			IO	+++	+++	+			
f74 P232	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	used	B			IOR	+	+++				
f74 P233	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	brass	B			IROR	+++	++				
f74 P234	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	LSCRUC	brass	B			O	++	++				?cementation or mould
f74 P260	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	brass	R	40r		IROR	+++	+++	+			Fig 2:13
f74 P351	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	Ba		+	O	+	+++			++	
f74 P352/1	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	B			OR	++	+++	+		+++	
f74 P352/2	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	B			IOR	++	+++	+		+++	
f74 P367/1	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	B			OR	+	+++	++		++	
f74 P367/2	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	B			O	++	++	+		++	
f74 P530	AVI	t193	53	SN	E-M/L11	iv-v Dumps	STCRUC											
f74 P552	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	used	B						++			
f74 P553	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	used	B				+		++			
f74 P554	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	used	B			O	+	++				
f74 P58	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	B	60m		IOR	+++	++			++	
f74 P65	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	brass	Ba	50m		IO	+++	+++	+			
f74 P67	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	STCRUC	silver	Ba			IOR	++	++			++	
f74 P306	AUF	t53	53	SN	E-M/L11	v Str T17 Floor	STCRUC	brass	L			IOR	+++	+++	+			
f74 P21	ART	t68	58	SN	L11-E12	vi Levelling dump												missing ?crucible

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P228	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	used	R	30r 60m		IOR		++				Fig 3:25
f74 P293	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass?	R	30r		O	++	+++	+			
f74 P371/1	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass	B			IOR	+++	++	+			
f74 P371/2	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass?	B		+	IO	++	+++	+			
f74 P371/3	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass?	B	60m		IROR	++	+++	+			
f74 P372	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass?	R/L			IROR	++	+++	+			Fig 3:15
f74 P373/1	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass	B			O	+++	+++	++			
f74 P373/2	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass	B			O	+++	++	++			
f74 P373/3	ART	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass?	B			O	++	+++	+			
f74 P301	ATM	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass	B			IOR	+++	++	++			
f74 P302	ATM	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	brass?	Ba			O	++	++	++			
f74 P235	AZX	t68	58	SN	L11-E12	vi Levelling dump												missing
f74 P236	AZX	t68	58	SN	L11-E12	vi Levelling dump	STCRUC	silver	B			OR	++	+++			++	
f74 P55	AXA	t70	59	SN	E-M/L11	vi Str T20	STCRUC	used	Ba	80m?		O	+	++	+			
f74 P39	AXN	t70	59	SN	E-M/L11	vi Str T20	LSCRUC p	silver	B			O	++	++	+		++	Fig 4:3
f74 P22	AUV	t71	59	SN	E-M/L11	vi Str T20 Floor	LSCRUC p	brass	R	70r		IOR	+++	+++	++			Fig 4:8
f74 P370/1	AUV	t71	59	SN	E-M/L11	vi Str T20 Floor	STCRUC	brass	B			O	+++	+++	+			
f74 P370/2	AUV	t71	59	SN	E-M/L11	vi Str T20 Floor	STCRUC	brass	B			IO	+++	+++	++			
f74 P370/3	AUV	t71	59	SN	E-M/L11	vi Str T20 Floor	STCRUC	silver	Ba			IO	+++	++	++		+++	
f74 P41	AXW	t71	59	SN	E-M/L11	vi Str T20 Floor	STCRUC	brass	B	80m		O	+++	++				
f74 P327	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass?	R/L	30r 50m		IROR	++	+++	+			Fig 2:19
f74 P328	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R			IROR	+++	+++	++			Fig 2:25
f74 P329/1	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	B			IROR	+++	+++	++			Fig 2:34
f74 P329/2	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R	30r		IROR	+++	+++	+			Fig 2:34
f74 P330/1	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	LSCRUC	copper?	B			O	++					mould?
f74 P330/2	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	LSCRUC	brass?	B			OR	++	++	+			mould?
f74 P431	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R/L			IO	+++	+++	++			
f74 P481	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R	60m		IROR	+++	++	++			Fig 2:24
f74 P482	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R	40r		IOR	+++	+++	++			Fig 2:23
f74 P483	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass?	R	30r		IO	++	+++				Fig 2:16
f74 P484/1	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R	30r 50m		IO	+++	++	+			Fig 2:27
f74 P484/2	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	B			IO	+++	++	++			Fig 2:27
f74 P485/1	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R	30r		IROR	+++	+++	++			Fig 2:26
f74 P485/2	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	B			IOR	+++	+++	++			Fig 2:26

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P486/1	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	LSCRUC p	brass	B		+?	IRO	+++	+++	++			
f74 P486/2	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	LSCRUC p	brass	B			IROR	+++	++	++			
f74 P487/1	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	B			IO	+++	+++	++			
f74 P487/2	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	Ba			IO	+++	+++	+			
f74 P487/3	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	B			IO	+++	+++	+			
f74 P487/4	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	B			IO	+++	+++	+			
f74 P488	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R/L	40r		IROR	+++	+++	++			Fig 2:18
f74 P70	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	STCRUC	brass	R/L			IOR	+++	++	++			
f74 P26	AUX	t77	60	SN	L10-M/L11	vi External surface assoc Str T21	STCRUC	brass	R	40r 80m		IROR	+++	++	+			Fig 2:33
f74 P54	AUX	t77	60	SN	L10-M/L11	vi External surface assoc with Str T21												missing
f72 P50	AIB	t81	63	SN	L11-E12	vii Levelling dump												?missing. cf P21
f74 P219	AJP	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	silver	B			IOR	++	++			+++	
f74 P268	AJP	t81	63	SN	L11-E12	vii Levelling dump	LSCRUC p	used	R	40r		O	+	+++				
f72 P51/1	AJP	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			O	+	++				
f72 P51/2	AJP	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			IOR	+	++				
f72 P55	AJP	t81	63	SN	L11-E12	vii Levelling dump												missing
f74 P14	AOK	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R	30r 60m		IOR	++	+++	+			Fig 3:28
f74 P369	AOK	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B	70m		IROR	+++	+++	++			
f74 P11	AOM	t81	63	SN	L11-E12	viii Levelling dump	STCRUC	brass?	B			IROR	++	+++	++			Fig 3:23
f74 P279	AOM	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			IRO	+	++	+			
f74 P12	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R			IROR	++	+++	+			
f74 P15/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IOR	++	+++	++			
f74 P15/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IRO	+++	++	++			
f74 P17	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	R	30r		O	++	++	+			Fig 3:6
f74 P19	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	Ba			IO	++	+++	+			
f74 P220	AON	t81	63	SN	L11-E12	vii Levelling dump												missing
f74 P221	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R	30r 70m		IOR	++	++	+			Fig 3:7
f74 P222	AON	t81	63	SN	L11-E12	vii Levelling dump												missing
f74 P223	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R/L			IO	+++	++	++			Fig 3:8
f74 P224	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			IO	+	++				
f74 P225	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	L			IO	+++	+++	+			
f74 P23/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R	30r		IOR	+++	+++	+			Fig 2:35
f74 P23/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IROR	+++	++	+			Fig 2:35

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P23/3	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IROR	++	++				Fig 2:35
f74 P23/4	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	Ba			O	+++	++	++			Fig 2:35
f74 P25	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R			IO	++	++	+			
f74 P271	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			O	++	++	+			
f74 P272	AON	t81	63	SN	L11-E12	vii Levelling dump	LSCRUC p	used	R/L			OR	+	+++	+			Fig 4:4
f74 P273	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R			OR	++	+++	+			
f74 P274	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			IOR	+	+++	+			
f74 P275	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B		+?	IO	+++	+++	++			
f74 P276/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IO	+++	+++	++			
f74 P276/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IO	++	+++	++			
f74 P28	AON	t81	63	SN	L11-E12	vii Levelling dump												missing ?crucible
f74 P29	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R/L			IOR	+++	+++	++			Fig 3:1
f74 P3	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R	40r		IROR	+++	+++	++			
f74 P37	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			O	++	++				
f74 P374	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			OR	++	++	+			
f74 P375	AON	t81	63	SN	L11-E12	vii Levelling dump												
f74 P376	AON	t81	63	SN	L11-E12	vii Levelling dump												missing
f74 P377	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	R			IO	+	++				
f74 P378	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B		+	I	+	++				
f74 P379/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IROR	+++	++	+++			
f74 P379/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			OR	+++	+++	++			
f74 P380	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R	30r		IOR	+++	+++	++			Fig 3:22
f74 P381/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B		+?	IROR	+++	+++	++			
f74 P381/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B		+?	IOR	+++	++	++			
f74 P382	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IRO	+++	++	+++			
f74 P383	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	Ba			OR	+	+++				
f74 P384/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			OR	++	+++	++			
f74 P384/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			OR	++	+++				
f74 P384/3	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			OR	+	+++	+			
f74 P385	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B			O	+	+++	+			
f74 P386/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IO	++	+++	+			
f74 P386/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IOR	++	++				
f74 P387	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R	30r		IROR	+++	+++	+			Fig 3:12
f74 P388	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	R			O	+	++	+			
f74 P389	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IO	+++	+++	++			
f74 P390	AON	t81	63	SN	L11-E12	vii Levelling dump												missing
f74 P391	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	leaded brass	R/L	50m		IROR	+++	++	+++			Fig 3:21

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P392	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R/L			IOR	+++	+++	+			Fig 3:9
f74 P393	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R			IOR	++	+++	+			Fig 3:5
f74 P394	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	R	30r		O	+	+++	+			
f74 P395	AON	t81	63	SN	L11-E12	vii Levelling dump	LSCRUC p	brass?	R			OR	++	+++	++			Fig 4:13
f74 P396	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R/L			IO	++	+++	+			
f74 P397	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	leaded brass	B			IRO	+++	+++	+++			
f74 P398	AON	t81	63	SN	L11-E12	vii Levelling dump	LSCRUC p	brass	R			OR	+++	++	++			
f74 P399	AON	t81	63	SN	L11-E12	vii Levelling dump	LSCRUC	brass?	B			OR	++	++	+			or mould
f74 P4/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IROR	++	+++	++			
f74 P4/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			O	+++	+++	+			
f74 P400/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			O	++	++				
f74 P400/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			OR	++	++	+			
f74 P401	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	unused?	R			IOR						
f74 P402	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R/L			OR	++	+++	+			
f74 P403	AON	t81	63	SN	L11-E12	vii Levelling dump	LSCRUC p	used	R	30r		O	+	++	+			Fig 4:10. PWR
f74 P404/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			OR	+++	+++	++			
f74 P404/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IRO	+++	++	++			
f74 P405/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B	80m		IO	+	++	+			
f74 P405/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IRO	++	++	+			
f74 P405/3	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IO	+++	++	+			
f74 P405/4	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	silver	B			O	++	++	++		+++	
f74 P420	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	bronze/gunmetal	L	50m		IOR	+	+++	+	+		Fig 3:11
f74 P432/1	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	L			IO	+++	++	+			
f74 P432/2	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IO	+++	++	++			
f74 P468	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	bronze/gunmetal	R			IROR	+++	+++	+	+		Fig 3:10
f74 P48	AON	t81	63	SN	L11-E12	viii Levelling dump	STCRUC	bronze/gunmetal		40m		IOR	+++	+++	+++	+		Fig 3:3
f74 P494	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IROR	++	+++	+			
f74 P495	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R			O	++	+++	+			
f74 P5	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IROR	++	+++				Fig 3:4
f74 P53	AON	t81	63	SN	L11-E12	vii Levelling dump												missing
f74 P540	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC											
f74 P541	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC											
f74 P59	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	R	30r		IRO	+	+++	+			Fig 2:36
f74 P7	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	B			IOR	+++	+++	++			
f74 P73	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R			IO	+++	++	++			Fig 3:2
f74 P8	AON	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R/L			IROR	+++	+++	++			

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P287	AQQ	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B		+	O	+		+			part of f74 P290
f74 P226	ARG	t81	63	SN	L11-E12	vi Levelling dump	STCRUC	used	B			OR		++				
f74 P289/1	ARG	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IO	++	+++	+			
f74 P289/2	ARG	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	used	B				++	++	+			
f74 P290	ARH	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B		+	O	++	++				part of f74 P287
f74 P295	ARS	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	silver	B			O	++	+++	+		++	
f74 P42	ARS	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R	40r 60m		IOR	+++	+++	++			Fig 3:24
f74 P407	ARW	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	Ba			IROR	++	+++	++			
f74 P490	ARW	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IO	++	++	++			
f74 P60	ARW	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	R	40r		IRO	++	+++	+			Fig 3:14
f74 P63	ARW	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			IOR	++	++				
f74 P20	ARZ	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	Ba			OR	++	+++	+			
f74 P539	ATS	t81	63	SN	L11-E12	vii Levelling dump	STCRUC											
f74 P31	AUI	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass	R	30r		IO	+++	+++	++			Fig 3:26
f74 P18	AVT	t81	63	SN	L11-E12	vii Levelling dump	STCRUC	brass?	B			O	++	+++	+			
f74 P49	ARX	t87	66	SN	E/M11-E12	vii Str T24	STCRUC	brass?	Ba			IROR	++	++	+			
f74 P36	AVL	t87	66	SN	E/M11-E12	vii Str T24												missing ?crucible
f74 P551	AOU	t88	66	SN	E/M-M12	vii Str T24 Floor	STCRUC	used	B				+	+	++			
f74 P6	AOU	t88	66	SN	E/M-M12	vii Str T24 Floor	STCRUC	brass?	R	30r		IROR	++	+++	+			Fig 3:29
f74 P231	AVF	t88	66	SN	E/M-M12	vii Str T24 Floor	STCRUC	used	B			IO	+	++	+			
f74 P469	AVF	t88	66	SN	E/M-M12	vii Str T24 Floor	Roman											reused NVCC beaker
f74 P24	AVG	t88	66	SN	E/M-M12	vii Str T24 Floor	STCRUC	used	R/L			IOR	+	++	+			Fig 3:13
f74 P27	AVG	t88	66	SN	E/M-M12	vii Str T24 Floor	STCRUC	brass	R/L			IROR	+++	++	++			
f72 P19	AGQ	t89	66	SN	E11-M12	vii-viii Occn/makeup assoc Str T24 & T30	STCRUC	used	B			IO	+	++				
f72 P72	AMJ	t91	67	SN	L11-M12	vii Str T25 Floor	STCRUC	brass?	R	30r		IROR	++	+++	+			Fig 3:17
f74 P308	AUL	t299	70	SN	E-M/L11	vii Pit F707	STCRUC	brass?	B			O	++	++	+			
f72 P32/1	AAA	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	brass?	R			IROR	++	++	++			
f72 P32/2	AAA	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	brass?	B			OR	++	++	++			
f72 P15/1	AGG	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	used	B			IROR	+	++				
f72 P15/2	AGG	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	brass?	B			O	++	++				
f72 P49	AGG	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	brass?	B			IOR	++	++	+			
f74 P13/1	AIO	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	used	B			O	+	+++	+			

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f74 P13/2	AIO	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	brass	R			IROR	+++	+++	++			
f74 P217	AIO	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	used	R			IOR		+++				Fig 3:27
f74 P218	AIO	t99	71	EM	L11-E12	vii Levelling dump	STCRUC	used	R	40r		OR	+	++				Fig 3:18
f74 P264	AIO	t99	71	EM	L11-E12	viii Levelling dump												missing
f74 P265	AIP	t99	71	EM	L11-E12	viii Levelling dump	STCRUC	brass?	Ba			IO	++	+++	+			
f74 P280	AOS	t102	72	EM	E/M12-E/M13	viii Str T27 Hearth	STCRUC	used	B			OR	+	++	+			
f74 P433	AKP	t160	72	EM	E/M-M12	viii Dump assoc Str T27/28	STCRUC	used	R	70r	+	O	+	++				Fig 3:19
f72 P29	ACV	t107	75	EM	E/M12-E13	viii Str T30	STCRUC	brass?	R	60r		IROR	++	++				
f74 P331	AOJ	t113	78	EM	E/M12-M12	ix Str T33	STCRUC	used	B			I	+	++	++			
f72 P89	AHO	t120	80	EM	E/M-M12	ix Pit F712 E of Str T35	STCRUC	used	B			O	+	+++				
f72 AE315	ABP	t121	82	EM	M/L12-E/M13	xi Pit F734												
f72 P31	ABW	t121	82	EM	M/L12-E/M13	x Levelling dump	LSCRUC											?crucible or mould
f72 P13	AFK	t121	82	EM	M/L12-E/M13	x Levelling dump	STCRUC	used	B		+	O	+	++	+			
f72 P16	AGM	t125	83	EM	E/M-M/L12	x Str T36	STCRUC	brass?	B			IOR	++	++	+			
f72 P26	ACM	t156	85	EM	E/M-M12	x-xi Dumps assoc Str T38 & T42/43	STCRUC	used	R	60r		IOR	+	++	+			Fig 3:30
f72 P27	ACM	t156	85	EM	E/M-M12	x-xi Dumps assoc with Str T38 & T42/43	LSCRUC p											?crucible or mould, textile impression
f72 P21	AJH	t156	85	EM	E/M-M12	x-xi Dumps assoc Str T38 & T42/43	STCRUC	brass	B		+?	IOR	+++	++	++			
f72 P70	MC	t122	90	EM	E/M-M/L12	xi Levelling dump	STCRUC	brass?	B	90m?		IO	++	++	+			
f74 P475/1	AEJ	t240	95	EM	E/M-M12	xi Pit F729	LSCRUC p	unused?	R				+	+	+			
f74 P475/2	AEJ	t240	95	EM	E/M-M12	xi Pit F729		used										missing
f72 P84	AEJ	t240	95	EM	E/M-M12	xi Pit F729	STCRUC											
f72 P58	IH	t246	95	EM	M12-E13	xi Pit F735	STCRUC	used	R	30r 70m		IOR	+	++	+			Fig 3:33. tong marks?
f72 P59	IH	t246	95	EM	M12-E13	xi Pit F735	STCRUC	used	Ba			IO	+	++	+			
f72 P38/1	WP	t153	100	EM	M-M/L12	xii Pit F16	STCRUC	used										Fig 3:34
f72 P44	WP	t153	100	EM	M-M/L12	xii Pit F16												missing
f72 P38/2	YE	t248	100	EM	M/L12-E13	xii Pit F737	STCRUC	used	R	80r	+	OR		++				Fig 3:34
f72 P12	DQ	t124	101	EM	M/L12-E13	xiii Levelling dump	STCRUC	used	B		+	O	+	+				
f72 P35	YZ	t143	105	EM	E/M12-E/M13	xii Dump assoc Str T46 & T51	STCRUC	silver	B		+	O	+	++	+		+	
f72 P36	YZ	t143	105	EM	E/M12-E/M13	xii Dump assoc Str T46 & T51	STCRUC	brass?	B			IOR	++	++	+			
f72 P46/1	YZ	t143	105	EM	E/M12-E/M13	xii Dump assoc Str T46 & T51	STCRUC	used	Ba		+	OR			+			Fig 3:35
f72 P46/2	YZ	t143	105	EM	E/M12-E/M13	xii Dump assoc Str T46 & T51	STCRUC	used	R	120m	+	IOR		+				Fig 3:35

Table 10: Catalogue of metal-melting crucible sherds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Diam	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
f72 P48	YZ	t143	105	EM	E/M12-E/M13	xii Dump assoc Str T46 & T51	STCRUC	brass	R	40r		IROR	+++	++	++			Fig 3:32
f72 P69	YZ	t143	105	EM	E/M-M/L12	xii Dump assoc Str T46 & T51	STCRUC	brass?	R	50r		IO	++	+++	++			Fig 3:31
f72 P42	XG	t149	105	EM	E/M12-E/M13	xiii Str T51	STCRUC	used	B			O		+				
f72 P41	XU	t149	105	EM	E/M12-E/M13	xiii Str T51	STCRUC	used	B			O	+	+++	+			
f72 P34	ZM	t149	105	EM	E/M12-E/M13	xiii Str T51	STCRUC	brass	B			IO	+++	++	++			
f72 P63	BE	s1	108	EM-HM	M15-M/L16	Levelling dump	STCRUC	brass	R	40r		IROR	+++	+++	++			
f72 P64	BE	s1	108	EM-HM	M15-M/L16	Levelling dump	STCRUC	used	B			IROR	+	+++	+			
f72 P65	BE	s1	108	EM-HM	M15-M/L16	Levelling dump	STCRUC	brass?	R			IROR	++	++	+			
f72 P88	YC	s20	112	EM-HM	E/M12-E/M13	Bldg Aii Construction layer	STCRUC											
f74 P267	AIV	s37	113	EM-HM	E13-M14	Bldg A Pit F54	MED	unused										
f72 P57	KP	s88	125	LM	L13-M15	Path E of Bldg Aii	STCRUC	used	B		+	O	+	++	+			
f72 P56	KG	s134	127	LM	M15-M/L16	Bldg Aii Robbing F92	STCRUC	unused?	B			O						
f72 P73	AG	s146	136	LM-PM	E-M16	Pit F125												missing ?crucible
f72 P81	AG	s146	136	LM-PM	E-M16	Pit F125	LMED/ PMED											
f74 P76	FH	s141	137	PM	E-M/L16	Levelling	PMED											?crucible
f72 P66	AZ	s103	142	PM	L13-M14	Backfill of kiln F126	STCRUC	used	R/L		+	O		+				
f72 P67	AZ	s103	142	PM	L13-M14	Backfill of ?kiln F126												missing
f74 P421	+	-	-	-	-	Unstratified	STCRUC	brass	B			IROR	+++	++	+			
f74 P422	+	-	-	-	-	Unstratified	STCRUC	brass?	B			IROR	++	++	+			
f74 P426	+	-	-	-	-	Unstratified	STCRUC	brass?	B		+	O	++	++				
f74 P429	+	-	-	-	-	Unstratified	STCRUC	brass?	R	30r		IROR	++	++	+			
f74 P492	+	-	-	-	-	Unstratified	STCRUC											
f72 P71	+	-	-	-	-	Unstratified	STCRUC	brass?	B			IOR	++	++	++			
f76 P77	+	-	-	-	-	Unstratified	STCRUC	brass	B			IROR	+++	++	+			
f74 P263	AEW	999	N/A	-	-	Unphased	STCRUC	used	B			O	+	+++				

Table 11: Catalogue of metal-melting crucible sherds from Danes Terrace

Finds No	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Vit	Cu	Zn	Pb	Sn	Ag	Comments
Danes Terrace I																
DT78 P3	ACV	7	31	PM	16-E17	Str 15B.2 occupation	STCRUC									LS-EM
DT78 P4	ACV	7	31	PM	16-E17	Str 15B.2 occupation	STCRUC	used	R	O	+	+++				LS-EM
DT78 P2	ACP	14	34	PM	L17-18	Str 15B dump over robbing	STCRUC	used	B	O	+	++	+			LS-EM
DT74i P14	HW	145	39	MOD	18-19	Loam	LS/SNCRUC	used	B	O	+	+++				LS-EM
DT74i P20	HW	145	39	MOD	18-19	Loam	LMCRUC	bronze	B		+++		+	+++		Med-LM
DT74i P15	IE	147	39	MOD	19	Well construction	CRUC	used	R		+	+++				
DT74i P12	IA	105	40	MOD	18-19	Str 15A robbing	STCRUC	used	B		+	+++	+			LS-EM
DT74i P6	OZ	105	40	MOD	18-19	Str 15A robbing	STCRUC	unused?	R							LS-EM
DT74i P7	IN	154	41	MOD	[19]	Str 24 wall	STCRUC	unused?	B							LS-EM
DT74i P18	+	N/A				Unstratified	LMCRUC	brass?	R/L	O	++	+++	+			Med-LM
DT74i P3	+	N/A				Unstratified	LMCRUC	bronze	B	O	++	+		++		Med-LM
Danes Terrace II																
DT74ii P11	ZZ	243	52	EM-HM	13	Str 8.1 ?construction deposit	STCRUC	used	B	O	++	+				LS-EM
DT74ii P13	AAC	248	55	EM-HM	E/M13	Str 8.2 make-up dump	STCRUC	used	B	O	+	+++	+			LS-EM
DT74ii P12	ZW	249	55	EM-HM	E/M13	Str 8.2 ?construction deposit	STCRUC	brass?	B	O	++	+++				LS-EM
DT74ii P19	XH	187	58	LM	M14	Str 14 floor	STCRUC	used	B	O	+	+				LS-EM
DT74ii P18	ZK	261	60	LM	L14	Str 8.2 pit cutting robbing	STCRUC	unused?	R/L	O						LS-EM
DT74ii P14	BO	314	70	PM	1st 1/2 16	Str 18 robbing	STCRUC	used	R	O	+	+				LS-EM
DT74ii P17	US	269	72	PM	L15-E16	Str 16 wall foundations	EMCRUC	brass	R	RO	+++	++				LS-EM
DT74ii P20	KF	288	75	PM	E16	Passage between Str 16 & Str 19	EMCRUC	used	B		+	+	+			LS-EM
DT74ii P15	CI	328	79	PM	E-M16	Str 21 ?hearth	LMCRUC	bronze	Ba	I	++	+	++	+++		Med-LM graphitic
DT74ii P2	CI	328	79	PM	E-M16	Str 21 ?hearth	LMCRUC	used	Ba	O	+	+++	+++			Med-LM graphitic
DT74ii P29	DG	332	86	PM	M16-M17	Pit	CRUC	used?	B		+	+	+			LS-EM
DT74ii P10	DG	332	86	PM	M16-M17	Pit	EMCRUC	brass?	R	O	++	+++				LS-EM
The dating given in the Comments column is based on the appearance of the crucibles																

Table 12: Catalogue of metal-melting crucible sherds from Hungate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Vit	Cu	Zn	Pb	Sn	Ag
H83 2038	981	115	20	LS-SN	EM-M10	Dump (?midden)	STCRUC	used	B		+	+++			
H83 828	907	113	24	LS-SN	E10-E/M11	Dump	STCRUC	used	B	O		++			
H83 822	908	113	24	LS-SN	E10-E/M11	Dump	STCRUC	silver	B	O	+	+			++
H83 862	908	113	24	LS-SN	E10-E/M11	Dump	STCRUC	used	B			++			
H83 821	903	127	26	LS-SN	11	Dump (?floor)	STCRUC	silver	B		+	++	+		+
H83 724	772	129	26	LS-SN	11	Dump	STCRUC	used	B		+	+			
H83 794	894	129	26	LS-SN	11	Dump	STCRUC	silver	B						++
H83 798	898	129	26	LS-SN	11	Dump	STCRUC	silver	B	O	+	++	+		+
H83 280	265	260	26	LS-SN	11	Dump	STCRUC	used	R		+	+			
H83 725	783	226	28	LS-SN	2nd 1/2 11	Str 7.2 levelling dump	STCRUC	used	B	O	+	+++			
H83 820	899	130	31	LS-SN	10-11	Str 8.1 floor	STCRUC	used	B		+	++			
H83 752	834	152	32	LS-SN	11	Str 8.2 make-up dump	STCRUC	unused?	B	O					
H83 676	682	126	35	LS-SN	M-L11	Pit	STCRUC	used	B	O	+	+			
H83 716	752	145	35	LS-SN	M-L11	Dump over Str 9	STCRUC	used	B			++			
H83 680	711	157	43	EM-HM	12	Silt	STCRUC	silver	B	O	+	+	+		++
H83 2037	576	183	43	EM-HM	12	Dump	STCRUC	used	B		+	+	+		
H83 204	180	296	44	EM-HM	M/L12+	Str 10 robbing	LSCRUC	unused?	B						
H83 183	14	352	52	PM	16	Str 12 robbing	LSCRUC	used	Ba		+		++		
H83 38	38	368	52	PM	16	Pit	STCRUC	used	B	O	+	+			

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
Silver Street B																		
LIN73si BI 188		31	B109	39	LS-SN	M-L10/11	Pit	STCRUC	used	R		O	+	+++				
LIN73si BI -	399	31	B109	39	LS-SN	M-L10/11	Pit	STCRUC	silver	R	+	O	++	++	+		+	
LIN73si BI -	609	31	B109	39	LS-SN	M-L10/11	Pit	STCRUC	silver	R	+	O	++	++	+		+	rim diam ~90mm
LIN73si BI 193		41	B112	39	LS-SN	M-L10	Pit	STCRUC	used	B		O	+	++				
LIN73si BI 194		41	B112	39	LS-SN	M-L10	Pit	STCRUC	used	R/L	+	O		+++				
LIN73si BI 195		41	B112	39	LS-SN	M-L10	Pit	STCRUC	used	B		OR			++			
LIN73si BI 196		41	B112	39	LS-SN	M-L10	Pit	STCRUC	used	B		O	+	++				
LIN73si BI 197		41	B112	39	LS-SN	M-L10	Pit	STCRUC	used	B	+	O	+	+				2 sherds
LIN73si BI 198		41	B112	39	LS-SN	M-L10	Pit	LSCRUC	used	R		O	+	+				
LIN73si BI -	610	41	B112	39	LS-SN	M-L10	Pit	STCRUC	silver	B	+	OR	++	++	+		+	19 sherds
LIN73si BI -	1026	41	B112	39	LS-SN	M-L10	Pit	STCRUC	used				+	+				46 sherds
LIN73si BI -	740	40	B113	39	LS-SN	L10-M/L11	Pit	STCRUC	used	B	+	O	+	++				
LIN73si BI -	680	40	B113	39	LS-SN	L10-M/L11	Pit	CRUC	silver		+		++	++	+		+	
LIN73si BI 189		28	B36	42	EM-LM	M-L12	Pit	STCRUC	used	R		O	+	+				
LIN73si BI -	344	15B	999	N/A				STCRUC	used	B	+	O	++	+++	+			
Silver Street C																		
LIN73si C 133		83	C67	68	LR	L3	Rampart dump	LSWCRUC	used	B			++	+++				
Saltergate DI																		
LIN73sa DI 303		105	D10	18	LS-SN	LS	Layer	LS/STCRUC	used	B				+				
LIN73sa DI -	3466	105	D10	18	LS-SN	LS	Layer	STCRUC		B		O						
LIN73sa DI 309		104	D31	20	LS-SN	L9-10	Structure 2 wall	LS/STCRUC	used	B			+	++				
LIN73sa DI 330		87	D35	21	EM	12?	Structure 3 levelling	LSCRUC	used	B			+	+++				
LIN73sa DI 336		54	D55	24	EM-HM	E-E/M13?	Pit	LSCRUC	used	R/B	+	O	+	+	+			
LIN73sa DI -	2717	54	D55	24	EM-HM	E-E/M13?	Pit	LSCRUC		R								
LIN73sa DI 305		93	D58	24	EM-HM	E-E/M13?	Pit	STCRUC		B								
LIN73sa DI 314		1	999	N/A				LS/STCRUC	used	B		O	+	+	+			
LIN73sa DI 326		22	999	N/A				LSCRUC		B	+	O						
LIN73sa DI 331		22	999	N/A				STCRUC	used	B			+	++	+			
LIN73sa DI 324		29	999	N/A				LOCAL	used	B			+	+	+			
LIN73sa DI 317		30	999	N/A				STCRUC	used	R		O	+	+	+			
LIN73sa DI 325		30	999	N/A				STCRUC	used	B			+	++	++			
LIN73sa DI 315		39	999	N/A				LS/STCRUC	silver	R			+	+	++		++	
LIN73sa DI 316		39	999	N/A				LS/STCRUC		R								

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
LIN73sa DI 323		50	999	N/A				STCRUC	leaded copper	B		I	++	+	+++			
LIN73sa DI 328		50	999	N/A				LSCRUC		B		O						
LIN73sa DI 320		54/61	999	N/A				STCRUC	used	R			+	+++	+			
LIN73sa DI 321		54/61	999	N/A				STCRUC		R		O						
LIN73sa DI 332		54/61	999	N/A				STCRUC		B								
LIN73sa DI 322		10/68	999	N/A				STCRUC		R								
LIN73sa DI -	3603	68	999	N/A				LS/STCRUC		B		OR						
LIN73sa DI 319		72	999	N/A				STCRUC	used	R		O	+	++				
LIN73sa DI 306		74	999	N/A				LSCRUC	used	B			+	+++				
LIN73sa DI 307		88	999	N/A				STCRUC		R								
LIN73sa DI 308		88	999	N/A				LSCRUC		R								
LIN73sa DI 318		88	999	N/A				LSCRUC		B		O						
LIN73sa DI 337		88	999	N/A				STCRUC	used	B	+	O	+	+				
LIN73sa DI -	2778	88	999	N/A				LSCRUC	used	B			+	+	+			
LIN73sa DI 311		+	N/A	N/A			Unstratified	LSCRUC	used	R		O	+	+				cloth impression int. 2 sherds
LIN73sa DI 312		+	N/A	N/A			Unstratified	LSCRUC	used	B			+	++	++			
Saltergate DII																		
LIN73sa DII -	2716	5	999	N/A				STCRUC	used	R		O	+	+++				
Saltergate E																		
LIN73sa EI 175		104	E88	60	SN	E-M11	Structure 7 demolition	STCRUC	used	B		O	+	+				
LIN73sa EI 183		104	E88	60	SN	E-M11	Structure 7 demolition	STCRUC		B		I						
LIN73sa EI	3483	150	E89	60	SN	E-M11	Structure 7 demolition	STCRUC	used	B			+	+				
LIN73sa EI 176		143	E76	63	SN	11	Dump	STCRUC		B								
LIN73sa EI 180		143	E76	63	SN	11	Dump	STCRUC	leaded copper	B		I	+++		+++			
LIN73sa EI 49	2732	71	E90	68	LM	2nd 1/2 15	Structure 9 robber trench	SRCRUC	copper alloy	B			+++		++			
LIN73sa EI	2878	92	E91	68	LM	14/15	Structure 9 robber trench	STCRUC	used	B			+	+	+			
LIN73sa EI 177		90	E93	68	LM	2nd 1/2 15	Structure 10 robber trench	STCRUC		B		O						
LIN73sa EI 184		107	E93	68	LM	2nd 1/2 15	Structure 10 robber trench	STCRUC		B		O						
LIN73sa EI 178		73	E105	71	MOD	19	Dump	STCRUC	copper alloy	B		O	++		+			
LIN73sa EI 179		73	E105	71	MOD	19	Dump	STCRUC		B		O						
LIN73sa EI 181		73	E105	71	MOD	19	Dump	LSWCRUC	copper alloy	R	+	OI	++	+	++			
LIN73sa EI 187		73	E105	71	MOD	19	Dump	LSCRUC	used	B			+	+	+			
LIN73sa EI 182		40	E106	71	MOD	19	Dump	LSWCRUC	used	B			+	+	+			

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
Saltergate F																		
LIN73sa F	3742	134	F104	N/A		M-L10	[Str 7]	STCRUC		R		O						
LIN73sa F	2936	66	F114	N/A		M-L10		CRUC										missing
LIN73sa F 495		49	F115	N/A		M-L10	[Str 7]	STCRUC	silver	B		O	++	+++	+		++	
LIN73sa F	2807	38	F126	N/A	LS	E-E/M11	Layer	STCRUC	silver	B			+	+			+	
LIN73sa F 503		46	F128	N/A		E-M/L11		STCRUC	copper alloy	R		O	++	+	++			
LIN73sa F	3537	57	F128	N/A		E-M/L11		STCRUC		B								
LIN73sa F 493		57	F128	N/A		E-M/L11		STCRUC		B		O						
LIN73sa F	3538	119	F132	N/A		L10	[Str 7]	STCRUC		R		O						
LIN73sa F	3395	115	F133	N/A		E-M/L11	[Str 7]	STCRUC	used	B			+	+++				
LIN73sa F	3396	117	F135	N/A		M/L9-E13	[Str 7]	STCRUC	used	B		O	+	++	+			
LIN73sa F 496		44	F140	N/A		E-M/L11		LSCRUC	used	B			+		+			
LIN73sa F 499		44	F140	N/A		E-M/L11		STCRUC		R		O						
LIN73sa F	2806	44	F140	N/A		E-M/L11		STCRUC		B								
LIN73sa F	3068	44	F140	N/A		E-M/L11		STCRUC		B		RO						
LIN73sa F 552		44	F140	N/A		E-M/L11		STCRUC		R		RI						
LIN73sa F	3065	11	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 38	2581	18	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B		O						
LIN73sa F	2805	18	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F	2646	19	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 31	2597	35	F141	N/A	SN	E/M-M/L11	Layer	LSCRUC	used	B			+		++			
LIN73sa F	2510	35	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	R		O	+	+++				
LIN73sa F	2651	35	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R		RO						
LIN73sa F	2511	37	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	silver	B		O	+	+	+		+	
LIN73sa F 550		37	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	silver	B			+	+	+		+	
LIN73sa F 551		37	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F	2652	58	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R								
LIN73sa F 553		58	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R								
LIN73sa F	2653	63	F141	N/A	SN	E/M-M/L11	Layer	LS/STCRUC		B		O						
LIN73sa F 554		63	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	B			+	+	+			
LIN73sa F 555		63	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R		O						
LIN73sa F 556		63	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R								
LIN73sa F	2654	65	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B		O						
LIN73sa F 34	2586	68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	B			+	+	+			

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
LIN73sa F 491		68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F	2655	68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 557		68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 558		68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	B			+	+				
LIN73sa F 559		68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 560		68	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R								
LIN73sa F	2657	73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B		O						
LIN73sa F 566		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 567		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 568		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	R			+	+				
LIN73sa F 569		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 570		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	B		RO	+	++				
LIN73sa F 571		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	B		RO	+	++	+++			
LIN73sa F 572		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R		O						
LIN73sa F 573		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R/L								
LIN73sa F 574		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 575		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 576		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F 577		73	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	copper alloy	B		IR	+++	+	+			
LIN73sa F	2809	86	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B		OIR						
LIN73sa F 589		86	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	R/L		O	+	++				
LIN73sa F 590		86	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								reused
LIN73sa F 591		87	F141	N/A	SN	E/M-M/L11	Layer	STCRUC	used	R			+	+	+			
LIN73sa F	2810	87	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		B								
LIN73sa F	2942	87	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R		OR						
LIN73sa F	2943	89	F141	N/A	SN	E/M-M/L11	Layer	STCRUC		R								
LIN73sa F	2505	4	F142	N/A		L10-M/L11		STCRUC		B		O						
LIN73sa F	2506	20	F142	N/A		L10-M/L11		STCRUC		B		O						
LIN73sa F	2504	3	F143	N/A		E-M/L11		STCRUC		B	+							
LIN73sa F 532		3	F143	N/A		E-M/L11		STCRUC		B								
LIN73sa F 533		3	F143	N/A		E-M/L11		STCRUC	used	B		OIR	+	+				
LIN73sa F	2507	23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	used	R/L		O	+					
LIN73sa F	2647	23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R		O						
LIN73sa F	2648	23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R/L								
LIN73sa F	3067	23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
LIN73sa F 492		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 508		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	used	B		O	+	++				
LIN73sa F 509		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 510		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 511		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 512		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 513		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		OIR						
LIN73sa F 514		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R		OR						
LIN73sa F 515		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	used	R			+	++				
LIN73sa F 516		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 517		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 518		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 519		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		OR						
LIN73sa F 520		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F 521		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 522		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	used	R		O	+	+				
LIN73sa F 523		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 524		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F 525		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		OR						
LIN73sa F 526		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F 527		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 528		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 529		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 530		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	silver	B			+	+++	+		+	
LIN73sa F 531		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 536		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 537		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 538		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 539		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F 592		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B								
LIN73sa F 593		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	silver	B			+	+++	+		+	
LIN73sa F 594		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R		O						
LIN73sa F 595		23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R		O						
LIN73sa F 88	3066	23	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F	2941	83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		OR						

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
LIN73sa F 494		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	silver	B		OR	+	+++	+		+++	
LIN73sa F 505		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	used	B			+	+				
LIN73sa F 581		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F 582		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 583		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC	used	R			+	++				
LIN73sa F 584		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		OR						
LIN73sa F 585		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 586		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		B		O						
LIN73sa F 587		83	F144	N/A	SN	E/M-M/L11	Pit	STCRUC		R								
LIN73sa F 588		83	F144	N/A	SN	E/M-M/L11	Pit	LS/STCRUC	silver	B		O	+	+++	+		++	
LIN73sa F	2656	69	F145	N/A		E-M/L11	[Pit]	STCRUC		B								
LIN73sa F 561		69	F145	N/A		E-M/L11	[Pit]	STCRUC		B								
LIN73sa F 562		69	F145	N/A		E-M/L11	[Pit]	STCRUC		B								
LIN73sa F 563		69	F145	N/A		E-M/L11	[Pit]	STCRUC	used	B			+	+++				
LIN73sa F 564		69	F145	N/A		E-M/L11	[Pit]	STCRUC		R		O						
LIN73sa F 565		69	F145	N/A		E-M/L11	[Pit]	STCRUC		B								
LIN73sa F	2508	26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC			+							
LIN73sa F 9		26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC		B		O						
LIN73sa F 501		26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC		B		O						
LIN73sa F 502		26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC		B								
LIN73sa F 506		26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC		B								
LIN73sa F 540		26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC	used	B		O	+	++				
LIN73sa F	2649	26	F147	N/A		E-M/L11	[part initial clearance]	STCRUC		B		O						
LIN73sa F 497		1	F149	N/A		L10/11-13/1	[mod lift shaft etc]	STCRUC		B		O						
LIN73sa F	2503	1	F149	N/A		L10/11-13/1	[mod lift shaft etc]	STCRUC	used	B		O	+	++				
LIN73sa F 498		30	F150	N/A		E-M/L11		STCRUC	used	B			+	+	+			
LIN73sa F 546		30	F150	N/A		E-M/L11		STCRUC										
LIN73sa F 547		30	F150	N/A		E-M/L11		STCRUC										
LIN73sa F 548		30	F150	N/A		E-M/L11		STCRUC		B		O						
LIN73sa F 549		30	F150	N/A		E-M/L11		STCRUC	used	B			+	++	+			
LIN73sa F	2650	30	F150	N/A		E-M/L11		STCRUC		R								
LIN73sa F	3069	70	F157	N/A		L10-M/L11	[Upper fill pit 145]	STCRUC		Ba		O						
LIN73sa F	3070	90	F157	N/A		L10-M/L11	[Upper fill pit 145]	STCRUC		B								
LIN73sa F	2808	75	F158	N/A		L10/M/L11	[Prob fill pit 144/5]	STCRUC		B								
LIN73sa F	3153	75	F158	N/A		L10/M/L11	[Prob fill pit 144/5]	STCRUC		R/B		O						

Table 13: Catalogue of metal-melting crucible sherds from Silver Street and Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	EOL	Vit	Cu	Zn	Pb	Sn	Ag	Comments
LIN73sa F 578		75	F158	N/A		L10/M/L11	[Prob fill pit 144/5]	STCRUC	used	R			+	+++				
LIN73sa F 579		75	F158	N/A		L10/M/L11	[Prob fill pit 144/5]	STCRUC		R/L								
LIN73sa F 580		75	F158	N/A		L10/M/L11	[Prob fill pit 144/5]	STCRUC		B		OR						
LIN73sa F 500		98	F158	N/A		L10-M/L11	[Prob fill pit 144/5]	STCRUC		B		O						
LIN73sa F 534		10	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC		R								
LIN73sa F 535		10	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC	used	R		O	+	+++				
LIN73sa F	2645	10	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC		B		O						
LIN73sa F	2509	27	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC										
LIN73sa F 541		27	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC		B								
LIN73sa F 542		27	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC		R								
LIN73sa F 543		27	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC	used	B		O	+	++				
LIN73sa F 544		27	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC										
LIN73sa F 545		27	F159	N/A		E-M/L11	[Upper fill pit 144?]	STCRUC										
LIN73sa F	2940	82	F159	N/A		E-M/L11	[Prob fill pit 144/5]	STCRUC		B								
LIN73sa F	3071	95	F160	N/A		M/L9-M/L11	[Upper fill pit 146]	STCRUC		R								

Table 14: Catalogue of metal-melting crucible sherds from Michaelgate Chestnut House

Finds No	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Vit	Cu	Zn	Pb	Sn	Ag
MCH84 183	70	15	9	LS-SN	E-E/M11	Dump	STCRUC	brass?	B	O	++	+++	++		
MCH84 190	70	15	9	LS-SN	E-E/M11	Dump	STCRUC	bronze	B	O	+++	+	+	+	
MCH84 161	66	25	10	LS-SN	12	Pit	STCRUC	brass	B	OI	+++	+++	++		
MCH84 175	74	25	10	LS-SN	12	Pit	LOCCRUC?	brass	B	O	+++	+++	+		
MCH84 165	78	26	10	LS-SN	12	Pit	STCRUC	brass?	B	O	++	+++	++		
MCH84 392	268	81	13	LS-SN	10-11	Str2 demolition	LOC/EMEDCRUC	used	B	O	+	+			
MCH84 553	367	183	16	LS-SN	E-E/M11	Dump (terrace)	LOC/STCRUC	brass		OI	+++	+++	+		
MCH84 554	367	183	16	LS-SN	E-E/M11	Dump (terrace)	STCRUC	brass?	R	ROI	++	+++	+		
MCH84 558	367	183	16	LS-SN	E-E/M11	Dump (terrace)	STCRUC	used	L		+	+++	+		
MCH84 586	367	183	16	LS-SN	E-E/M11	Dump (terrace)	STCRUC	brass?	R	O	++	+++	+		
MCH84 587	367	183	16	LS-SN	E-E/M11	Dump (terrace)	STCRUC	used	B		+	+++	+		
MCH84 582	369	183	16	LS-SN	E-E/M11	Dump (terrace)	STCRUC	used	B		+	+++	+		
MCH84 521	366	184	17	LS-SN	11	Pit	STCRUC	brass	B	RO	+++	+++	++		
MCH84 522	366	184	17	LS-SN	11	Pit	STCRUC?	used	B		+	+++	++		
MCH84 523	366	184	17	LS-SN	11	Pit	STCRUC	leaded brass	R	O	+++	++	+++		
MCH84 526	366	184	17	LS-SN	11	Pit	STCRUC	brass	B		+++	+++	++		
MCH84 581	366	184	17	LS-SN	11	Pit	STCRUC	brass?	Ba		++	+++	+		
MCH84 528	365	186	20	SN-EM	2nd 1/2 11	Hillwash/dump	STCRUC	used	B		+	++	+		
MCH84 520	364	191	20	SN-EM	2nd 1/2 11	Hillwash/dump	STCRUC	used	B		+	+++	+		
MCH84 360	166	120	28	SN-EM	12	Str 6 demolition	LOCCRUC?	used	R	O	+	++			
MCH84 323	156	127	29	SN-EM	E-E/M13	Dump	STCRUC	used	B	O	+	+++	+		
MCH84 564	383	188	31	SN-EM	12	Pit	STCRUC	used	B	OR	+	+++	+		
MCH84 497	349	189	31	SN-EM	L11	Pit	STCRUC	used	Ba	OR	+	++	+		
MCH84 498	349	189	31	SN-EM	L11	Pit	STCRUC	used	B		+	+++	+		
MCH84 506	349	189	31	SN-EM	L11	Pit	STCRUC	brass?	B		++	+++	++		
MCH84 487	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	brass	R	ORIR	+++	+++	+		
MCH84 488	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	B	OR	+	+++	+		
MCH84 489	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	brass	B	OI	+++	+++	++		
MCH84 490	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	brass	B		+++	+++	++		
MCH84 491	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	B	OR		+++	+		
MCH84 492	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	R			+++	+		
MCH84 493	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	B	OR		+++	+		
MCH84 494	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	R/L		+	+++	+		
MCH84 496	347	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	brass?	R	OI	++	+++	+		
MCH84 557	354	192	32	SN-EM	M12	Str 12 ?floor	STCRUC	brass?	B		++	+++	+		

Table 14: Catalogue of metal-melting crucible sherds from Michaelgate Chestnut House

Finds No	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Vit	Cu	Zn	Pb	Sn	Ag
MCH84 499	336	194	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	B		+	+++	+		
MCH84 552	336	194	32	SN-EM	M12	Str 12 ?floor	STCRUC	used	Ba	O	+	+++	+		
MCH84 535	346	195	33	SN-EM	M12	Str 8 foundations	STCRUC	used	R			+++	+		
MCH84 509	350	195	33	SN-EM	M12	Str 8 foundations	STCRUC	brass?	B	OI	++	+++	+		
MCH84 508	355	195	33	SN-EM	M12	Str 8 foundations	STCRUC	brass?	B	OI	++	+++	+		
MCH84 555	355	195	33	SN-EM	M12	Str 8 foundations	STCRUC	leaded brass	L	I	+++	+++	+++		
MCH84 469	337	197	33	SN-EM	M12	Str 8 dump (terrace make-up)	STCRUC	brass	Ba	ORIR	+++	+++	++		
MCH84 470	337	197	33	SN-EM	M12	Str 8 dump (terrace make-up)	STCRUC	used	B		+	+++	+		
MCH84 471	337	197	33	SN-EM	M12	Str 8 dump (terrace make-up)	STCRUC	brass?	B		++	+++	+		
MCH84 428	318	217	34	EM-HM	M12	Str 9 dump (terrace make-up)	STCRUC	brass?	R/Ba	O	++	+++			
MCH84 437	318	217	34	EM-HM	M12	Str 9 dump (terrace make-up)	STCRUC	brass?	B		++	+++	++		
MCH84 438	318	217	34	EM-HM	M12	Str 9 dump (terrace make-up)	STCRUC	used	R		+	+++			
MCH84 441	318	217	34	EM-HM	M12	Str 9 dump (terrace make-up)	STCRUC	brass	B		+++	++	++		
MCH84 485	345	200	35	EM-HM	M12	Str 10 surface	STCRUC	used	B	OR		+++	+		
MCH84 486	345	200	35	EM-HM	M12	Str 10 surface	STCRUC	used	R/L&B	O	+	+++	+		
MCH84 505	345	200	35	EM-HM	M12	Str 10 surface	STCRUC	used	B	O	+	+++	+		
MCH84 464	333	201	35	EM-HM	M12	Str 10 pit	STCRUC	brass?	B		++	+++	+		
MCH84 465	333	201	35	EM-HM	M12	Str 10 pit	STCRUC	brass?	B	O	++	+++	++		
MCH84 466	335	201	35	EM-HM	M12	Str 10 pit	STCRUC	brass?	R	OR	++	+++	++		
MCH84 467	335	201	35	EM-HM	M12	Str 10 pit	STCRUC	leaded brass	B	O	+++	+++	+++		
MCH84 468	335	201	35	EM-HM	M12	Str 10 pit	STCRUC	used	B		+	+	+++		
MCH84 401	139	144	42	EM-HM	L13-M14	Dump (terrace make-up)	CRUC								
MCH84 442	326	207	43	EM-HM	E-E/M13	Str 11 foundations	STCRUC	brass	B		+++	+++	++		
MCH84 409	317	216	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	leaded brass	B	OI	+++	+++	+++		
MCH84 419	317	216	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	used	B		+	+++	+		
MCH84 420	317	216	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	used	B	IR	+	+++	++		
MCH84 425	317	216	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	brass?	R/L		++	+++	++		
MCH84 407	316	218	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	brass?	R	O	++	++	+		
MCH84 408	316	218	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	used	B		+	+++			
MCH84 583	316	218	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	used	B		+	+	+		
MCH84 584	316	218	44	EM-HM	13-M14	Str 9 robbing debris	STCRUC	brass?	B		++	+++	++		
MCH84 427	+	N/A				Unstratified	STCRUC	used	B		+	+++	+		

Table 15: Catalogue of metal-melting crucible sherds from West Parade

Finds No	Cxt	cg	Phase	Period	Date	Context description	Type	Use	Sh	Vit	Cu	Zn	Pb	Sn	Ag
WP71 P32	II CF	N/A	P6a	SN	L11-M12	Pit 19	SNCRUC	used	B			++			
WP71 P39	II BY	N/A	P6b-c	SN-EM	M12-L13	Dump/accumulation	CRUC	used	B	O	+	+++			
WP71 P31	II BK	N/A	P6b?	SN-EM	M-L12?	Dump/accumulation	STCRUC	used	R			+++			
WP71 P25	I EK	N/A	P6a	SN	L11-M12	Pit 11	STCRUC	used	B		+	++			
WP71 P26	I ES	N/A	P6a	SN	L11-M12	Pit 12	STCRUC	used	B		+	+++			
WP71 P38	I CQ	N/A	P6a?	SN	L11-M12?	Dump/levelling	STCRUC	unused	L						
WP71 P20	I AT	N/A	P6c	EM	L12-13	Floor	STCRUC	used	B		+	+++	+		
WP71 P24	I DG	N/A	P6c	EM	13	Dump/construction	STCRUC	used	B	O	+				
WP71 P37	II AH	N/A	P6c	EM	L12-13	Dump	STCRUC	?pewter	B				+	++	
WP71 P22	I BU	N/A	P6c	EM	M-L13	Levelling assoc. stokehole/kiln	STCRUC	used	B		+	+	++		
WP71 P35	II BJ	N/A	P6c	EM	L12-E13	Cobbles	STCRUC	used	B				+		
WP71 P36	II BJ	N/A	P6c	EM	L12-E13	Cobbles	STCRUC	used	B		+	+++	+		
WP71 P23	I CB	N/A	P6c	EM	13	Pit 21/2	CRUC	used	B	O	+	++			
WP71 P28	II BD	N/A	P6c	EM	13	Pit 21/2	CRUC	used	B	O	+	++	+		
WP71 P29	II BD	N/A	P6c	EM	13	Pit 21/2	CRUC	used	B	O	+	++			
WP71 P34	II BD	N/A	P6c	EM	13	Pit 21/2	STCRUC	used	R			++	+		
WP71 P17	I AH	N/A	P6c	EM	L12-13	Dump/accumulation	CRUC	used	L	O	+	++	+		
WP71 P18	I AP	N/A	P6c	EM	L12-13	Dump/levelling	LSCRUC	used	R	O		+++			
WP71 P16	I AD	N/A	P6b?	SN-EM	M-L12	Stone scatter	STCRUC	used	B		+	+++			
WP71 P30	II AD	N/A	P6d	HM	E-M14	Boundary wall infill	STCRUC	used	B	O	+	++	+		
WP71 P19	I AR	N/A	P6d	HM	L13-E14	Oven infill	STCRUC	used	L			+			
WP71 P27	II AA	N/A	P7	PM-MOD		Dump/accumulation	STCRUC	used	B	O	+	+++	+		

Table 16: Catalogue of metal-melting crucible sherds from other sites

Yr	Cxt	cg	LUB	Period	Date	Context description	Type	Use	Sh	Vit	Cu	Zn	Pb	Sn	Ag	Comments
Grantham Place																
GP81 128	251	107	12	SN	1st 1/2 11	Undescribed layers	STCRUC	used	B	O	+	+++				
GP81 129	251	107	12	SN	1st 1/2 11	Undescribed layers	STCRUC	silver	B	O	+	+++	+		+	
GP81 157	251	107	12	SN	1st 1/2 11	Undescribed layers	STCRUC	used	R			+++				
GP81 158	251	107	12	SN	1st 1/2 11	Undescribed layers	STCRUC	used	B		+	++				
GP81 159	251	107	12	SN	1st 1/2 11	Undescribed layers	STCRUC	used	B		+	++				
GP81 160	246	24	13	SN	1st 1/2 11	Str3 beamslot fill	STCRUC	used	B		+	+++	+			
GP81 161	246	24	13	SN	1st 1/2 11	Str3 beamslot fill	STCRUC	silver	B		+	+++			++	
GP81 125	172	45	23	EM-HM	L11-E12	Dump	STCRUC	used	B		+	++				
The Park																
P70 P43	AL	N/A	-	8?	PM	Spread	LMCRUC	brass?			++	++	+			
P70 P40	IA	N/A	-	8?	PM	Pit	STCRUC	gold	B	I	+	+				gold droplets visible ?re-used as HT
P70 P45	SD	N/A	-	8?	PM	Pit	CRUC	used	R		+	+				
Steep Hill																
SH74 P8	QB	52	15	EM-HM	11-12	Str 5 occupation	EMCRUC	silver	R		+	+	++		+	?HT
SH74 P10	MI	210	27	PM	16	Str 8.3 silting in drain	EMCRUC	leaded brc	B	OI	+++		+++	+		?HT
Spring Hill/Michaelgate																
SPM83 49	101	2	31	EM-HM	M15-16+	Graveyard dump	STCRUC	brass	B	OR	+++	+++	+			
Lucy Tower																
LT72 P10	DQ	5	3	EM	L12	Dump	STCRUC	unused?	B							
LT72 P6	DS	3	2	SN-EM	12	Peat	STCRUC	used	B			++				
LT72 P7	DS	3	2	SN-EM	12	Peat	STCRUC	used	B	O	+					
LT72 P8	DS	3	2	SN-EM	12	Peat	STCRUC	used	L			++				
LT72 P9	DT	3	2	SN-EM	12	Peat	STCRUC	used	B		+	+				

APPENDIX 3 CATALOGUE OF MOULDS

In Appendix 3 the additional columns are:
Description: of the object or fragment
Max size/length/thick(ness): dimensions (in mm)
No of frags: number of fragments included under a single finds no
Elements detected by XRF:

Cu	copper	)
Zn	zinc	)
Pb	lead	)
Sn	tin	) elements detected by XRF
Ag	silver	)
As	arsenic	)
Sb	antimony	)
Br	bromine	)
	+++	strong XRF signal
	++	detected
	+	weak XRF signal
	nd	no metals detected
	na	not analysed

Figs: Figure numbers in the main text and appendix

Table 17: Catalogue of object moulds from Flaxengate

Find No	Cxt	cg	LUB	Period	Date	Context description	Description	Max size (mm)	Fig A1, xx	Cu	Zn	Pb	Sn
Note: The descriptions for all entries (except F72 M85) should be read as 'Fragment from a ceramic …'													
F76 P56	BJW	t270	36	LS-SN	E/M-M/L10+	ii Pit F692	piece mould (top valve), outside slightly vitrified	27					
F74 P310	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	c186 piece mould (possibly bottom valve)	27	14				
F74 P310	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	c187 piece mould (top valve) with luting clay	30	15				
F74 P317	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	piece mould with traces of luting clay	32	19				
F74 P425	ASK	t302	36	LS-SN	M/L9-L10	vii Pit F698	mould with concavo-convex cross-section	23					
F74 P285	APQ	t66	36	LS-SN	L11-E12	v-vi Str R3 Robber trench	end of piece mould (bottom valve) with parts of three matrices	42	7				
F74 P454	F106	sp4	43	LS	E/M-M10	iii Spit Dump	mould (top valve)	25					
F74 P206	G88	sp12	44	LS-SN	E/M-L10	ii-iv Spit Occupation	mould (possibly bottom valve) with relief decoration	27	1				
F74 P241	G94	sp15	44	LS-SN	M-L10	ii-iv Spit Occupation	piece mould for a decorated object, with luting clay on the outside. Relief decoration has broken away from the rough areas.	26	5 and Fig 9	++	++	+++	
F74 P135	B100	sp44	44	LS-SN	L10	ii-v Spit Occupation	mould with relief decoration and possible runner	25	12 and Fig 6				
F74 P415	B105	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	c221 mould	20					
F74 P415	B105	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	c222 mould	20	11				
F74 P520	B95	sp65	44	LS-SN	E-E/M11	iv-v Spit Occupation	mould with relief design	19	3				
F74 P116	B94	sp80	44	LS-SN	E-M/L11	iv-vi Spit Occupation	piece mould (bottom valve) with relief decoration	40	2	+	+++	++	
F74 P134	B99	sp81	44	LS-SN	L10-M/L11	iv-vi Spit Occupation	mould	20					
F72 M85	F5	sp16	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	About half a square block of stone, with decorated matrices on both sides. The stone was identified by Anderson (1981) as very fine grained calcareous mudstone	50	Fig 10			+	+
F74 P505	H8	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	mould	23					
F74 P503	G29	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump	piece mould (possibly top valve), vitrified on outside	25					

Table 17: Catalogue of object moulds from Flaxengate

Find No	Cxt	cg	LUB	Period	Date	Context description	Description	Max size (mm)	Fig A1, xx	Cu	Zn	Pb	Sn
F74 P447	E26	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	piece mould (top valve) with two diverging runners	27	10				
F74 P519	G12	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	piece mould (bottom valve) thickened at one end to accommodate runner/in-gate	30	6	++	+++	++	
F74 P305	AUF	t53	53	SN	E-M/L11	v Str T17 Floor	piece mould, the outer edge but none of the matrix survives	24	13				
F74 P292	ART	t68	58	SN	L11-E12	vi Levelling dump	piece mould (edge of top valve) with luting clay	27					
F74 P311	AWR	t68	58	SN	L11-E12	vi Levelling dump	c196 mould, fabric may be vegetable tempered	25	18				
F74 P311	AWR	t68	58	SN	L11-E12	vi Levelling dump	c197 ?piece mould, fabric may be vegetable tempered	35	17				
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c198						
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c199						
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c200 two fragments, one a top valve						
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c201						
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c202/205 piece mould (edge of bottom valve)	30	21				
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c203						
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c204						
F74 P278	AON	t81	63	SN	L11-E12	vii Levelling dump	c206						
F74 P326	AON	t81	63	SN	L11-E12	vii Levelling dump	piece mould, possibly an in-gate, with a textile impression	21	4				
F74 P406	AON	t81	63	SN	L11-E12	vii Levelling dump	mould	15					
F74 P521	AON	t81	63	SN	L11-E12	vii Levelling dump	mould	22	25				
F74 P521	AON	t81	63	SN	L11-E12	vii Levelling dump	mould, featureless	25					
F74 P522	AON	t81	63	SN	L11-E12	vii Levelling dump	c200 piece mould (top valve)	20	27				
F74 P522	AON	t81	63	SN	L11-E12	vii Levelling dump	c200 piece mould (bottom valve) with luting clay	25	28				
F74 P522	AON	t81	63	SN	L11-E12	vii Levelling dump	c203 mould, flat, reduced-fired	-					
F74 P522	AON	t81	63	SN	L11-E12	vii Levelling dump	c203 mould, convex	-					
F74 P523	AON	t81	63	SN	L11-E12	vii Levelling dump	piece mould (probably bottom valve), relief decoration abraded	27					

Table 17: Catalogue of object moulds from Flaxengate

Find No	Cxt	cg	LUB	Period	Date	Context description	Description	Max size (mm)	Fig A1, xx	Cu	Zn	Pb	Sn
F74 P543	AOV	t81	63	SN	L11-E12	vii Levelling dump	mould (probably edge of top valve), outer surface bloated and highly vitrified, traces of copper colouring	27					
F74 P303	AUI	t81	63	SN	L11-E12	vii Levelling dump	piece mould (probably edge of top valve) with flat reduced-fired surface	28					
F74 P309	AVE	t87	66	SN	E/M11-E12	vii Str T24	piece mould (bottom valve) with luting clay	33	22	+	+++	++	
F74 P299	ASZ	t89	66	SN	E/M11-E/M13	vii-viii Occupation/makeup assoc. Str T24	?piece mould; six fragments, three cf P310	max 30					
F74 P544	ASZ	t89	66	SN	E/M11-E/M13	vii-viii Occupation/makeup assoc Str T24	mould (possibly top valve)	21					
F72 P22	AMP	t91	67	SN	L11-M12	vii Str T25 Floor	piece mould (bottom valve) with luting clay	27	20				
F74 P281	AOS	t102	72	EM	E/M12-E/M13	viii Str T27 Hearth	overheated sherd (possibly a potsherd)						
F72 P17	AGM	t125	83	EM	E/M-M/L12	x Str T36	mould with relief decoration, external surface vitrified with red spots and flecks of copper corrosion	40	30 and Fig 7	+	++		++
F72 P18	AGM	t125	83	EM	E/M-M/L12	x Str T36	piece mould (bottom valve) for relatively massive bar-like object with knobs on, luting clay survives	60x23	8 and Fig 8	?	+++	++	
F72 P62	BE	s1	108	E-HM	E13-M14	Levelling	mould (probably bottom valve)	30	16				
F72 P80	FH	s141	137	PM	E-M/L16	Levelling	mould, two joining fragments	38	23				
F72 Ae101	HE	s142	143	MOD	M/L16-E17	ii-iv Dump	mould (two fragments), possibly for a cauldron foot, with copper-rich slag on the outside	45x 20					
F72 P79	HC	s147	145	MOD	L18-20	Fill of well F144	piece mould (bottom valve) with fine relief decoration and luting clay	22	26				
F72 P86	HC	s147	145	MOD	L18-20	Fill of well F144	mould, possibly for a cauldron foot	70x25					
F74 P424	+	-	N/A	-	-	Unstratified	piece mould (possible top valve) with plain concavo-convex section and luting clay	27					
F74 P249	J9	sp22	38	LS	E/M-M10	ii-iii Spit Dump	MISSING - possible clay mould fragment						
F74 P441	F52	sp36	38	LS	M10-E/M11	iii Spit Dump & occupation	MISSING - possible clay mould fragment						
F74 P314	AEJ	t240	95	EM	E/M-M12	xi Pit F729	MISSING - possible clay mould fragment						

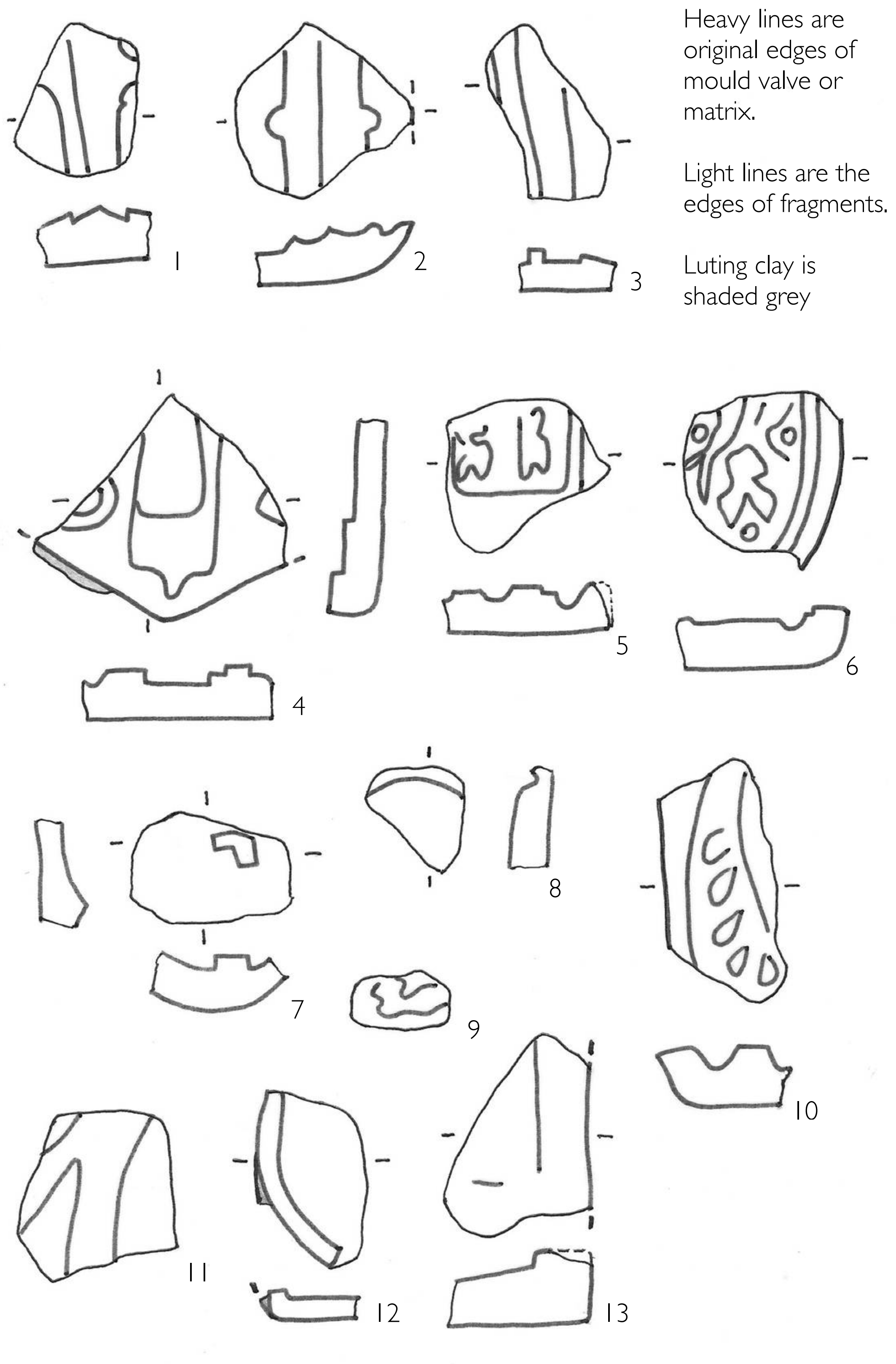


Figure 39: Flaxengate: sketches of clay piece mould fragments. Scale approx 1:1

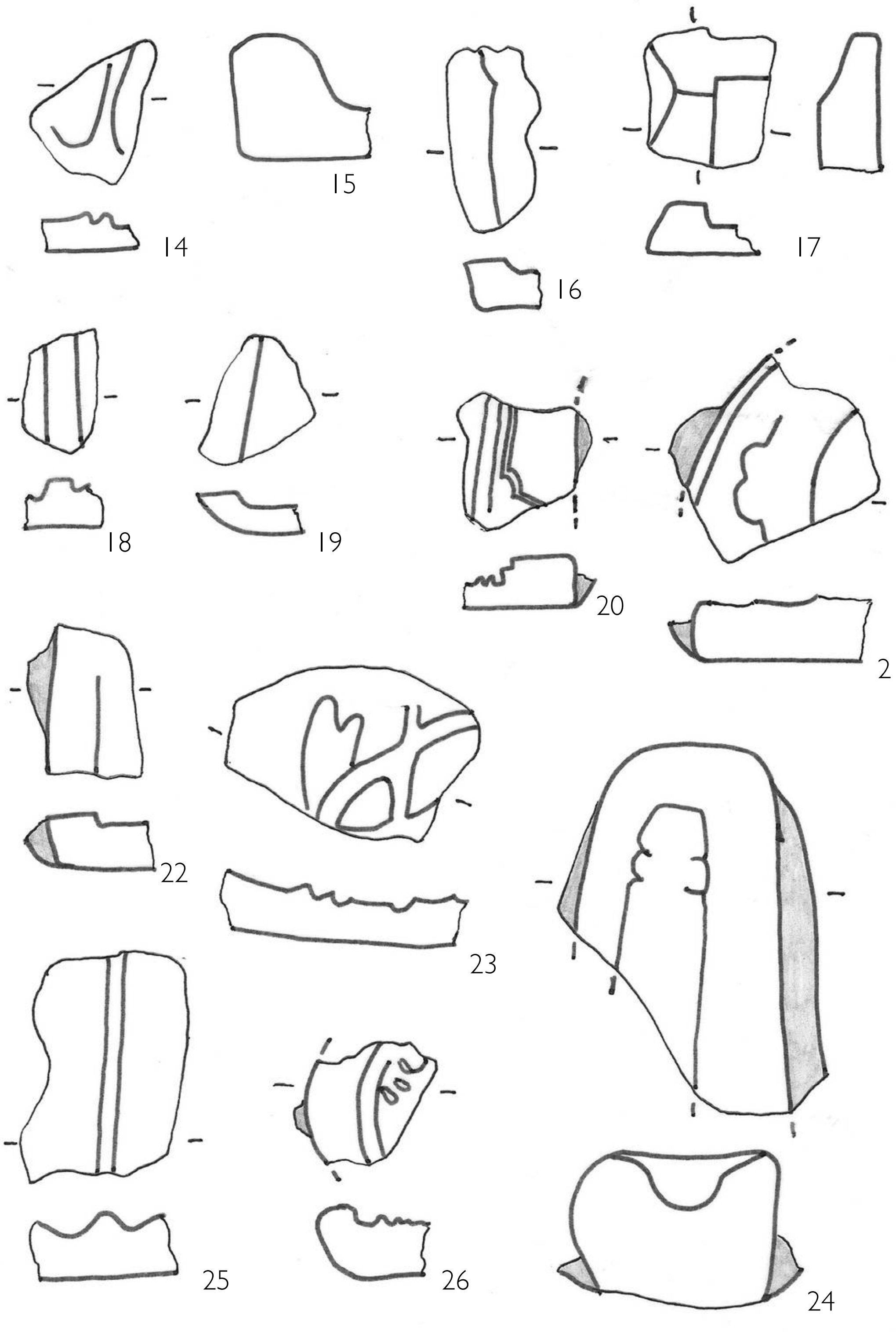


Figure 40: Flaxengate: sketches of clay piece mould fragments. Scale approx 1:1

Table 18: Catalogue of clay mould fragments from Hungate

Full finds No	Cxt	cg	LUB	Period	Date	Context description	Description	No of frags	Length	Thick	Elements detected by XRF
XRF analyses marked * may only have detected slight traces of metals											
H83 181	1	999	N/A				?mould	1	39		Cu Zn Pb *
H83 15	2	348	53	PM		Pit	joining fragments with luting clay	2	54		Cu Zn Pb *
H83 16	2	348	53	PM	[16]	Pit	joining fragments	2	65	10	Cu Pb *
H83 17	2	348	53	PM	[16]	Pit	with luting clay	1	40		Cu Zn Pb *
H83 18	2	348	53	PM	[16]	Pit		20	max 55	22	Cu Zn Pb *
H83 5	10	348	53	PM	[16]	Pit		1			Cu Zn Pb Sn *
H83 182	13	338	55	PM	LAST 1/4 1	Str 13.2 make-up	?from cope, mould diameter ~200mm	2	60	22	Cu Zn Pb Sn *
H83 85	43	336	54	PM	L16-M17	Str 13.1 make-up		5	max 55	18	Cu Zn Pb *
H83 165	83	202	50	PM	L15-M16	Str 12.1 make-up	?from cope	1	115	30	Zn Cu Pb *
H83 141	93	360	52	PM	16	Str 12 demolition		1			Cu Pb Sn (Zn)
H83 139	95	374	49	LM-PM	L15-M16	Dump		2	20		Cu Pb *
H83 162	95	374	49	LM-PM	L15-M16	Dump		7	max 60	20	Cu Zn Pb Sn *
H83 164	95	374	49	LM-PM	L15-M16	Dump	from core and cope, several with internal pale slip	19	max 55	18	Pb (Cu Zn)
H83 363	500	253	52	PM	16	Robber trench of Str 12					
H83 364	500	253	52	PM	16	Robber trench of Str 12		1	37		Cu Pb *
H83 365	500	253	52	PM	16	Robber trench of Str 12		1	40	12	Cu Zn Pb *
H83 366	500	253	52	PM	16	Robber trench of Str 12	luting clay on outside	1	57	16	Cu Pb Zn *
H83 367	500	253	52	PM	16	Robber trench of Str 12		1	62	12	Cu Pb Zn *
H83 368	503	255	52	PM	16	Robber trench of Str 12	cauldron foot?	1	80	8	Pb, Zn (Cu)
H83 359	503	255	52	PM	16	Robber trench of Str 12		1	25	10	Pb Cu ?Zn
H83 372	500	253	52	PM	16	Robber trench of Str 12	from core and cope	37	av 50	av 12	Cu Pb Zn *
H83 450	500	253	52	PM	16	Robber trench of Str 12	?from core	1	90	15	Cu Zn Pb *
H83 374	503	255	52	PM	16	Robber trench of Str 12	?from core	1	45		Cu Pb (Zn ?Sn)
H83 451	503	255	52	PM	16	Robber trench of Str 12		3	45		Cu Pb *
H83 377	509	253	52	PM	16	Robber trench of Str 12	?from core	1	37	17	Zn Cu Pb *
H83 379	509	253	52	PM	16	Robber trench of Str 12	?from cope, vitrified on outside	1	115	35	Cu Pb (Zn ?Sn)
H83 390	511	250	52	PM	16	Rubble dump: demolition Str 12	from cope (2) and ?core (1)	3	max 70	55	Cu Zn Pb *
H83 398	511	250	52	PM	16	Rubble dump : demolition Str 12					

Table 18: Catalogue of clay mould fragments from Hungate

Full finds No	Cxt	cg	LUB	Period	Date	Context description	Description	No of frags	Length	Thick	Elements detected by XRF
H83 466	525	245	50	PM	E16	Str 12.1 wall	mould				Zn Pb Cu
H83 422	511	250	52	PM	16	Rubble dump : demolition Str 12	vitrified mould or ?hearth lining				Pb Cu (Sn Zn Sb)
H83 353	500	253	52	PM	16	Robber trench of Str 12	vitrified mould (?from in-gate) or ?hearth lining (two pieces analysed)	2	67	10	Cu Pb As (Sb Sn). Cu Pb (Zn Sn Sb)

Table 19: Catalogue of clay mould fragments from other sites

Full finds No	Cxt	cg	LUB	Period	Date	Context description	Description	No of frags	Length	Thick	Elements detected by XRF
XRF analyses marked * may only have detected slight traces of metals											
Lucy Tower											
LT72 P5	CN	44	20	PM	17-M18		mould for large object, ?foot from cauldron	1	74		Pb Zn Cu *
LT72 P11	CN	44	20	PM	17-M18		?from cope, mould diameter ~200mm	4	max 90	25	Cu Zn Pb *
The Park											
P70 P28	QW	N/A	8?	PM		Robbing of wall	mould for large object	1	70	25	Zn Cu Pb *
Swan Street											
SW82 51	8	174	50	LM-PM	M16	Demolition Str 13	mould for large object	1	45	15	Cu Zn Pb Sb *
SW82 235	54	153	59	PM	E18	Robbing of Str 13	mould for large object	1	50	15	Cu Zn *

Table 20: Catalogue of ingot moulds from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Material	Description	Use	Elements detected by XRF	Fig
F76 P46	BEA	t130	35	LS	E/M-L10	ii Road surface	fired clay	Irregular block of fired clay, now broken. Bar matrix is blackened and incomplete; L:50mm, W:14mm, D:12mm	silver	Cu, Zn, Pb, Ag, Br	16
F74 ST15	E11	sp109	45	LS	E-M/L11	v Spit	stone	Block cut from a quernstone. Complete matrices for two bars and a disc. The disc (Diam:30mm, D:4mm) and one bar (L:185mm, W:12 14mm, D:11mm) are on the flat surface. The other bar matrix (L:145mm, W:12mm D:5mm) is on the side.	silver	Cu, Zn, Pb, Ag (not known which matrix was analysed)	11
F74 M45	AZH	t74	60	SN	L10-M/L1	vi Str T21	stone	End fragment of a rectangular block of micaceous sandstone (surviving L:50mm, WL43mm), possibly a reused hone. One face has a disc matrix (Diam:~18mm) and a bar matrix (L:~45mm, W:6mm). Underside has an incomplete disc matrix. Both faces partly blackened.		na	12
F74 ST6	AUO	t81	63	SN	L11-E12	vii Levelling dump	stone	Irregular sandstone block, now broken; incomplete bar matrix L:120mm, W:19mm		na	15
F74 ST8	ACK	t93	68	SN	L10-E12	vii Surface E of Str T24	stone	Irregular ?sandstone block. The complete bar matrix (L:201mm, W:~20mm, D:14mm) is blackened	silver?	traces of Cu, Br	14
F72 M3	CX	t89	66	SN	E11-E12	vii-viii Str T24 Dump	stone	Complete stone ingot mould. Matrix measures L:88mm, W:11 14mm, D:7mm		na	
F72 M190	ABS	t130	85	EM	E/M-M10	x Str T38 hearth	stone	Micaceous sandstone, possibly unused as there is no blackening in or around the matrix, and no metals were detected. The matrix is complete and measures L:120mm, W:20-35mm, D:8mm	?unused	nd	13
F74 P115	B98	sp83	44	LS-SN	L10-M/L1	iii-vi Spit Occupation & dump	tile	Re-used as a mould. The letter C and a small disc shape have been cut into one large face. Only the area round the disc is blackened. Surviving L:135mm, W:110mm, D:35mm		Zn, Pb, Cu (area round disc)	41

Figure 41: Flaxengate: fragment of a tile with the letter C cut into it. The small blackened disc-shape on the edge nearest the scale may have been used as an ingot mould

Table 21: Catalogue of ingot moulds from other sites

Finds no	Cxt	cg	LUB	Period	Date	Context description	Material	Description	Elements detected by XRF	Fig
Grantham Place										
GP81 183	192	33	20	SN	L11-E12	Dump	stone	fragment, only one egde survives. L:120mm, D:30mm for darkened area.	Cu, Pb, Zn	17
Saltergate										
LIN73sa DI 62 [RN2690]	87	D35	21	EM	12?	Structure 3 levelling	stone	incomplete; soapstone vessel sherd re-used as mould. Incomplete, blackened matrix (L:34mm, W:18mm, D:5mm)	Cu	18
Holmes Grain										
HG72 M20	+					U/S	stone	rounded ?sandstone cobble with flattened upper surface, broken at one end (L: 160mm, W: 100mm). Surviving bar matrix is blackened (L:134mm, W:18mm)	Zn, Cu, Pb	19
HG72 P28	EL	149	39	LS	L10-11		ceramic	re-used ?Roman brick/tile (L:223mm, W:145) with incomplete bar matrix (L:200mm, W:12mm) cut into flat face. Some blackening in and around matrix	Zn, Pb, Cu	20

APPENDIX 4 CATALOGUE OF HEATING TRAYS

In Appendix 4 the additional columns are:

Type: of vessel

LS/SNLS	Lincoln Late Saxon/Saxo-Norman Sandy ware
LSLS	Lincoln Late Saxon Sandy ware
STCRUC	Stamford ware
LSCRUC	Lincoln Sandy ware
MS	Miscellaneous
LOCAL	local fabric

Reused:

X	purpose-made disc
yes	re-used potsherd

Diam: diameter (in mm)

This does not always agree with the size shown in Fig 26, probably because the sherds are small, and the discs hand made and therefore somewhat irregular

Vit: vitrified (glassy) surfaces

T	vitrified layer on part or all of top surface
TR	patches of red colour in vitrified layer on top surface
B	vitrified layer on part or all of bottom surface
BR	patches of red colour in vitrified layer on bottom surface
ER	patches of red colour in vitrified layer on edge

Cu	copper	)
Zn	zinc	)
Pb	lead	) elements detected by XRF
Sn	tin	)
Ag	silver	)
Au	gold	)

+++	strong XRF signal
++	detected
+	weak XRF signal
[+]	visible but not detected by XRF

Figs: Figure numbers in the main text and appendix

Table 22: Catalogue of heating trays from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	reused	Diam	Vit	Cu	Zn	Pb	Sn	Ag	Au	Figs
F76 P72	BOU	T14	20	LS	M/L-L9	i Road surface	JAR LS/SNLS	yes		T	++		+++				
F76 P73	CDQ	T7	22	LS	L9-M10	i Str T3 Hearth	JAR LSLS	yes		TR B	+++		+++				
F74 P166	E85	SP52	35	LS-SN	M10-E/M11	iii-vi Spit Road & dump	JAR LS/SNLS	yes		TR	+++		+++				43
F76 P25	BOH	T37	35	LS-SN	E/M-M10	iii Road surface	JAR LS/SNLS	yes		T	+++		+++	+			43
F76 P3	BDD	T289	36	LS-SN	E-M/L11	vi Pit F675	LSCRUC	x		TR	+++	++	+++		++		26:25; 42
F74 P193	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13		x									26:27
F74 P190	G72	SP36	38	LS	L10-E/M11	iii Spit Dump & occupation	STCRUC										
F74 P269	J11	SP37	38	LS	M-L10	ii-iii Spit Dump & occupation	LSCRUC		50	T B	++		++				26:19; 43
F74 P152	H11	SP88	38	LS	L10-M/L11	iii Spit Occupation	LSCRUC	x	70	T B	+++	++	+++				26:28
F74 P337	H12	SP88	38	LS	L10-M/L11	iii Spit Occupation	LSCRUC	x	30		+++		+++				26:23; 42
F74 P474	B103	SP48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	JAR LS/SNLS	yes		T	+++	++	+++	+			43
F74 P78	B104	SP48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation		x									
F74 P110	B105	SP48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	LSCRUC		40	TR ER	+++	+++	+++		+++		42
F74 P141	B105	SP48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	LSCRUC			T	+++		+++		+++		43
F74 P142	B105	SP48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	LSCRUC			ER?	+++	++	+++				
F74 P133	B99	SP81	44	LS-SN	L10-M/L11	iv-vi Spit Occupation	LSCRUC	x	35	TR BR	+++		+++		+++		26:20; 42
F74 P533	B98	SP83	44	LS-SN	L10-M/L11	iii-vi Spit Occupation & dump	STCRUC										
F76 P96	D32	SP109	45	LS-SN	E-M/L11	v Spit Occupation	JAR LS/SNLS	yes		TR BR ER	+++	+	+++				
F74 P75	E11	SP109	45	LS-SN	E-M/L11	v Spit Occupation	LSCRUC	x	40	TR BR ER	+++		+++		+		26:21; 42
F74 P89	E5	SP20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	LSCRUC	x	100?	TR	+++		+++		+		26:29; 43
F74 P150	E5	SP20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	LSCRUC			TR	+++		+++		+++		43
F74 P77	E6	SP20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	LSCRUC		50	TR	+++	++	+++				42
F74 P419	E6	SP20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	LSCRUC	x	45	TR	+++		+++				25; 26:22
F74 P199	G12	SP58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC			TR	+++	++	+++				43
F74 P332	G12	SP58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC	x	60	T B ER	+++	+++	+++	+			26:26; 42
F74 P336	G12	SP58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC		60	TR B ER	+++	++	+++		++		42
F74 P366	G12	SP58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	LSCRUC		70?	T BR ER	+++	+++	+++				42
F74 P94	F12	SP67	45	LS-SN	E-E/M11	iv-v Spit Dump & occupation	LSCRUC		60	T	+++	+++	+++				42
F74 P112	F29	SP71	45	LS-SN	L10-M/L11	iv-v Spit Dump	LSCRUC			TR	+++	+++	+++		++		
F74 P157	E9	SP72	45	LS-SN	E-M/L11	v-vi Spit Dump	LSCRUC			TR	+++		+++		+++		42
F74 P56	AVZ	T38	46	LS	E/M-M10	iv Levelling dump	LSCRUC		40?	TR BR ER	+++	+++	+++				
F76 P7	BEP	T51	52	SN	E/M-M/L11	v Levelling dump	JAR LS/SNLS	yes			++	++	+++	+			
F74 P497	AZN	T69	57	SN	E/M-M/L11	vi Road surface	JAR LS/SNLS	yes		T	+		+++	+			

Table 22: Catalogue of heating trays from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Type	reused	Diam	Vit	Cu	Zn	Pb	Sn	Ag	Au	Figs
F74 P57	AZN	T69	57	SN	E/M-M/L11	vi Road surface	JAR LS/SNLS	yes									
F74 P312	AWR	T68	58	SN	L11-E12	vi Levelling dump	JAR LS/SNLS	yes		TR	+++	++	+++				43
F74 P46	AZX	T68	58	SN	L11-E12	vi Levelling dump	LSCRUC	x	45	TR BR ER	+++	+++	+++		+++		26:24; 42
F74 P565	AZX	T68	58	SN	L11-E12	vi Levelling dump	JAR LS/SNLS	yes		T	+++	++	+++				
F74 P9	AON	T81	63	SN	L11-E12	vii Levelling dump	STCRUC			TR BR	+++	+++	+++				
F74 P261	AEE	T99	71	EM	L11-E12	viii Levelling dump	JAR LS/SNLS	yes		T	++	+	+++				
F74 P14	AGC	T111	77	EM	L10-12	ix Str T31 & T32 Floor	LSCRUC			TR ER	+++	++	+++		++		
F72 P53	OE	S74	127	LM	L14-L15	Bldg Eii Demolition & robbing	MS										
F74 P427	+	-	-	-	-	Unstratified	LOCAL	x		TR BR ER	+++		+++				
F74 P428	+	-	-	-	-	Unstratified	JAR LS/SNLS			T B	+++		++	+			

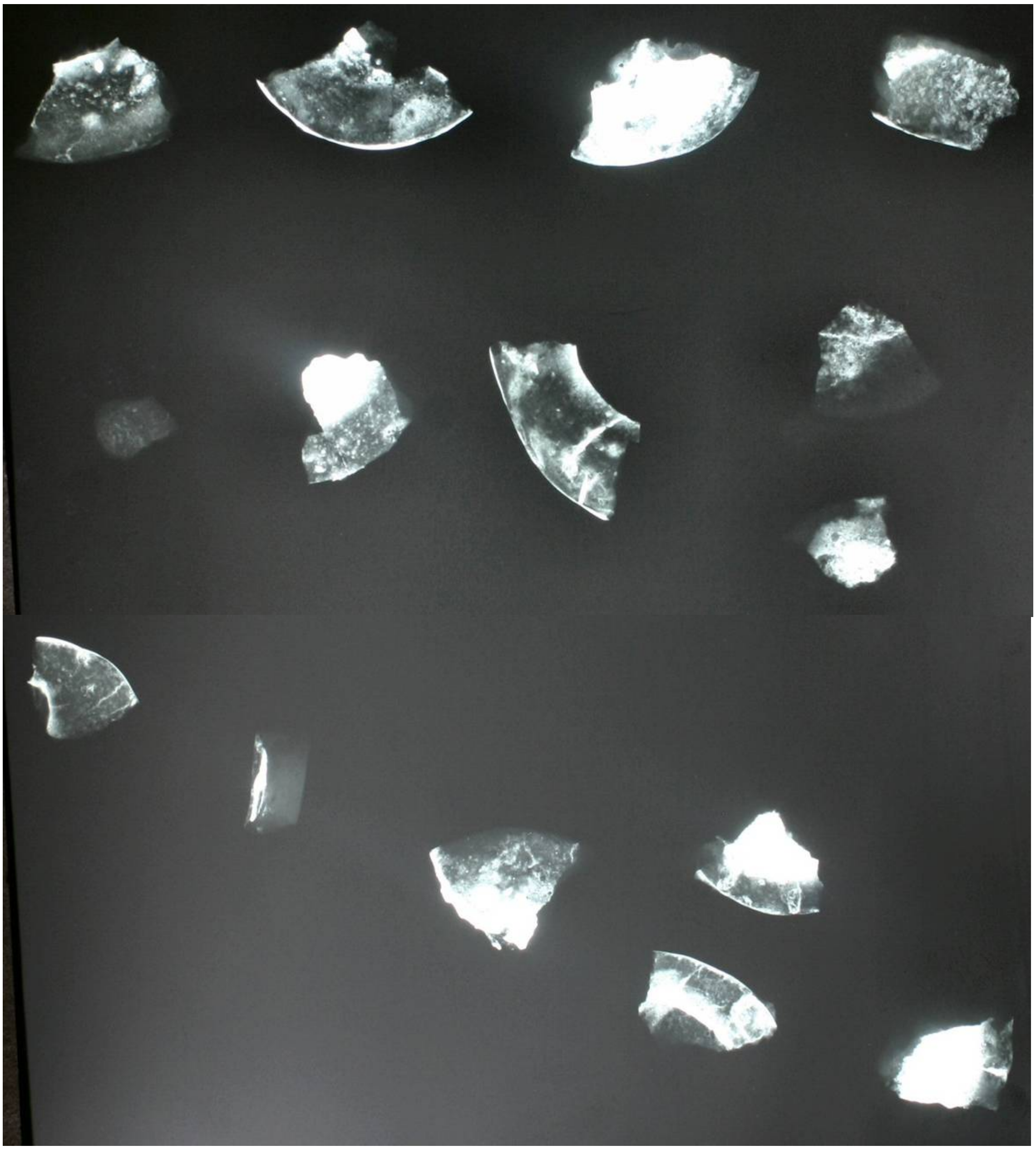


Figure 42: Flaxengate: X-radiograph of heating tray fragments (Plate 7 1980)
Top line (L to R): F76 P3; F74 p337; F74 P75; F74 P14
Middle line (L to R): F74 P157; F74 P94; F74 P366; F74 P133 (2 sherds)
Bottom line (L to R): F74 P110; F74 P336; F74 P332; F74 P46 (2 sherds); F74 P77
Image width 160mm

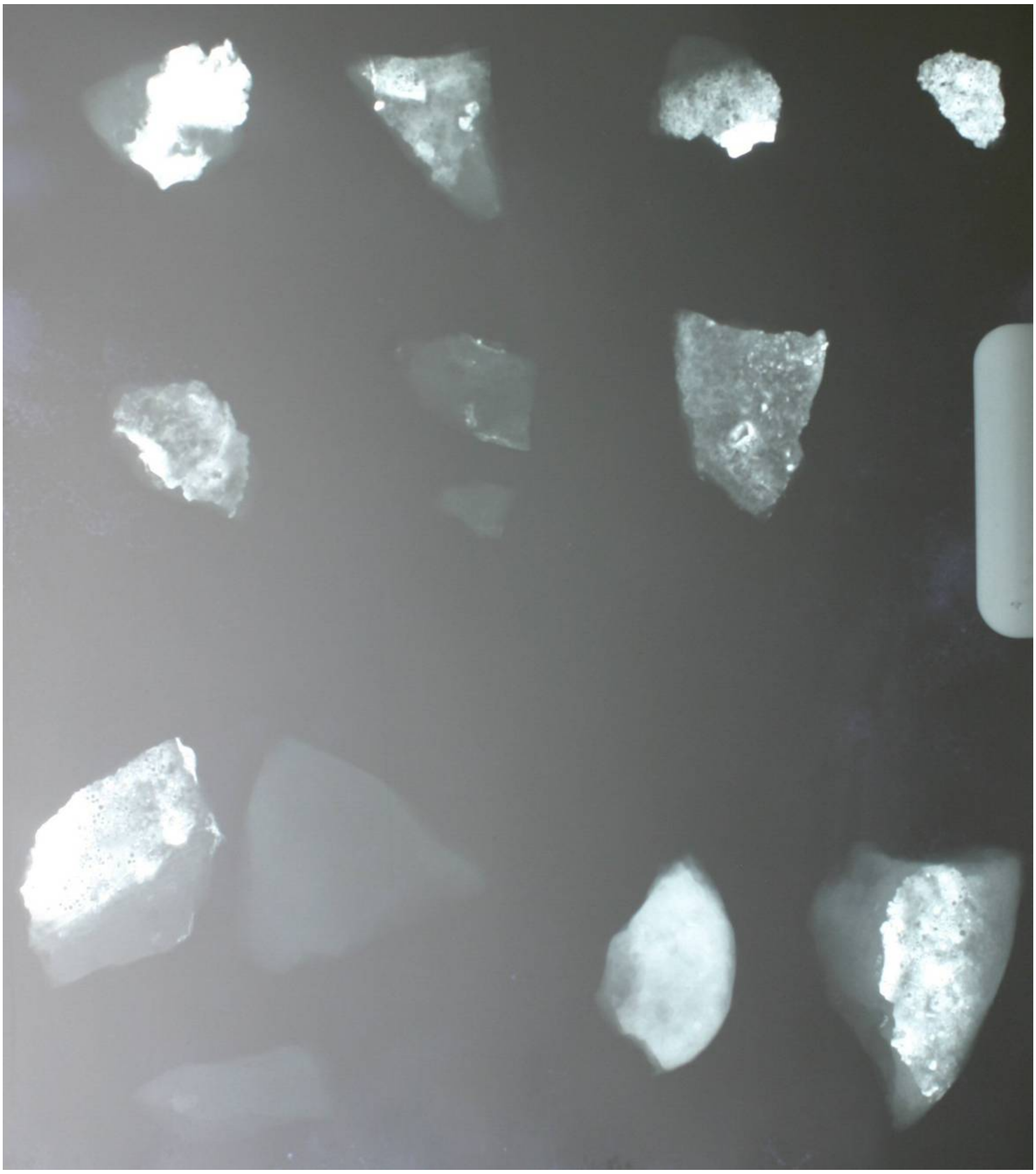


Figure 43: Flaxengate: X-radiograph of heating tray fragments (Plate 9 1980)
Top line (L to R): F74 P141; F76 P25; F74 P166; F74 P474
Middle line (L to R): F74 P150; F74 P269 (2 sherds); F74 P312
Bottom line (L to R): F74 P199 (3 sherds); [F74 P193]; F74 P89
Image width 165mm

Note that F74 P193 is part of a cylinder of fired clay and not a heating tray

Table 23: Catalogue of heating trays from other sites

Finds No	Cxt	cg	LUB	Period	Date	Description	Type	reused	Vit	Cu	Zn	Pb	Sn	Ag	Au
Silver Street B															
LIN73si BI - [RN1278]	1C	B54	40	EM-LM	M12-E/M13	Str 10 wall foundations	STCRUC	yes		+		++			+
Saltergate F															
LIN73sa F 504	44	F140	N/A							++		+++			
The Park															
P70 P40	IA	N/A	8?	PM		Pit	STCRUC	yes		+	+				yes
Steep Hill															
SH74 P8	QB	52	15	EM-HM	11-12	Str 5 occupation	EMCRUC	yes		+	+	++		+	
SH74 P10	MI	210	27	PM	16	Str 8.3 silting in drain	EMCRUC	yes	OI	+++		+++	+		
The heating trays from The Park and Steep Hill are also listed as possible crucibles															

APPENDIX 5 CATALOGUE OF LITHARGE CAKES

In Appendix 5 the additional columns are:
Lith No: unique number assigned to each litharge cake
Wt: in grams
Comments: other notes and analytical results.
Cerussite is lead carbonate, a common decay product of litharge.

Cu	copper	)
Pb	lead	) elements detected by XRF
Ag	silver	)

Elements written within brackets gave only a weak signal
Figs: Figure numbers in the main text and appendix

Figure 44: Flaxengate: quadrant of plano-convex litharge cake F76 BXN M47; the original edge is at the back of the picture

Figure 45: Flaxengate: litharge cake F76 BPM M30; a typical amorphous fragment

Table 24: Catalogue of litharge cakes from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Lith No	Wt	Comments	Fig
F76 M40	BVD	R80	16	LSAX	9	large pit	21	325	XRD (sample 11/31) detected cerrussite and copper. XRF detected Cu Pb Ag	
F76 Ae269	BXN	R101	17	LSAX	9	loam dump	26	80	?calcareous clay hearth	
F76 M47	BXN	R101	17	LSAX	9	loam dump	22	260	rim	44
F76 Pb33	BXN	R101	17	LSAX	9	loam dump	-		not seen	
F76 Fe290	BDQ	R90	25	LSAX	9/10	levelling loam dump	27	110	joins M22	28
F76 M14	BDS	R90	25	LSAX	9/10	levelling loam dump	24	50	?calcareous clay hearth	
F76 M22	BDQ	R90	25	LSAX	9/10	levelling loam dump	27	250	joins Fe290. XRD (sample 11/30) detected cerussite. XRF detected Pb (Cu)	28
F76 M33	BNF	R90	25	LSAX	9/10	levelling loam dump	23	110		
F76 M38	BDS	R90	25	LSAX	9/10	levelling loam dump	32	10		
F76 Ae163	BPM	R104	32	LSAX	9	loam dump	29	25		
F76 M30	BPM	R104	32	LSAX	9	loam dump	31	100		45
F76 M31	BPM	R104	32	LSAX	9	loam dump	30	30		
F76 M4	BCU	T19	32	LSAX	E10	ii; initial loam dumps	16/EL2	450	bone ash hearth lining **	
F76 M6	BDG	T19	32	LSAX	E10	ii; initial loam dumps	34	20		
F74 Ae456	B106	SP48	44	LSAX	M10	iii;16;loam dump and occupation	25	40		
F76 M41	BPH	S21	115	MED	L12	robber trench of wall of Roman building	33	50		
** Bulk analysis (SEM+EDX): CaO 21.8%, P2O5 17.3%, SiO2 1.2%, Al2O3 1.0%, PbO 43.7%, CuO 13.7%, Ag2O 2.8%										

Table 25: Catalogue of litharge cakes from Silver Street and Saltergate

Finds No	RN	Cxt	cg	LUB	Period	Date	Description	Lith No	Wt	Comments
Silver Street										
LIN73si C 57	1123	127	67	68	LROM	later 3	Dump		910	
Saltergate										
LIN73sa DI 165	3196	105	10	18	LS-SN	L 10	Rubbly loam	13		?calcareous clay hearth
LIN73sa DI 84	2852	75	52	24	EM-HM	E-EM13	Pit	9		
LIN73sa F 87	3030	96	126	N/A	LS	E-E/M11	Layer	11		
LIN73sa F 507	3695	156	136	N/A		M/L9-M10		15	20	
LIN73sa F 69	2904	44	140	N/A		E-M/L11		10	60	rim
LIN73sa F 75	3072	44	140	N/A		E-M/L11		12	25	rim
LIN73sa F 26	2444	35	141	N/A	SN	E/M-M/L11	Layer	7	20	
LIN73sa F 48	2659	68	141	N/A	SN	E/M-M/L11	Layer	8	30	rim?
LIN73sa DI 28	2059	1	999	N/A			N/A	6	520	?calcareous clay hearth
LIN73sa DI 183	3322	121	999	N/A			N/A	14	70	rim

Table 26: Catalogue of lithage cakes from Swan Street

Finds No	Cxt	cg	LUB	Period	Date	Description	Lith No	Wt	Comments
SW82 674	386	51	17	L-VLROM	VL4	Str1.6 occupation debris?	35		

APPENDIX 6 CATALOGUE OF PARTING VESSELS

In Appendix 6 the additional columns are:
PV No: unique number assigned to each vessel sherd
Sherd: type
Diam: diameter (in mm)

r	rim
m	at maximum
b	base

EOL: extra outer layer of less refractory clay

Cu	copper	)
Zn	zinc	)
Pb	lead	) elements detected by XRF
Sn	tin	)
Ag	silver	)
Au	gold	)

+++	strong XRF signal
++	detected
+	weak XRF signal
[+]	gold visible under a microscope but not detected by XRF

Comments: other notes and references to illustrations

Table 27: Catalogue of parting vessels from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	PV No	Sh	Cu	Zn	Pb	Sn	Ag	Au	Comments
F76 P91	BXN	r101	17	VLR-LS	VL4-L9	Dump	8	rim	++				++	++	diam~250mm.small
F76 P91	BXN	r101	17	VLR-LS	VL4-L9	Dump	9	rim	++				++	++	diam~250mm.large
F76 P90	CAI	r101	17	VLR-LS	VL4-L9	Dump	2	lid					+	+	
F76 P90	BHU	r105	17	VLR-LS	VL4-L9	Turf	4	lid			+		+		
F76 P91	BQZ	r108	21	LS	M/L9-E10	Str T2	10	base						[+]	
F76 P91	BDQ	r90	25	LS	L9-E/M10	Levelling dump	7	rim						[+]	diam 200mm
F76 P90	BDS	r90	25	LS	L9-E/M10	Levelling dump	6	lid			+		+	[+]	
F76 P92	BDS	r90	25	LS	L9-E/M10	Levelling dump									not seen
F76 P90	BCU	t19	32	LS	E/M-M10	ii Levelling dump	3	lid						[+]	
F76 P90	BNG	t259	44	LS-SN	E/M-M10	iii Spit; Pit F670	5	lid			+		+		
F76 P91	D46	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	11	rim							diam 240mm, base~200mm
F76 P91	G10	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	12	wall							
F76 P92	G54	sp111	44	LS-SN	E-E/M11	v Dump nr Str T18									not seen
PV Nos 7-11 all come from different vessels															
Not used as parting vessels															
F76 P88	BJZ	t258	31	LS	L9-M10	i Pit F663	1	?		+	+				
F76 P96	BDS	r90	25	LS	L9-E/M10	Levelling dump	13								
F76 P97	BDS	r90	25	LS	L9-E/M10	Levelling dump	14								
F76 P98	BDS	r90	25	LS	L9-E/M10	Levelling dump	15								

Table 28: Catalogue of parting vessels from Saltergate

Finds no	RN	Cxt	cg	LUB	Period	Date	Context description	PV No	Sh	Cu	Zn	Pb	Sn	Ag	Au	Comments
LIN73sa DI 340		113	D5	13	VLR-LS	VL4-L7/E8	Layer	17	base							
LIN73sa DI 342		123	D11	17	LS-SN	LS	Layer	19	rim							
LIN73sa DI 327		50	999	N/A				16	wall/base							post-Roman fabric?
LIN73sa DI 345		88	999	N/A				20	rim	+				++	++	diam~250mm
LIN73sa DI 404		88	999	N/A				21	rim	++	++			++	++	diam~200mm
LIN73sa DI 405		88	999	N/A				22	rim	+				++	+	
LIN73sa DI 406		88	999	N/A				23	base					++	++	
LIN73sa F 599		96	F126	N/A	LS	E-E/M11	Layer	24	base/wall							post-Roman fabric?
LIN73sa F 600		96	F126	N/A	LS	E-E/M11	Layer	25	wall	+				+	++	post-Roman fabric?
LIN73sa F 601		130	F96	N/A				26	base	++				++	+	
Not used as a parting vessel																
LIN73sa DI 341		50	999	N/A				18	wall							

Table 29: Catalogue of parting vessels from Grantham Place

Finds No	Cxt	cg	LUB	Period	Date	Context description	Sh	Cu	Zn	Pb	Sn	Ag	Au	Comments
GP81 202	261	10	4	L-VLR	L4-VL4	Dump (cut feature?)	base							
GP81 201	162	42	22	EM-HM	12	Floor?		+				+++	+	

APPENDIX 7 CATALOGUE OF SCRAP AND WASTE METAL

In Appendix 7 the additional columns are:
Description: of the object. May be further qualified, eg by
Cross section or Shape
Analysis: In Table 30 gives cross references to analyses in Tables 31 and 36

Cu	copper	)	
Zn	zinc	)	
Pb	lead	)	% composition of elements quantified by ICP-AES
Sn	tin	)	
Ag	silver	)	

Total: Sum of values for individual elements. A total that is not close to 100% means it may not be reliable; see Section 7 for a fuller discussion
RW No: Analysis No in White 1982; the data in Tables 31-35 comes from White 1982.
NB No: Analysis No in Blades 1995; the data in Tables 36 comes from Blades 1995. Note that Blades also determined contents of the following elements: sulphur, cobalt, chromium, manganese, vanadium, cadmium, bismuth and phosphorus (Blades 1995). All were present at very low levels.
Alloy name: This is assigned on the basis defined by Bayley and Butcher (2004, Table 5) and allows the general type of metal to be identified. Where the analytical total is not close to 100%, the proportions of zinc, tin and lead apparently present may not accurately represent the actual composition of the metal so the alloy name assigned may be incorrect. See Section 3 'Alloy composition' and Section 7 'Alloy names' for more details.

Table 30: Catalogue of scrap and waste metal from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Analysis (see Tables 31 and 36)
F76 Ae127	BDQ	r90	25	LS	L9-E10	Levelling dump	spillage/droplet	NB 1337
F76 Ae152	BDQ	r90	25	LS	L9-E10	Levelling dump	spillage	NB 1329
F76 Ae124	BDS	r90	25	LS	L9-E10	Levelling dump	spillage	
F76 Ae192	BOF	t175	32	LS	M/L9-E10	Levelling dump	spillage/droplet + spillage	
F76 Ae202	BOF	t175	32	LS	M/L9-E10	Levelling dump	spillage/droplet	
F76 Ae29	BCU	t19	32	LS	E/M-M10	ii Levelling dump	spillage/droplet + offcut	
F76 Ae17	BDG	t19	32	LS	E/M-M10	ii Levelling dump	spillage/droplet	
F76 Ae21	BDG	t19	32	LS	E/M-M10	ii Levelling dump	spillage/droplet	
F76 Ae37	BDG	t19	32	LS	E/M-M10	ii Levelling dump	offcut	NB 1332
F76 Ae149	BEU	t19	32	LS	E/M-M10	ii Levelling dump	spillage	
F76 Ae82	BEU	t19	32	LS	E/M-M10	ii Levelling dump	spillage/droplet	
F76 Ae167	BSH	t19	32	LS	E/M-M10	Levelling dump	offcut	
F74 Ae457	E84	sp52	35	LS-SN	M10-E/M11	iii-vi Spit Road & dump	spillage/droplet	NB 1336
F74 Ae403	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	spillage	
F74 Ae443	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	spillage	
F74 Ae525	BCM	t268	36	LS-SN	E/M-L10	ii-iv Pit F695	spillage	
F74 Ae526	BCO	t269	36	LS-SN	[L9-E/M12]	ii-iv Pit F706	spillage	
F74 Ae349	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	offcut	
F74 Ae350	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	offcut ? from bar	
F74 Ae353	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	spillage/droplet + offcut	
F74 Ae355	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	offcut	
F74 Ae358	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	offcut	NB 1333
F74 Ae26	ASF	t297	36	LS-SN	E/M12-E13	vii Pit F699	offcut	
F74 Ae32	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 robbing	spillage + offcut	
F74 Ae36	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 robbing	offcut	
F74 Ae37	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 robbing	spillage/droplet	
F74 Ae39	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 robbing	offcut	
F74 Ae537	J33	sp8	38	LS	E/M-M10	ii-iii Spit Dump	spillage/droplet	
F74 Ae474	G30	sp88	38	LS	L10-M/L11	iii Spit Occupation	offcut	
F74 Ae534	H10	sp88	38	LS	L10-M/L11	iii Spit Occupation	offcut	

Table 30: Catalogue of scrap and waste metal from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Analysis (see Tables 31 and 36)
F74 Ae413	H11	sp88	38	LS	L10-M/L11	iii Spit Occupation	spillage	
F74 Ae492	F94	sp26	44	LS-SN	E/M-L10	iii-iv Spit Occupation	offcut	
F74 Ae486	F87	sp29	44	LS-SN	M-L10	iii-iv Spit Occupation	spillage	NB 1335
F74 Ae401	C8	sp115	45	LS-SN	M/L9-M/L11	vi Spit Dump	offcut	
F74 Ae494	F49	sp13	45	LS-SN	L10	iii-iv Spit Dump nr Str T9 & T13	spillage	
F74 Ae523	F49	sp13	45	LS-SN	L10	iii-iv Spit Dump nr Str T9 & T13	spillage/droplet	
F74 Ae483	G49	sp13	45	LS-SN	L10	iii-iv Spit Dump nr Str T9 & T13	offcut, 2	
F74 Ae476	G29	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump nr Str T13	offcut	
F74 Ae442	D47	sp20	45	LS-SN	L10-M/L11	ii-vi Spit Dump	spillage/droplet	
F74 Ae412	G12	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	offcut	
F74 Ae479	G32	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	spillage/droplet	
F74 Ae455	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	spillage	
F74 Ae467	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	spillage/droplet	
F74 Ae386	E8	sp69	45	LS-SN	E/M-M/L11	iv-v Spit Dump & pit	spillage/droplets, 3 + offcut	RW 48
F74 Ae383	D8	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	spillage	
F74 Ae323	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	offcut	
F74 Ae343	AVZ	t38	46	LS	E/M-M10	iv Levelling dump	offcut	
F74 Ae345	AZW	t38	46	LS	E/M-M10	iv Levelling dump	spillage/droplet	
F74 Ae325	AUT	t51	52	SN	E/M-M/L11	v Levelling dump	copper 'pan'	
F74 Ae336	BAF	t51	52	SN	E/M-M/L11	v Levelling dump	copper 'pan'	
F74 Ae376	AVI	t193	53	SN	E-M/L11	iv-v Dumps assoc Str T17	offcut	NB 1323
F74 Ae426	AVI	t193	53	SN	E-M/L11	iv-v Spit Dumps assoc Str T17	spillage/droplet	NB 1334
F74 Ae262	AZE	t167	54	SN	L11-M12	v Dumps assoc Str T18	spillage/run	RW 42
F74 Ae294	AZE	t167	54	SN	L11-M12	v Dumps assoc Str T18	offcut	
F74 Ae290	AZN	t69	57	SN	E/M-M/L11	vi Road surface	offcut	
F74 Ae291	AZN	t69	57	SN	E/M-M/L11	vi Road surface	spillage	
F74 Ae171	ART	t68	58	SN	L11-E12	vi Levelling dump	spillage	
F74 Ae271	AWR	t68	58	SN	L11-E12	vi Levelling dump	spillage	
F74 Ae310	AWR	t68	58	SN	L11-E12	vi Levelling dump	spillage/droplet	
F74 Ae319	AZW	t68	58	SN	L11-E12	vi Levelling dump	offcut	

Table 30: Catalogue of scrap and waste metal from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Analysis (see Tables 31 and 36)
F74 Ae264	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	spillage/run + offcut	RW 43
F74 Ae277	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	spillage/run	RW 45
F74 Ae363	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	offcut, 6	
F74 Ae269	AUN	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	spillage/droplet	
F74 Ae332	AUX	t77	60	SN	L10-M/L11	vi Surface assoc Str T21	copper 'pan'	
F74 Ae177	AOK	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae114	AOM	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae117	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae118	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae119	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae121	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae212	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage	
F74 Ae233	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage	NB 1344
F74 Ae82	AOM	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae104	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage	RW 39
F74 Ae105	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae115	AON	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae125	AON	t81	63	SN	L11-E12	vii Levelling dump	offcuts, 2	
F74 Ae126	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplets, 2	
F74 Ae127	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet + offcut	
F74 Ae154	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/run	RW 40
F74 Ae157	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	RW 41
F74 Ae181	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplets, 2	NB 1347
F74 Ae182	AON	t81	63	SN	L11-E12	vii Levelling dump	offcut + copper 'pan'	
F74 Ae190	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet + offcut	NB 1345
F74 Ae195	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage	
F74 Ae227	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae235	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage	
F74 Ae239	AON	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae543	AON	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	

Table 30: Catalogue of scrap and waste metal from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Analysis (see Tables 31 and 36)
F74 Ae544	AON	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae229	AOV	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae230	AOV	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae243	AOV	t81	63	SN	L11-E12	vii Levelling dump	spillage/droplet	
F74 Ae305	AQQ	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae174	ARG	t81	63	SN	L11-E12	vii Levelling dump	copper 'pan'	
F74 Ae162	ARJ	t81	63	SN	L11-E12	vii Levelling dump	offcut	NB 1313
F74 Ae285	ARS	t81	63	SN	L11-E12	vii Levelling dump	copper 'pan'	
F74 Ae311	ARS	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae252	ARW	t81	63	SN	L11-E12	vii Levelling dump	copper 'pan'	
F74 Ae261	ARZ	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae284	ARZ	t81	63	SN	L11-E12	vii Levelling dump	spillage/run	RW 46
F74 Ae148	ATS	t81	63	SN	L11-E12	vii Levelling dump	spillage	
F74 Ae265	ATV	t81	63	SN	L11-E12	vii Levelling dump	spillage/run	RW 44
F74 Ae49	ATV	t81	63	SN	L11-E12	vii Levelling dump	spillage	
F74 Ae95	ATV	t81	63	SN	L11-E12	vii Levelling dump	spillage	
F74 Ae244	AVT	t81	63	SN	L11-E12	vii Levelling dump	offcut	
F74 Ae267	AON	t86	63	SN	E/M12-E/M13	vii Levelling dump	spillage/droplet	
F74 Ae312	AON	t86	63	SN	E/M12-E/M13	vii Levelling dump	spillage	
F74 Ae272	ARX	t87	66	SN	E/M11-E12	vii Str T24 Floor	spillage	
F74 Ae146	AOU	t88	66	SN	E/M-M12	vii Str T24 Floor	offcut + copper 'pan'	
F74 Ae158	AVF	t88	66	SN	E/M-M12	vii Str T24 Floor	spillage/droplet	
F74 Ae145	AVG	t88	66	SN	E/M-M12	vii Str T24 Floor	offcut + copper 'pan'	
F74 Ae155	AVG	t88	66	SN	E/M-M12	vii Str T24 Floor	spillage + offcut	
F72 Ae299	APB	t91	67	SN	L11-M12	vii Str T25 Floor	spillage/droplet	RW 38
F74 Ae101	AOP	t95	69	SN	E/M11-E/M12	vii Str T26	spillage/droplet	
F74 Ae100	AOQ	t95	69	SN	E/M11-E/M12	vii Str T26	offcut	
F74 Ae144	AWL	t296	70	SN	E/M-M12	vii Pit F710	offcut	
F74 Ae251	AUL	t299	70	SN	E-M/L11	vii Pit F707	spillage/droplet + offcut	
F74 Ae46	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	

Table 30: Catalogue of scrap and waste metal from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Analysis (see Tables 31 and 36)
F74 Ae68	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae70	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplets, 4	
F74 Ae71	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae72	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae74	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage	
F74 Ae75	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae92	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae98	AIO	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae8	AIP	t99	71	EM	L11-E12	viii Levelling dump	offcut	
F74 Ae139	ASX	t99	71	EM	L11-E12	viii Levelling dump	offcut	
F74 Ae226	ASX	t99	71	EM	L11-E12	viii Levelling dump	spillage/droplet	
F74 Ae268	ASX	t99	71	EM	L11-E12	viii Levelling dump	copper 'pan'	
F74 Ae142	AOS	t102	72	EM	E/M-M12	viii Str T27 Hearth	spillage/droplet	
F74 Ae12	AKP	t160	72	EM	E/M-M12	viii Dump assoc Str T27/28	spillage	
F74 Ae13	AKP	t160	72	EM	E/M-M12	viii Dump assoc Str T27/28	spillage/droplet	
F74 Ae23	AKP	t160	72	EM	E/M-M12	viii Dump assoc Str T27/28	offcut	
F74 Ae18	ANU	t306	73	EM	E/M12-E13	viii Str T28 Pit F562	offcut	
F74 Ae107	AIM	t113	78	EM	E/M-M12	ix Str T33	offcut	
F74 Ae131	AIM	t113	78	EM	E/M-M12	ix Str T33	spillage/droplet + offcut	
F72 Ae270	ABU	t121	82	EM	M/L12-E/M13	x Levelling dump	spillage/droplet	
F72 Ae292	ABU	t121	82	EM	M/L12-E/M13	x Levelling dump	worked blob	
F74 Ae185	AIT	t156	85	EM	E/M-M12	x-xi Dump assoc Str T38 & T42/43	copper 'pan'	
F72 Ae253	AEK	t158	86	EM	E/M12-E/M13	x-xi Dumps assoc Str T39	offcut	
F72 Ae130	MC	t122	90	EM	E/M-M/L12	xi Levelling dump	offcut - object fragment	
F74 M32	AIZ	t224	95	EM	M12-E13	Pit F713	spillage/droplet	
F74 Ae33	ALR	t224	95	EM	M12-E13	xi Pit F713	offcut	
F74 Ae61	ATN	t243	95	EM	M12-E13	xi Pit F732	offcut	
F72 Ae212	WP	t153	100	EM	M-M/L12	Pit F16	offcut	
F74 Ae16	ALQ	t248	100	EM	M/L12-E13	xii Pit F737	spillage/droplet	
F72 Ae231	VV	t305	106	EM	E/M-M12	xiii Road surface F752	offcut	

Table 30: Catalogue of scrap and waste metal from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Analysis (see Tables 31 and 36)
F72 Ae60	BE	s1	108	EM-HM	E13-M14	Levelling	offcut	
F74 Ae22	AIW	s37	113	EM-HM	E13-M14	Bldg A Pit F54	spillage/droplet	
F72 Ae152	OS	s25	116	EM-HM	E13-M14	Dumps assoc with constr Bldg Eii	offcut	
F74 Ae42	ALU	s28	116	EM-HM	E13-M14	Pit F14 to rear of Bldg E	offcut	
F74 Ae63	ALV	s28	116	EM-HM	E13-M14	Pit F14 to rear of Bldg E	offcut - triangular xs	
F72 Ae14	AN	s91	120	LM	L14-L15	Bldg Aii Pit F72	offcut	
F72 Ae2	AC	s133	127	LM	M15-M/L16	Bldg Aii demolition F68	offcut	
F72 Ae198	OR	s30	127	LM	L14-L15	Bldg Eii infill of garderobe F1	offcut	
F72 Ae207	ZR	s74	127	LM	L14-L15	Bldg Eii demolition & robbing	offcut	
F72 Ae103	JK	s112	129	LM	M-L15	Bldg C infill of features F83 & F85	offcut	
F72 Ae108	JH	s87	130	LM	M-L15	Accumulation above Bldg Eii	spillage	
F72 Ae109	JH	s87	130	LM	M-L15	Accumulation above Bldg Eii	offcut	
F72 Ae115	GV	s113	133	LM-PM	M15-M/L16	Bldg C infill of oven F84	offcut from as-cast bar	
F72 Ae88	FH	s141	137	PM	E-M/L16	Levelling	spillage/droplet	
F72 Ae94	FH	s141	137	PM	E-M/L16	Levelling	copper 'pan'	
F72 Ae97	FH	s141	137	PM	E-M/L16	Levelling	copper 'pan'	
F72 Ae59	DK	s152	141	PM	M-L17	Bldg D robbing	offcut	
F74 Ae24	+	-	-	-	-	Unstratified	spillage/droplets, 3 + offcut	
F74 Ae222	+	-	-	-	-	Unstratified	copper 'pan'	
F74 Ae375	+	-	-	-	-	Unstratified	offcut	

Table 31: Catalogue of analysed spillages from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Cu	Zn	Pb	Sn	Ag	Total	RW No	Alloy name
F74 Ae386	E8	sp69	45	LS	E/M-M/L11	iv-v Spit Dump & pit	76.7	4.9	2.8	1.1	1.3	86.8	48	copper/brass
F74 Ae262	AZE	t167	54	SN	L11-M12	v Dumps assoc Str T18	67.2	10.1	8.2	2.0	0.6	88.1	42	leaded brass
F74 Ae264	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	65.8	nd	4.6	15.1	0.4	85.9	43	(leaded) bronze
F74 Ae277	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	65.5	12.9	10.5	1.2	0.6	90.7	45	leaded brass
F74 Ae104	AON	t81	63	SN	L11-E12	vii Levelling dump	79.1	10.3	3.4	1.0	0.4	94.2	39	brass
F74 Ae154	AON	t81	63	SN	L11-E12	vii Levelling dump	82.7	14.4	4.1	1.2	nd	102.4	40	(leaded) brass
F74 Ae157	AON	t81	63	SN	L11-E12	vii Levelling dump	93.7	1.9	6.5	1.1	0.5	103.7	41	(leaded) copper
F74 Ae265	ATV	t81	63	SN	L11-E12	vii Levelling dump	87.8	nd	7.5	11.3	0.3	106.9	44	(leaded) bronze
F74 Ae284	ARZ	t81	63	SN	L11-E12	vii Levelling dump	75.5	17.5	6.6	11.1	0.5	111.2	46	(leaded) gunmetal
F72 Ae299	APB	t91	67	SN	L11-E/M12	vii Str T25 Floor	87.4	3.5	0.8	1.0	0.7	93.4	38	copper/brass

Table 32: Catalogue of analysed bars and bar ingots from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	cross section	Cu	Zn	Pb	Sn	Ag	Total	RW No	Alloy name
F76 Ae256	BXN	r101	17	VLR-LS	M/L-L9	Dump	strip	rectangular	82.7	4.7	6.8	6.5	1.8	102.5	82	(leaded) gunmetal
F76 Ae73	BDQ	r90	25	LS	L9-E10	Levelling dump	strip	square	81.1	11.0	4.3	1.1	0.4	97.9	79	(leaded) brass
F76 Ae134	BNF	r90	25	LS	L9-E10	Levelling dump	strip	square	86.1	nd	0.2	1.1	0.8	88.2	80	copper
F76 Ae183	BNK	t261	31	LS	L9-M10	I Pit F658	strip	rectangular	95.0	0.1	0.2	7.4	0.2	102.9	81	bronze
F74 Ae509	BCO	t269	36	LS-SN	[L9-E/M12]	ii-iv Pit F706	strip, decorated	square	85.1	1.8	nd	nd	0.3	87.2	75	copper
F74 Ae19	APQ	t66	36	LS-SN	L11-E12	v-vi Str R3 robber trench	strip; decorated	rectangular	91.6	nd	0.8	0.9	0.6	93.9	53	copper
F74 Ae447	B100	sp44	44	LS-SN	L10	iii-v Spit Occupation	strip	rectangular	98.5	nd	1.0	1.3	0.4	101.2	74	copper
F74 Ae409	B93	sp84	44	LS-SN	L10-M/L11	iv-vi Spit Occupation	hook	square	96.2	1.8	2.0	1.6	0.4	102.0	71	copper
F74 Ae432	D31	sp109	45	LS-SN	E-M/L11	v Spit Occupation	strip, decorated	square	85.7	7.3	2.8	1.4	0.3	97.5	73	copper/brass
F74 Ae524	G10	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	strip, decorated	rectangular	92.8	nd	0.2	1.3	1.3	95.6	76	copper
F74 Ae425	E32	sp67	45	LS-SN	E-E/M11	iv-v Spit Dump & occupation	strip	thin rectangular	84.5	12.4	4.3	2.7	0.2	104.1	72	(leaded) brass
F74 Ae258	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	strip	rectangular	93.3	1.5	4.0	3.8	4.3	106.9	61	(leaded) bronze/ gunmetal
F74 Ae260	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	bar/?ingot	square	86.6	7.2	3.8	6.5	1.8	105.9	62	gunmetal
F74 Ae270	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	strip; tapers	square	82.5	10.2	3.3	1.7	0.1	97.8	63	brass
F74 Ae283	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	strip	square	86.3	8.1	5.4	1.6	0.3	101.7	64	(leaded) brass
F74 Ae287	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	strip	square	78.7	13.8	4.2	1.7	0.2	98.6	65	(leaded) brass
F74 Ae288	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	ingot	square	78.1	11.3	2.2	1.2	0.3	93.1	66	brass
F74 Ae301	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	bar	rectangular	106.1	0.3	1.4	1.3	7.2	116.3	67	copper
F74 Ae303	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	strip	square/rectangular	92.4	6.0	2.7	1.6	0.4	103.1	68	copper/brass
F74 Ae363	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	ingot		76.6	5.1	2.3	1.3	0.3	85.6	69	copper/brass
F72 Ae301	AIB	t81	63	SN	L11-E12	vii Levelling dump	strip	rectangular	88.5	5.4	1.0	9.1	1.2	105.2	83	bronze/gunmetal
F74 Ae103	AOK	t81	63	SN	L11-E12	vii Levelling dump	strip	polygonal	75.5	5.1	2.2	7.7	0.8	91.3	56	bronze/gunmetal
F74 Ae123	AON	t81	63	SN	L11-E12	vii Levelling dump	strip	square/rectangular	84.8	14.0	4.3	2.4	0.4	105.9	58	(leaded) brass
F74 Ae151	AON	t81	63	SN	L11-E12	vii Levelling dump	ingot	square	72.4	20.6	6.5	1.4	0.5	101.4	59	(leaded) brass
F74 Ae179	AON	t81	63	SN	L11-E12	vii Levelling dump	strip; tapers	square	75.7	19.1	1.4	1.2	0.3	97.7	60	brass
F74 Ae547	ARS	t81	63	SN	L11-E12	vii Levelling dump	strip, decorated	thin rectangular	83.3	15.1	4.7	2.1	0.3	105.5	70	(leaded) brass
F76 Ae51	BFJ	t85	65	SN	[12-E13]	vii Str T23 Hearth	strip		84.9	4.6	1.9	1.2	0.4	93.0	78	copper/brass
F72 Ae230	IG	t99	71	EM	L11-E12	viii Levelling dump	strip	square	80.8	14.7	0.7	3.1	0.1	99.4	51	brass
F74 Ae108	AIO	t99	71	EM	L11-E12	viii Levelling dump	strip	square/rectangular	85.0	15.7	nd	1.4	0.3	102.4	57	brass
F74 Ae28	APE	t160	72	EM	E/M-M12	viii Dumps associated with Str T27/28	strip	rectangular	81.4	6.5	2.1	1.4	0.1	91.5	54	copper/brass
F74 Ae4	ACY	t156	85	EM	E/M-M12	x-xi Dumps associated with Str T38 & T42/43	strip	rectangular	83.9	4.6	3.8	1.7	0.2	94.2	52	copper/brass
F74 Ae48	ALU	s28	116	EM-HM	E13-M14	Pit F14 to rear of Bldg E	strip	semi-circular	86.2	5.3	3.5	1.0	0.3	96.3	55	copper/brass
F72 Ae65	FE	s87	130	LM	M-L15	Accumulation above Bldg Eii	bar	rectangular	85.9	5.0	1.9	8.1	0.3	101.2	49	bronze/gunmetal
F72 Ae77	FN	s126	135	PM	E-M/L16	Bldg E levelling	strip	circular/rectangular	90.9	5.3	0.4	8.3	0.3	105.2	50	bronze/gunmetal
F76 Ae4	+	-	-	-	-	Unstratified	strip; tapers	square	80.2	9.3	4.7	1.3	0.2	95.7	77	(leaded) brass

Table 33: Catalogue of analysed wire from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	cross sectio	Cu	Zn	Pb	Sn	Ag	Total	RW No	Alloy name
F76 Ae292	BVL	r22	7	LR	M3	Demolition debris	rod; hook-shaped	circular	75.0	1.1	0.1	9.4	0.1	85.6	36	bronze
F76 Ae231	BVQ	r86	24	LS	[L9-E10]	Pit	rod	polygonal	89.8	nd	0.6	11.5	0.6	102.5	34	bronze
F76 Ae102	BKK	r68	25	LS	E/M-M10	Dump & trample	pin		85.5	nd	1.3	10.0	0.2	97.0	29	bronze
F76 Ae75	BKK	r68	25	LS	E/M-M10	Dump & trample	strip	semi-oval	74.2	11.7	1.2	2.8	0.3	90.2	27	brass
F76 Ae151	BDQ	r90	25	LS	L9-E10	Levelling dump	pin		83.3	10.2	0.4	2.7	0.1	96.7	31	brass/gunmetal
F76 Ae120	BDS	r90	25	LS	L9-E10	Levelling dump	ring fragment		80.0	nd	4.2	11.8	0.3	96.3	30	(leaded) bronze
F76 Ae84	BDS	r90	25	LS	L9-E10	Levelling dump	rod; hooked, decorated		78.3	4.0	5.8	4.6	0.7	93.4	28	(leaded) gunmetal
F76 Ae69	BDM	r100	32	LS	L9-E10	Dump	rod; decorated		79.4	4.3	3.5	4.7	4.1	96.0	26	gunmetal
F76 Ae199	BRT	r103	32	LS	L9-E10	Demolition debris	rod	polygonal	63.6	7.3	2.3	7.3	0.6	81.1	33	gunmetal
F74 Ae516	BCL	r104	32	LS	E/M-M10	Dump	rod; part of object	oval	64.4	7.3	1.5	8.4	0.7	82.3	25	gunmetal
F76 Ae261	CAO	t25	34	LS	L9-E10	ii Str T8	ring fragment	variable	72.5	17.4	0.5	1.8	0.2	92.4	35	brass
F76 Ae168	BOH	t37	35	LS-SN	E/M-M10	iii Road surface	rod	circular	73.2	3.1	8.7	9.6	0.9	95.5	32	leaded bronze
F74 Ae329	AVV	t281	36	LS-SN	E11-E12	v-vi Pit F693	pin	circular	87.1	nd	nd	10.6	0.4	98.1	13	bronze
F74 Ae340	ASO	t66	36	LS-SN	L11-E12	v-vi Str R3 Robbing	wire; thin and twisted	circular	89.0	3.5	1.5	1.1	0.3	95.4	14	copper/brass
F74 Ae501	G103	sp4	43	LS	E/M-M10	iii Spit Dump over Str T8	rod	circular	80.0	4.8	6.5	4.8	8.6	104.7	24	(leaded) gunmetal
F74 Ae458	E81	sp47	44	LS-SN	L10-E/M11	iii-v Spit Occupation (Str T10, T15, T18)	rod	circular to oval	76.8	13.0	1.6	2.9	0.1	94.4	21	brass
F74 Ae433	H9	sp19	45	LS-SN	E-M/L11	iii-iv Spit Dump near Str T13	rod	polygonal	72.5	18.6	nd	5.5	0.1	96.7	18	brass/gunmetal
F74 Ae477	E26	sp20	45	LS-SN	E/M10-M/L11	ii-vi Spit Dump	ring fragment	oval	76.5	16.7	0.4	1.2	nd	94.8	22	brass
F74 Ae453	E48	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	rod; needle fragment		79.4	4.8	0.3	2.4	0.2	87.1	20	gunmetal
F74 Ae434	D28	sp85	45	LS-SN	L10-M/L11	iv-vi Spit Dump	rod	circular	70.4	9.1	2.9	1.6	0.3	84.3	19	brass
F74 Ae276	AVI	t193	53	SN	E-M/L11	iv-v Dumps associated with Str T17	hook	circular	98.5	1.5	2.7	1.2	0.4	104.3	12	copper
F74 Ae186	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	rod	polygonal	82.4	9.2	6.0	1.0	0.4	99.0	6	(leaded) brass
F74 Ae263	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	rod	circular to polygonal	79.6	7.2	4.1	1.2	0.3	92.4	15	(leaded) brass
F74 Ae266	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	rod; file marks	polygonal	88.6	5.0	5.2	1.2	0.4	100.4	10	(leaded) copper/brass
F74 Ae274	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	hook-shaped	circular	94.6	nd	1.3	1.0	0.5	97.4	11	copper
F74 Ae197	AON	t81	63	SN	L11-E12	vii Levelling dump	rod	polygonal	71.2	15.6	7.7	1.1	0.4	96.0	7	(leaded) brass
F74 Ae85	AON	t81	63	SN	L11-E12	vii Levelling dump	hook	circular	80.3	0.6	0.3	1.2	0.6	83.0	4	copper
F74 Ae200	ARW	t81	63	SN	L11-E12	vii Levelling dump	rod	circular	81.7	15.0	2.8	1.1	0.5	101.1	9	brass
F72 Ae282	AMP	t91	67	SN	L11-M12	vii Str T25 Floor	wire; S-shaped links		57.5	9.3	0.2	1.6	0.1	68.7	2	brass
F74 Ae159	AWL	t296	70	SN	E/M-M12	vii Pit F710	rod	circular	98.0	nd	4.2	1.2	0.5	103.9	5	(leaded) copper
F74 Ae21	ALB	t98	70	SN	L10-M/L11	vii Pit F708	rod; decorated	circular	72.2	17.8	0.0	1.1	0.3	91.4	3	brass
F72 Ae245	AFK	t121	82	EM	M/L12-E/M13	x Levelling dump	rod	circular	50.0	6.2	0.8	0.9	0.2	58.1	1	brass
F74 Ae417	+	-	-	-	-	Unstratified	ring fragment	circular	84.5	nd	1.3	1.1	0.7	87.6	16	copper
F74 Ae496	H79	-	-	-	-	Unstratified	rod		71.5	23.2	1.9	1.2	0.4	98.2	23	brass

Table 34: Catalogue of analysed sheet from Flaxengate

Full finds no	Cxt	cg	LUB	Period	Date	Context description	Description	Cu	Zn	Pb	Sn	Ag	Total	RW No	Alloy name
F74 Ae320	AVV	t281	36	LS	E-M/L11	v-vi Pit F693		79.2	2.4	3.7	11.2	1.2	97.7	118	bronze
F74 Ae468	F72	sp56	38	LS	L10	iv-v Spit Occupation & dump	thin; ?object	91.5	0.9	1.1	11.3	0.5	105.3	120	bronze
F74 Ae466	E28	sp68	45	LS	L10-M/L11	iv-v Spit Dump		87.5	9.0	2.5	0.7	0.6	100.3	119	brass
F74 Ae168	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	tool marks	86.2	12.1	nd	1.5	0.3	100.1	114	brass
F74 Ae256	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36		84.5	5.1	2.4	0.5	1.5	94.0	115	copper/brass
F74 Ae300	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	thick	73.5	10.1	7.0	0.5	0.5	91.6	116	(leaded) brass
F74 Ae307	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	thin	73.2	11.3	4.2	0.4	0.5	89.6	117	(leaded) brass
F74 Ae83	AON	t81	63	SN	L11-E12	vii Levelling dump	thin	98.0	nd	1.7	1.4	0.5	101.6	111	copper
F74 Ae89	ATV	t81	63	SN	L11-E12	vii Levelling dump		78.2	7.9	8.0	1.3	0.4	95.8	112	(leaded) brass
F74 Ae160	AON	t81	63	SN	L11-E12	vii Levelling dump	thin strip	95.3	4.9	3.6	1.3	6.8	111.9	113	copper/brass
F74 Ae53	ATU	t99	71	EM	L11-E12	viii Levellling dump	decorated	74.3	5.0	10.2	1.5	0.3	91.3	109	leaded brass
F72 Ae257	AJE	t109	76	EM	E-E/M13	ix Levelling dump	thin	90.9	2.5	3.9	2.0	2.5	101.8	107	copper
F72 Ae291	ABU	t121	82	EM	M/L12-E/M13	x Levelling dump	thick	78.0	5.8	13.1	1.8	0.2	98.9	108	leaded brass/gunmetal
F72 Ae228	IH	t246	95	EM	M12-E13	xi Pit F735	thin	76.9	7.2	7.5	3.1	0.2	94.9	106	(leaded) gunmetal
F72 Ae216	XF	t149	105	EM	E/M12-E/M13	xiii StrT51 Dump	tapering section	69.8	8.5	10.5	1.9	0.7	91.4	105	leaded brass
F74 Ae54	ALU	s28	116	E-HM	E13-M14	Pit F14 to rear of Bldg E	?object	92.6	0.6	1.4	1.1	0.4	96.1	110	copper
F72 Ae157	KV	s145	139	PM	M17-M18	Levelling	thin and folded	29.5	2.7	0.2	1.9	nd	34.3	104?	

Table 35: Catalogue of analysed tags from Flaxengate

Finds no	Cxt	cg	LUB	Period	Date	Context description	Description	shape	Cu	Zn	Pb	Sn	Ag	Total	RW No	Alloy name
F74 Ae354	BAB	t290	36	LS	E-M/L11	vi Pit F674	unfinished	triangular	87.1	10.8	1.5	1.5	0.3	101.2	99	brass
F74 Ae335	BAB	t290	36	LS	E-M/L11	vi Pit F674	unfinished	triangular	85.6	10.0	2.5	1.6	0.2	99.9	102	brass
F76 Ae85	BGZ	t31	41	LS	E/M-M10	iii Levelling dump	unfinished	triangular	90.6	3.4	0.6	5.0	0.4	100.0	85	gunmetal
F74 Ae306	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished; cracked	triangular	77.9	5.8	2.7	1.0	2.5	89.9	87	copper/brass
F74 Ae167	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	circular	89.2	6.9	2.1	1.3	0.3	99.8	89	copper/brass
F74 Ae289	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished; distorted	triangular	84.4	8.0	3.0	1.5	0.4	97.3	91	brass
F74 Ae165	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	88.0	5.8	3.9	1.9	0.6	100.2	92	copper/brass
F74 Ae286	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	almost complete; relief decoration	triangular	80.9	12.0	3.5	1.2	1.8	99.4	93	brass
F74 Ae308	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	79.9	10.9	3.5	1.1	0.3	95.7	96	brass
F74 Ae170	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	84.9	11.2	3.4	1.3	0.5	101.3	97	brass
F74 Ae302	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	91.1	3.2	1.2	1.6	0.5	97.6	98	copper/brass
F74 Ae299	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	82.9	15.5	1.3	1.5	0.3	101.5	100	brass
F74 Ae281	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	80.5	11.2	3.0	1.3	0.4	96.4	101	brass
F74 Ae166	AUJ	t72	59	SN	L10-M/L11	vi Str T20 Pit F36	unfinished	triangular	86.1	0.9	2.9	7.0	0.8	97.7	103	bronze
F74 Ae254	ARW	t81	63	SN	L11-E12	vii Levelling dump	unfinished	triangular	86.4	13.7	3.2	1.3	0.2	104.8	88	brass
F74 Ae183	ARG	t81	63	SN	L11-E12	vii Levelling dump	unfinished	triangular	92.0	8.8	1.6	1.1	0.3	103.8	90	brass
F74 Ae164	AON	t81	63	SN	L11-E12	vii Levelling dump	broken	triangular	93.3	7.9	2.7	1.4	0.3	105.6	95	copper/brass
F72 Ae274	AEU	t295	70	SN	E-M/L11	vii-ix Pit F711	unfinished	triangular	93.2	1.4	2.3	11.7	0.3	108.9	84	bronze
F74 Ae25	AIK	s90	113	EM-HM	L14-E15	Bldg A Pit F54	unfinished	circular	69.4	10.5	1.3	1.5	0.5	83.2	86	brass
F74 Ae527	+	-	-	-	-	Unstratified	unfinished	triangular	82.0	10.5	1.3	1.7	0.4	95.9	94	brass

Table 36: Catalogue of analysed metal finds from Flaxengate (data from Blades 1995)

Finds No	Cxt	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
F76 Ae8	BCU	unfinished ring?	1310	70.1	1.79	10.13	13.39	0.74	0.03	0.04	0.13	0.08	0.007	96.6	leaded bronze
F76 Ae132	BDQ	waste	1311	81.9	1.43	1.05	11.47	0.14	0.02	0.05	0.20	0.14	0.004	96.7	bronze
F74 Ae511 ?		wire/rod	1312	88.0	4.18	1.11	7.43	0.19	0.03	0.03	0.15	0.05	0.003	101.3	bronze/gunmetal
F74 Ae162	ARJ	melted waste	1313	78.2	13.82	5.28	1.34	0.18	0.03	0.04	0.18	0.07	0.001	99.3	(leaded) brass
F74 Ae207	AVI	bar/ingot	1314	87.7	0.20	6.50	2.83	0.08	0.05	0.16	0.16	0.13	0.010	98.2	(leaded) copper
F76 Ae44	BGD	bar/ingot	1315	82.9	0.45	1.57	6.95	0.24	0.02	0.03	0.15	0.16	0.008	92.8	bronze
F74 Ae459	E91	bar/ingot	1316	71.6	24.42	0.27	0.02	0.02	0.04	0.17	0.08	0.00	0.001	96.6	brass
F76 Ae94	BDQ	sheet	1317	84.0	1.64	1.50	5.88	0.07	0.02	0.02	0.14	0.18	0.006	93.6	bronze
F76 Ae196	BVD	sheet?	1318	84.5	13.84	0.14	0.10	0.17	0.02	0.01	0.14	0.03	0.001	99.0	brass
F74 Ae411	B104	sheet	1319	82.8	0.45	1.09	9.91	0.03	0.04	0.07	0.08	0.07	0.012	94.7	bronze
F76 Ae160	BCU	sheet	1320	87.7	0.04	0.56	11.50	0.03	0.02	0.02	0.14	0.05	0.002	100.1	bronze
F74 Ae431	B106	sheet waste	1321	82.8	0.24	2.67	8.25	0.12	0.03	0.30	0.14	0.12	0.004	94.9	bronze
F74 Ae421	B104	sheet	1322	73.1	25.90	0.18	0.01	0.04	0.02	0.25	0.03	0.00	0.001	99.6	brass
F74 Ae376	AVI	spillage	1323	87.4	0.00	1.41	10.93	0.03	0.02	0.01	0.10	0.03	0.002	100.0	bronze
F76 Ae128	BNF	spillage	1324	95.7	0.56	0.90	2.91	0.12	0.03	0.01	0.08	0.05	0.003	100.4	copper
F76 Ae150	BDQ	spillage	1325	62.5	0.13	5.70	29.13	0.92	0.02	0.02	0.11	0.02	0.004	98.8	(leaded) bronze
F74 Ae152	AON	spillage	1326	79.2	16.01	3.13	0.07	0.09	0.03	0.13	0.34	0.06	0.002	99.2	brass
F76 AE27	BDG	spillage	1327	50.9	0.04	2.43	0.00	0.00	0.00	0.00	0.03	0.13	0.009	53.6	?
F76 Ae138	BNF	spillage	1328	81.3	0.00	8.97	8.69	0.04	0.03	0.05	0.12	0.05	0.004	99.4	leaded bronze
F76 Ae152	BDQ	spillage	1329	76.0	0.12	8.59	15.48	0.10	0.03	0.02	0.09	0.03	0.003	100.5	leaded bronze
F76 Ae87	BDU	spillage	1330	81.5	0.00	6.17	9.93	0.05	0.02	0.01	0.12	0.07	0.003	98.2	(leaded) bronze
F76 AE216	BE	spillage	1331	66.6	0.04	5.15	14..21	0.02	0.01	0.00	0.11	0.04	0.006	86.5	? bronze
F76 Ae37	BDG	spillage	1332	78.3	12.46	1.49	1.51	0.35	0.02	0.04	0.14	0.07	0.002	94.7	brass
F74 Ae358	BAB	spillage	1333	85.6	14.08	5.53	0.03	0.11	0.04	0.07	0.16	0.07	0.001	105.8	(leaded) brass
F74 Ae426	AVI	spillage	1334	86.8	7.89	2.91	1.24	0.60	0.02	0.07	0.06	0.12	0.003	99.8	copper/brass
F74 Ae486	F87	spillage	1335	66.6	0.04	22.32	7.43	0.08	0.02	0.04	0.08	0.08	0.003	96.8	leaded bronze
F74 Ae457	E84	spillage	1336	79.7	19.79	0.37	0.18	0.14	0.01	0.02	0.08	0.04	0.002	100.3	brass
F76 Ae127	BDQ	spillage	1337	71.3	28.30	2.58	0.02	0.05	0.01	0.01	0.06	0.11	0.005	102.4	brass
F76 Ae200	BVD	spillage	1338	83.1	0.55	11.51	6.18	0.12	0.03	0.03	0.15	0.07	0.004	101.8	leaded bronze
F76 Ae38	BDG	spillage	1339	82.1	0.59	1.51	13.20	0.06	0.02	0.02	0.06	0.11	0.015	97.8	bronze

Table 36: Catalogue of analysed metal finds from Flaxengate (data from Blades 1995)

Finds No	Cxt	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
F76 Ae276	BVT	spillage	1340	85.4	2.62	0.94	6.97	0.18	0.03	0.04	0.08	0.04	0.005	96.4	bronze/gunmetal
F74 AE350	BAB	spillage/bar ingot?	1341	83.5	0.17	2.55	1.82	0.45	0.02	0.04	0.16	0.08	0.003	89.2	? copper
F74 Ae552	E28	spillage	1342	69.9	18.24	7.60	0.07	0.28	0.02	0.02	0.26	0.09	0.002	96.6	(leaded) brass
F76 Ae301	CFO	spillage	1343	79.3	1.32	1.58	7.63	0.60	0.02	0.03	0.13	0.06	0.004	91.3	bronze
F74 Ae233	AOM	spillage	1344	98.6	0.00	0.27	0.07	0.10	0.00	0.00	0.04	0.04	0.002	99.2	copper
F74 Ae190	AON	spillage	1345	97.3	0.78	0.83	0.08	0.12	0.02	0.01	0.18	0.15	0.002	99.6	copper
F76 Ae121	BDG	spillage	1346	67.2	0.00	3.55	28.46	0.06	0.01	0.01	0.07	0.03	0.003	99.4	bronze
F74 Ae181	AON	spillage	1347	77.9	13.98	6.10	0.27	0.27	0.03	0.05	0.18	0.07	0.002	99.0	(leaded) brass

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
Broadgate East															
BE73 I Ae3		wire/rod	1362	73.0	25.99	0.70	0.00	0.14	0.29	0.06	0.08	0.06	0.002	100.4	brass
BE73 I Ae50		wire/rod	1357	85.1	14.97	0.08	0.01	0.05	0.23	0.58	0.16	0.17	0.002	101.5	brass
BE73 I Ae51		sheet	1351	99.6	0.00	0.32	0.03	0.00	0.04	0.37	0.07	0.09	0.002	100.6	brass
BE73 I Ae53		wire loop	1361	98.8	1.18	1.45	0.74	0.11	0.04	0.08	0.33	0.07	0.002	102.8	brass
BE73 I Ae66		bar/ingot?	1352	74.3	21.79	1.42	1.18	0.91	0.18	0.12	0.09	0.09	0.003	100.1	brass
BE73 I Ae80		wire twist	1355	72.8	27.12	0.95	0.07	0.15	0.25	0.03	0.09	0.03	0.001	101.5	brass
BE73 I Ae86		wire/rod	1353	64.1	31.71	2.22	0.18	0.17	0.15	0.00	0.10	0.03	0.002	98.6	brass
BE73 I Ae124		sheet	1350	94.5	2.07	0.24	4.40	0.08	0.12	0.33	0.55	0.15	0.002	102.6	bronze/gunmetal
BE73 I Ae130		pin?	1358	79.4	12.00	0.49	2.32	0.19	0.03	0.79	0.32	0.07	0.002	95.7	brass
BE73 I Ae136		twisted wire	1354	73.7	26.67	0.89	0.08	0.13	0.34	0.06	0.04	0.03	0.002	102.0	brass
BE73 I Ae141		wire hook	1359	92.8	4.38	1.62	1.20	0.08	0.05	0.07	0.40	0.10	0.002	100.8	brass
BE73 V Ae14		wire/rod	1359	73.0	21.55	1.06	0.00	0.34	0.27	0.03	0.07	0.03	0.001	96.4	brass
BE73 V Ae48		strip waste	1349	92.4	2.02	0.11	3.44	0.12	0.19	0.78	0.05	0.15	0.002	99.3	bronze/gunmetal
BE73 V Ae150		rod	1356	72.0	21.06	0.78	1.90	0.20	0.04	0.23	0.05	0.08	0.002	96.4	brass
Grantham Place															
GP81 19		bar ingot worked	1348	78.9	16.68	5.02	0.04	0.17	0.00	0.00	0.05	0.11	0.002	100.9	(leaded) brass
Silver Street															
LIN73 A 48	995	wire	1234	n.d.	0.71	1.00	1.09	0.09	0.03	0.04	0.25	0.10	0.009	n.d.	?
LIN73 A 80	1408	wire	1232	89.8	6.03	0.31	2.95	0.25	0.01	0.04	0.11	0.04	0.001	99.6	gunmetal
LIN73 BI 166	1407	sheet waste	1228	71.7	0.08	11.22	10.67	0.03	0.02	0.07	0.16	0.07	0.004	94.1	leaded bronze
LIN73 BII 73	766	wire	1233	77.1	20.87	0.14	1.26	0.25	0.02	0.05	0.13	0.04	0.002	99.9	brass
LIN73 BII 91	932	spillage	1231	77.9	0.98	5.59	10.47	0.07	0.02	0.02	0.13	0.05	0.366	95.8	(leaded) bronze
LIN73 C 16	49	spillage	1229	74.6	0.03	1.85	24.30	0.01	0.04	0.22	0.50	0.08	0.001	101.7	speculum
LIN73 C 63	1040	wire	1235	n.d.	0.24	0.03	0.18	0.05	0.01	0.00	0.09	0.07	0.002	n.d.	?
LIN73 C 66	1132	strap-end?	1236	92.1	6.28	0.70	4.84	0.42	0.02	0.04	0.15	0.05	0.002	104.7	gunmetal

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
Danes Terrace															
DT74 I Ae4		spillage	1373	68.1	0.26	19.81	4.37	0.05	0.19	0.96	4.11	0.13	0.003	98.2	caldarium
DT74 I Ae26		sheet	1415	94.6	3.02	0.32	3.70	0.12	0.10	0.21	0.27	0.13	0.002	102.5	gunmetal
DT74 I Ae38		strip	1383	98.8	0.64	0.19	4.03	0.10	0.15	0.30	0.06	0.16	0.002	104.5	bronze
DT74 I Ae49		wire	1363	97.7	0.00	1.58	0.15	0.15	0.02	0.24	0.16	0.08	0.002	100.1	copper
DT74 I Ae52		strip	1384	89.5	3.63	0.16	0.00	0.03	0.23	1.24	0.05	0.15	0.002	95.1	copper/brass
DT74 I Ae55		spillage	1374	66.4	0.08	14.18	5.72	0.28	0.38	0.92	1.95	0.13	0.004	90.4	caldarium
DT74 I Ae66		sheet	1381	88.7	6.88	0.54	3.11	0.19	0.03	0.11	0.33	0.14	0.003	100.1	gunmetal
DT74 I Ae66		wire	1368	69.5	0.13	16.55	2.66	0.45	0.69	2.18	5.55	0.15	0.003	98.4	caldarium
DT74 I Ae70		wire	1364	84.6	13.52	1.06	3.48	0.20	0.04	0.01	0.16	0.07	0.002	103.2	brass/gunmetal
DT74 I Ae73		sheet	1382	91.9	1.84	0.05	3.53	0.03	0.42	2.16	0.07	0.19	0.001	100.2	bronze/gunmetal
DT74 I Ae75		wire/rod	1369	82.3	10.99	0.09	3.31	0.34	0.06	0.08	0.05	0.14	0.002	97.4	brass/gunmetal
DT74 I Ae93		wire/needle?	1367	86.6	3.67	1.65	3.94	0.24	0.06	0.72	0.46	0.15	0.003	97.8	gunmetal
DT74 I Ae95		strip/offcut	1376	n.d.	3.84	1.36	0.02	0.05	0.02	0.02	0.17	0.13	0.003	112.7	?
DT74 I Ae97		sheet	1378	n.d.	1.29	0.27	4.90	0.12	0.16	0.45	0.11	0.16	0.002	n.d.	?
DT74 I Ae99		wire	1371	87.1	10.54	0.04	0.01	0.20	1.56	2.58	0.07	0.15	0.002	102.4	brass +As +Ni
DT74 I Ae101		bar	1412	94.4	2.60	0.27	4.17	0.16	0.02	0.10	0.43	0.17	0.004	102.4	(leaded) brass
DT74 I Ae101		bar	1375	67.2	27.45	6.25	0.04	0.12	0.04	0.08	0.28	0.06	0.003	101.6	bronze/gunmetal
DT74 I Ae103		sheet	1377	94.0	4.28	0.25	3.91	0.12	0.05	0.20	0.61	0.12	0.006	103.6	gunmetal
DT74 I Ae112		sheet waste	1365	75.4	23.73	0.31	0.01	0.66	0.21	0.02	0.05	0.15	0.002	100.6	brass
DT74 I Ae117		sheet	1379	93.0	2.18	0.09	3.47	0.04	0.53	1.49	0.07	0.19	0.001	101.1	bronze/gunmetal
DT74 I Ae118		strip	1372	66.9	0.12	11.92	2.72	0.21	0.93	2.30	4.39	0.13	0.003	90.3	caldarium
DT74 I Ae118		strip	1385	84.4	8.47	0.85	3.21	0.20	0.03	0.08	0.29	0.13	0.001	97.7	brass/gunmetal
DT74 I Ae118		strip	1380	74.5	25.70	0.64	0.01	0.06	0.22	0.30	0.09	0.14	0.001	101.7	brass
DT74 I Ae164		sheet	1413	n.d.	5.82	0.53	4.02	0.34	0.03	0.05	0.16	0.14	0.002	n.d.	?
DT74 I Ae271		sheet	1414	87.1	10.26	0.89	2.98	0.10	0.04	0.00	0.26	0.08	0.000	101.8	brass/gunmetal
DT74 II Ae4		wire	1393	76.0	25.05	0.27	0.00	0.65	0.19	0.02	0.05	0.13	0.002	102.4	brass
DT74 II Ae12		pin .	1409	81.0	22.28	0.44	0.02	0.17	0.02	0.00	0.05	0.14	0.010	104.2	brass
DT74 II Ae25		sheet	1416	96.5	0.85	0.26	4.29	0.02	0.26	0.81	0.06	0.14	0.001	103.3	bronze
DT74 II Ae27		sheet	1418	78.9	9.08	2.21	3.41	0.36	0.06	0.39	0.34	0.12	0.002	95.1	brass/gunmetal
DT74 II Ae34		pin/needle	1405	68.0	30.49	0.63	0.01	0.11	0.23	0.04	0.05	0.03	0.002	99.6	brass
DT74 II Ae36		wire	1397	81.5	16.11	0.04	0.01	0.08	0.29	0.72	0.06	0.18	0.001	99.0	brass
DT74 II Ae52		wire	1396	77.0	23.84	0.60	0.02	0.10	0.02	0.00	0.07	0.09	0.005	101.8	brass
DT74 II Ae53		wire	1395	77.7	24.52	1.15	0.00	0.31	0.39	0.05	0.05	0.03	0.001	104.2	brass
DT74 II Ae56		wire	1391	99.3	1.07	1.54	0.04	0.02	0.01	0.00	0.10	0.10	0.042	102.2	brass
DT74 II Ae65		wire	1407	77.9	19.26	1.95	0.00	0.18	0.18	0.02	0.04	0.08	0.001	99.7	brass

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
DT74 II Ae67		wire/rod twisted	1389	76.0	25.34	0.43	0.01	0.13	0.06	0.07	0.06	0.09	0.004	102.2	brass
DT74 II Ae73		wire/hook	1366	85.1	5.47	0.77	3.68	0.12	0.03	0.12	0.20	0.14	0.002	95.7	brass
DT74 II Ae73		wire/hook	1370	72.2	26.23	0.50	0.03	0.08	0.01	0.01	0.06	0.11	0.004	99.3	brass
DT74 II Ae73		wire/hook	1388	71.5	28.93	1.44	0.05	0.08	0.01	0.01	0.05	0.12	0.004	102.3	gunmetal
DT74 II Ae90		sheet	1419	73.3	19.97	2.30	0.46	0.18	0.15	0.01	0.08	0.06	0.001	96.6	brass
DT74 II Ae100		rod	1403	73.4	21.08	0.77	0.07	0.06	0.21	0.03	0.03	0.06	0.001	95.8	brass
DT74 II Ae119		pin?	1406	68.5	23.14	0.33	0.28	0.08	0.09	0.05	0.05	0.13	0.002	92.7	brass
DT74 II Ae124		pin/needle	1408	77.7	21.63	0.15	0.01	0.09	0.02	0.00	0.04	0.08	0.001	99.8	brass
DT74 II Ae126		pin?	1400	77.5	22.98	0.55	0.02	0.14	0.02	0.00	0.05	0.13	0.006	101.4	brass
DT74 II Ae135		pin/needle	1399	77.4	22.55	0.22	0.01	0.15	0.02	0.00	0.06	0.12	0.006	100.5	brass
DT74 II Ae154		pin/needle	1411	76.5	22.52	0.07	0.02	0.08	0.03	0.06	0.07	0.12	0.007	99.5	brass
DT74 II Ae159		wire	1390	69.0	31.29	0.97	0.11	0.19	0.12	0.00	0.08	0.04	0.001	101.8	brass
DT74 II Ae 160		pin?	1394	n.d.	11.95	0.28	0.02	0.06	0.16	0.25	0.13	0.11	0.001	n.d.	brass
DT74 II Ae180		sheet	1417	87.4	5.77	0.69	3.67	0.12	0.02	0.09	0.22	0.12	0.002	98.3	gunmetal
DT74 II Ae212		wire	1401	80.6	16.47	0.10	0.00	0.19	0.43	0.94	0.05	0.23	0.001	99.0	brass
DT74 II Ae225		pin/needle	1402	80.2	12.87	0.04	0.01	0.08	1.11	1.73	0.05	0.15	0.002	96.2	brass +As +Ni
DT74 II Ae233		spiral coil	1387	78.2	22.94	0.33	0.01	0.17	0.02	0.03	0.04	0.14	0.005	101.9	brass
DT74 II Ae235		pin/needle	1392	81.6	13.98	0.04	0.01	0.40	2.45	1.43	0.05	0.14	0.001	100.6	brass +As +Ni
DT74 II Ae242		wire	1386	90.8	2.07	2.61	0.72	0.08	0.07	0.03	0.38	0.13	0.002	97.4	brass
DT74 II Ae248		pin/needle	1410	77.0	22.51	0.31	0.02	0.12	0.01	0.00	0.05	0.13	0.008	100.2	brass
DT74 II Ae252		wire	1398	72.6	26.13	0.32	0.00	0.10	0.24	0.10	0.05	0.22	0.002	99.8	brass
DT74 II Ae274		pin/needle	1404	69.4	25.74	0.91	0.64	0.18	0.21	0.02	0.08	0.06	0.001	97.3	brass
DT74 II Ae287		spillage	1420	68.3	0.00	1.64	26.84	0.06	0.04	0.22	0.26	0.12	0.003	97.6	speculum
DT78 Ae5		wire/waste	7238	78.5	18.74	0.81	0.01	0.16	0.17	0.01	0.09	0.05	0.001	98.4	brass
DT78 Ae19		sheet	1225	80.0	18.45	0.34	1.71	0.06	0.02	0.01	0.03	0.14	0.005	100.9	brass
DT78 Ae20		pin/needle	1239	71.2	26.39	1.38	0.00	0.46	0.29	0.03	0.05	0.02	0.003	100.0	brass
DT78 Ae22		wire coil	1240	70.4	25.09	1.05	0.06	0.20	0.27	0.03	0.05	0.03	0.001	97.4	brass

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
Hungate															
H83 20		wire/rod	1275	74.7	21.98	1.16	0.04	0.10	0.29	0.03	0.04	0.03	0.001	98.3	brass
H83 46		wire twist	1272	72.2	27.36	0.23	0.08	0.16	0.22	0.05	0.04	0.04	0.001	100.4	brass
H83 66		disc/weight?	1302	72.2	14.53	1.17	0.16	0.44	0.10	0.02	0.26	0.04	0.002	88.9	brass
H83 67		sheet waste	1306	67.0	21.73	1.24	0.06	0.27	0.08	0.01	0.08	0.06	0.004	90.7	brass
H83 71		sheet waste	1303	64.6	31.45	1.15	1.07	0.07	0.21	0.02	0.06	0.03	0.001	98.8	brass
H83 91		sheet	1308	64.0	0.48	24.12	3.05	0.18	0.58	1.41	3.87	0.13	0.006	98.1	caldarium
H83 106		wire/strip	1271	80.8	8.90	1.63	3.83	0.26	0.05	0.36	0.53	0.15	0.001	96.7	gunmetal
H83 123		spillage	1284	96.2	0.01	0.44	1.03	0.03	0.21	0.28	0.38	0.15	0.003	98.7	copper
H83 125		sheet	1267	81.9	17.95	0.34	2.09	0.10	0.02	0.00	0.04	0.11	0.004	102.6	brass
H83 178		bar/ingot?	1266	77.5	0.98	14.77	3.94	0.28	0.39	0.80	2.17	0.13	0.002	101.3	caldarium
H83 384		spillage	1281	74.8	0.02	2.24	18.90	0.04	0.24	0.44	1.00	0.11	0.002	98.2	bronze
H83 430		wire	1270	68.0	23.46	2.37	0.22	0.30	0.22	0.01	0.06	0.03	0.001	94.8	brass
H83 440		sheet	1304	73.3	16.80	0.54	0.01	0.07	0.03	0.00	0.10	0.11	0.001	91.0	brass
H83 441		wire	1273	71.5	20.49	0.18	0.05	0.10	0.23	0.08	0.03	0.04	0.002	92.7	brass
H83 449		wire	1277	71.2	25.28	0.78	0.22	0.34	0.36	0.07	0.08	0.04	0.003	98.4	brass
H83 708		spillage	1293	70.6	0.04	4.59	25.11	0.01	0.27	1.54	0.08	0.11	0.001	102.4	speculum
H83 734		wire	1276	98.9	0.00	0.63	0.36	0.06	0.03	0.00	0.05	0.06	0.015	100.2	copper
H83 919		tapered rod	1274	78.5	2.47	2.10	7.00	0.16	0.03	0.07	0.15	0.10	0.000	90.6	bronze/gunmetal
H83 963		spillage	1288	100.9	0.09	2.43	0.38	0.01	0.00	0.00	0.11	0.08	0.006	104.0	copper
H83 995		spillage	1278	66.2	0.20	17.52	8.64	0.26	0.02	0.02	0.08	0.04	0.003	93.1	bronze
H83 1114		spillage	1292	73.1	3.82	11.56	6.45	0.13	0.03	0.04	0.10	0.09	0.009	95.4	leaded bronze/gunmetal
H83 1256		spillage	1298	87.0	0.05	1.39	8.51	0.19	0.03	0.03	0.19	0.21	0.012	97.7	bronze
H83 1291		spillage	1285	86.4	0.00	2.61	4.52	0.06	0.02	0.03	0.16	0.06	0.005	94.1	bronze
H83 1397		sheet	1309	97.4	0.05	0.88	4.70	0.21	0.04	0.03	0.18	0.05	0.003	103.5	bronze
H83 1512		bar/ingot	1268	79.5	13.63	0.65	4.91	0.47	0.02	0.06	0.14	0.08	0.006	99.5	brass/gunmetal
H83 1658		strip	1269	87.2	0.00	5.22	6.53	0.03	0.02	0.03	0.10	0.05	0.002	99.2	(leaded) bronze
H83 1659		spillage	1289	78.6	0.00	5.00	8.82	0.26	0.01	0.01	0.06	0.03	0.002	93.0	(leaded) bronze
H83 1685		spillage	1290	72.2	0.10	5.83	9.56	0.25	0.03	0.02	0.15	0.04	0.002	88.3	(leaded) bronze
H83 1764		spillage	1279	80.7	0.00	3.39	6.28	0.18	0.01	0.01	0.06	0.03	0.002	90.8	bronze
H83 1777		spillage	1295	75.2	0.00	2.61	4.85	0.17	0.01	0.00	0.10	0.03	0.002	83.1	? bronze

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
H83 1779		spillage	1283	97.9	0.00	2.32	0.02	0.00	0.01	0.00	0.04	0.05	0.002	100.4	copper
H83 1780		spillage	1294	70.3	0.05	2.18	5.18	0.44	0.01	0.01	0.09	0.04	0.002	78.7	? bronze
H83 1826		sheet	1307	91.0	0.59	0.18	4.04	0.24	0.40	0.61	0.07	0.14	0.002	97.4	bronze
H83 1898		sheet	1305	77.4	17.76	0.33	1.94	0.04	0.01	0.00	0.03	0.11	0.005	97.7	brass
H83 1900		spillage	1291	97.2	0.00	0.18	0.04	0.00	0.04	0.46	0.07	0.16	0.002	98.2	copper
H83 1919		spillage	1287	72.4	0.00	3.23	24.56	0.05	0.05	0.18	0.40	0.09	0.002	101.0	speculum
H83 1961		spillage	1286	64.4	0.00	3.98	27.07	0.04	0.04	0.16	0.35	0.09	0.002	96.3	speculum
H83 1979		spillage	1280	71.0	0.02	1.92	24.53	0.05	0.06	0.23	0.82	0.14	0.002	98.8	speculum
H83 1984		spillage	1282	65.6	0.02	2.07	19.88	0.01	0.05	0.15	0.57	0.11	0.002	88.5	speculum
H83 1992		spillage	1297	66.0	0.00	2.30	24.99	0.10	0.04	0.17	0.40	0.10	0.002	94.2	speculum
Saltergate															
LIN73 DI 10	2012	wire	1441	81.4	15.52	0.74	3.84	0.15	0.02	0.02	0.10	0.06	0.001	101.9	brass/gunmetal
LIN73 DI	2240	spillage	1446	72.7	0.01	7.87	20.85	0.01	0.08	0.18	0.08	0.08	0.001	101.9	speculum
LIN73 DI 153	3192	spillage	1448	72.1	0.19	5.43	22.12	0.05	0.05	0.34	0.07	0.08	0.002	100.5	speculum
LIN73 DI 226	3550	spillage	1447	69.2	0.02	5.19	24.10	0.05	0.00	0.01	0.04	0.10	0.002	98.8	speculum
LIN73 DIV 10	3422	spillage	1449	88.6	0.29	0.65	11.71	0.09	0.02	0.03	0.13	0.08	0.002	101.7	bronze
LIN73 DIV 68	5111	wire	1444	85.2	0.03	2.74	10.57	0.05	0.07	0.07	0.10	0.07	0.009	99.0	bronze
LIN73 DIV 67	5112	spillage	1450	72.1	0.00	20.41	6.90	0.05	0.02	0.04	0.16	0.05	0.003	99.8	leaded bronze
LIN73 DIV 122	5339	strip	1442	79.7	23.84	0.19	0.40	0.13	0.01	0.00	0.10	0.04	0.002	104.4	brass
LIN73 EI 8	2091	sheet	1438	102.6	0.05	0.17	0.01	0.00	0.07	0.37	0.07	0.09	0.002	103.7	copper
LIN73 EI 24	2097	wire	1445	77.7	20.84	0.50	0.02	0.13	0.01	0.00	0.04	0.11	0.006	99.4	brass
LIN73 EI	2126	sheet/strip	1437	99.8	0.03	0.16	0.00	0.00	0.04	0.78	0.07	0.06	0.002	101.1	copper
LIN73 EI	2126	sheet/strip	1436	101.1	0.03	0.03	0.01	0.00	0.04	0.53	0.06	0.09	0.002	102.0	copper
LIN73 EI	2127	sheet	1440	103.5	0.05	0.25	0.01	0.00	0.02	0.53	0.06	0.07	0.002	104.5	copper
LIN73 EI 30	2171	sheet	1439	91.3	3.64	0.42	4.15	0.11	0.05	n.d.	0.32	0.11	0.003	100.2	gunmetal
LIN73 EI 42	2549	wire	1443	85.1	13.76	0.02	0.01	0.09	0.12	1.01	0.06	0.11	0.001	100.4	brass

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
Chestnut House, Michaelgate															
MCH84 7		wire eye?	1245	67.6	29.85	3.24	0.01	0.05	0.00	0.01	0.07	0.09	0.004	101.0	brass
MCH84 12		wire	1243	79.8	22.55	0.81	0.03	0.15	0.03	0.02	0.10	0.06	0.001	103.8	brass
MCH84 13		wire hook	1241	79.2	19.84	1.57	0.03	0.19	0.31	0.03	0.05	0.04	0.001	101.3	brass
MCH84 14		wire	1244	75.4	22.49	0.78	0.03	0.15	0.03	0.00	0.12	0.05	0.001	99.1	brass
MCH84 128		strip	1227	88.2	4.42	0.20	3.45	0.18	0.23	0.36	0.07	0.15	0.002	97.5	gunmetal
MCH84 192		spillage	1254	88.4	1.04	1.97	8.66	0.07	0.02	0.04	0.20	0.13	0.004	100.9	bronze
MCH84 216		spillage	1251	72.0	1.93	12.19	12.87	0.09	0.01	0.03	0.18	0.05	0.003	99.5	leaded bronze
MCH84 253		spillage	1250	80.0	11.28	7.38	0.13	0.14	0.03	0.70	0.26	0.06	0.001	100.1	(leaded) brass
MCH84 294		spillage	1249	73.2	1.29	6.71	18.81	0.08	0.05.	0.46	0.08	0.07	0.002	100.9	(leaded) bronze
MCH84 318		sheet	1228	88.8	22.66	1.33	2.94	0.22	0.01	0.00	0.03	0.04	0.002	96.0	brass
MCH84 351		spillage	1248	69.7	0.25	6.05	17.00	0.08	0.03	0.13	0.11	0.10	0.003	93.5	(leaded) bronze
MCH84 395		wire/needle?	1242	78.6	19.49	5.23	0.06	0.25	0.08	0.13	0.15	0.06	0.001	104.1	(leaded) brass
MCH84 400		bar/ingot?	1237	80.8	0.07	0.80	5.35	0.34	0.02	0.02	0.16	0.19	0.188	88.1	? bronze
MCH84 429		spillage	1253	97.7	0.00	0.36	0.00	0.00	0.01	0.00	0.09	0.11	0.001	98.3	copper
MCH84 513		spillage	1247	66.5	23.43	9.60	0.07	0.23	0.01	0.01	0.26	0.07	0.001	100.3	leaded brass
MCH84 544		spillage	1252	97.4	0.05	0.62	0.03	0.04	0.01	.0.00	0.16	0.11	0.001	98.5	copper
MCH84 549		wire hook	1248	79.7	13.07	3.58	1.61	0.05	0.01	0.08	0.07	0.14	0.008	98.4	brass
MCH84 575		spillage	1255	97.8	0.00	0.18	5.01	0.27	0.02	0.02	0.13	0.06	0.001	103.5	bronze
Spring Hill/Michaelgate															
SPM83 17		sheet	1259	82.0	17.23	0.22	0.38	0.46	0.02	0.05	0.17	0.05	0.002	100.6	brass
SPM83 59		sheet	1257	98.2	0.00	0.14	2.17	0.05	0.02	0.05	0.21	0.09	0.001	101.2	copper
SPM83 126		spillage	1261	82.6	0.48	0.48	9.46	0.52	0.02	0.00	0.12	0.05	0.002	93.8	bronze
SPM83 212		spillage	1264	74.2	0.08	9.68	11.16	0.22	0.02	0.01	0.16	0.07	0.004	95.6	leaded bronze
SPM83 215		spillage	1265	82.8	1.06	6.17	10.83	0.46	0.02	0.03	0.13	0.05	0.002	101.4	(leaded) bronze
SPM83 216		wire	1256	77.9	16.74	0.04	0.01	0.29	0.01	0.01	0.07	0.03	0.001	95.1	brass
SPM83 261		spillage	1262	61.8	0.06	17.47	9.39	0.10	0.02	0.03	0.15	0.08	0.003	89.3	leaded bronze
SPM83 305		sheet	1260	97.9	0.00	0.18	1.65	0.29	0.02	0.07	0.25	0.08	0.001	100.6	copper
SPM83 338		sheet	1258	69.7	0.06	19.59	9.34	0.07	0.02	0.05	0.15	0.08	0.006	99.1	leaded bronze
SPM83 468		spillage	1283	61.8	0.14	19.21	7.99	0.56	0.01	0.01	0.12	0.04	0.002	90.1	leaded bronze

Table 37: Catalogue of analysed metal finds from other sites in the city (data from Blades 1995)

Finds No	RN	Description	NB No	Cu	Zn	Pb	Sn	Fe	Ni	As	Sb	Ag	Au	Total	Alloy name
Steep Hill															
SH74 Ae26		wire/pin?	1460	69.6	28.69	1.46	0.01	0.15	0.22	0.01	0.10	0.05	0.001	100.3	brass
SH74 Ae60		sheet	1454	100.5	0.04	0.60	0.01	0.00	0.07	0.42	0.09	0.03	0.001	101.8	copper
SH74 Ae68		spillage	1464	87.1	0.03	4.40	11.64	0.04	0.02	0.02	0.10	0.07	0.001	103.5	(leaded) bronze
SH74 Ae73		strip	1457	75.0	24.08	0.11	0.69	0.50	0.01	0.02	0.08	0.03	0.002	100.6	brass
SH74 Ae76		pin/needle?	1459	69.0	28.71	1.50	0.00	0.14	0.28	0.02	0.06	0.03	0.001	99.7	brass
SH74 Ae77		sheet	1452	80.6	17.53	0.38	2.62	0.08	0.04	0.05	0.08	0.05	0.005	101.5	brass
SH74 Ae78		sheet	1456	76.6	20.53	0.99	2.11	0.19	0.27	0.04	0.06	0.04	0.001	100.8	brass
SH74 Ae86		sheet	1451	67.0	30.63	1.65	0.29	0.41	0.18	0.01	0.06	0.04	0.001	100.4	brass
SH74 Ae91		wire twist	1462	76.0	23.81	1.19	0.01	0.14	0.29	0.05	0.07	0.03	0.001	101.7	brass
SH74 Ae101		rod	1463	91.0	5.86	2.01	2.91	0.21	0.05	0.27	0.27	0.13	0.002	102.8	gunmetal
SH74 Ae116		spillage	1465	75.6	0.18	14.15	9.61	0.17	0.02	0.03	0.15	0.05	0.003	100.0	leaded bronze
SH74 Ae121		sheet	1467	96.9	0.04	2.20	2.15	0.00	0.03	0.03	0.11	0.08	0.002	101.7	copper
SH74 Ae122		spillage	1466	97.0	0.01	0.27	3.24	0.03	0.00	0.03	0.13	0.04	0.001	100.8	bronze
SH74 Ae123		sheet	1453	87.7	10.56	0.04	1.54	0.38	0.20	0.63	0.05	0.15	0.001	101.4	brass
SH74 Ae164		wire/rod	1461	99.0	0.18	0.64	0.17	0.01	0.05	0.07	0.57	0.15	0.003	100.9	copper
SH74 Ae172		strip	1455	75.3	22.92	0.70	1.97	0.13	0.17	0.00	0.09	0.05	0.001	101.4	brass
Swan Street															
SW82 49		wire	1435	72.3	25.22	1.39	0.00	0.14	0.24	0.08	0.06	0.03	0.002	99.5	brass
SW82 54		wire	1433	75.2	23.11	0.37	0.01	0.08	0.15	0.04	0.09	0.04	0.001	99.2	brass
SW82 65		wire/needle?	1429	85.9	13.76	0.88	0.01	0.08	1.27	1.03	0.10	0.12	0.001	103.2	brass +As +Ni
SW82 131		wire	1432	75.4	24.25	0.52	0.04	0.18	0.01	0.00	0.08	0.14	0.008	100.6	brass
SW82 169		spillage	1425	76.8	15.22	5.31	0.03	0.10	0.03	0.17	0.56	0.12	0.001	98.5	(leaded) brass
SW82 210		pin/needle?	1427	90.8	4.84	1.04	3.05	0.34	0.04	0.02	0.26	0.10	0.003	100.5	gunmetal
SW82 244		pin/needle	1430	78.8	20.55	0.80	0.24	0.75	0.01	0.00	0.10	0.09	0.008	101.4	brass
SW82 467		pin/needle?	1431	85.9	12.39	0.03	0.01	0.06	1.53	2.27	0.05	0.09	0.001	102.4	brass +As +Ni
SW82 469		spillage	1426	85.5	14.89	1.03	0.13	0.09	0.04	0.06	0.25	0.07	0.003	102.1	brass
SW82 565		bar	1423	54.9	0.03	2.25	6.96	0.31	0.02	0.01	0.05	0.05	0.010	65.1	? leaded bronze
SW82 612		bar/ingot?	1422	73.1	16.83	0.27	0.34	0.37	0.01	0.04	0.16	0.04	0.002	91.5	brass
SW82 720		bar	1421	79.9	0.25	4.91	10.10	0.35	0.02	0.06	0.15	0.07	0.003	96.1	(leaded) bronze
SW82 724		spillage	1424	85.7	3.72	9.74	2.45	0.10	0.02	0.04	0.15	0.05	0.003	102.1	leaded gunmetal
SW82 816		wire/rod	1434	79.4	8.98	0.13	5.05	0.49	0.03	0.05	0.22	0.06	0.002	94.7	gunmetal
SW82 817		rod	1428	69.2	28.06	1.51	0.01	0.12	0.21	0.00	0.09	0.04	0.001	99.3	brass

Table 38: Catalogue of lead scrap and waste from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Description
F76 Fe614	BVN	r78	13	LR	L3-E4	Linear feature	
F76 Pb27	BXN	r101	17	VLR-LS	VL4-L9	Dump	
F76 Pb28	BXN	r101	17	VLR-LS	VL4-L9	Dump	
F76 Pb29	BHV	r101	17	VLR-LS	VL4-L9	Dump	
F76 Pb19	BNH	r91	23	LS	L9-E10	Dump	
F76 Pb22	BNH	r91	23	LS	L9-E10	Dump	
F76 Pb23	BNL	r91	23	LS	L9-E10	Dump	sheet
F76 Pb24	BNL	r91	23	LS	L9-E10	Dump	
F76 Pb12	BDQ	r90	25	LS	L9-E/M10	Levelling dump	
F76 Pb13	BDQ	r90	25	LS	L9-E/M10	Levelling dump	
F76 Pb15	BDQ	r90	25	LS	L9-E/M10	Levelling dump	
F76 Pb18	BDS	r90	25	LS	L9-E/M10	Levelling dump	strips
F76 Pb25	BLP	r96	31	LS	M/L10	Str R3 Robber trench	sheet, perforated?
F76 Pb9	BKX	r96	31	LS	M/L10	Str R3 Robber trench	
F76 Pb32	BDM	r100	32	LS	E/M-M10	Dump	
F76 Pb4	BDM	r100	32	LS	E/M-M10	Dump	
F76 Pb7	BDM	r100	32	LS	E/M-M10	Dump	
F74 Pb45	BCL	r104	32	LS	E/M-M10	Dump	
F76 Pb10	BEU	t19	32	LS	E/M-M10	ii Levelling dump	
F76 Pb17	BEU	t19	32	LS	E/M-M10	ii Levelling dump	
F76 Pb2	BCU	t19	32	LS	E/M-M10	ii Levelling dump	
F76 Pb20	BCU	t19	32	LS	E/M-M10	ii Levelling dump	
F76 Pb3	BCU	t19	32	LS	E/M-M10	ii Levelling dump	strip
F76 Pb6	BDG	t19	32	LS	E/M-M10	ii Levelling dump	rough perforated disc
F76 Pb8	BEU	t19	32	LS	E/M-M10	ii Levelling dump	sheet
F74 Pb48	J17	sp51	35	LS-SN	E/M-M10	iii-v Spit Road & dump	
F74 Pb41	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	
F74 Pb33	D52	sp92	36	LS-SN	E11-E12	iv Spit Pit F673	sheet, thick
F74 Pb42	BAZ	t267	36	LS-SN	E/M-L10	ii-iv Pit F694	sheet
F74 Pb16	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	
F76 Pb11	BLC	t66	36	LS-SN	L11-E/M12	v-vi Str R3 Robber trench	sheet
F74 Pb49	H90	sp7	37	LS	E/M-M10	ii-iii Spit Occupation	

Table 38: Catalogue of lead scrap and waste from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Description
F74 Pb35	F71	sp36	38	LS	M10-E/M11	iii Spit Dump & occupation	sheet
F74 Pb44	J50	sp8	38	LS	E/M-M10	ii-iii Spit Dump	
F74 Pb47	H73	sp8	38	LS	E/M-M10	ii-iii Spit Dump	sheet
F74 Pb46	H12	sp88	38	LS	L10-M/L11	iii Spit Occupation	strip
F74 Pb43	G80	sp17	44	LS-SN	E/M-L10	ii-iv Spit Occupation	sheet
F74 Pb51	B105	sp48	44	LS-SN	L10-E/M11	iii Spit Dump & occupation	unfinished ring?
F74 Pb50	A103	sp82	44	LS-SN	L10	iv-vi Spit Occupation/dump/occupation	
F74 Pb30	F69	sp13	45	LS-SN	L10	iii-iv Spit Dump	
F74 Pb34	F49	sp13	45	LS-SN	L10	iii-v Spit Dump	sheet
F74 Pb37	G48	sp16	45	LS-SN	E/M10-M/L11	ii-iv Spit Dump	textile impression
F74 Pb22	G12	sp58	45	LS-SN	L10-E/M11	iii-iv Spit Dump & occupation	
F74 Pb36	G32	sp58	45	LS-SN	L10-E/M11	iii-iv Spit Dump & occupation	
F74 Pb40	G71	sp58	45	LS-SN	L10-E/M11	iii-iv Spit Dump & occupation	sheet
F74 Pb26	D29	sp60	45	LS-SN	L10-M/L11	v Spit Occupation	
F74 Pb29	D50	sp66	45	LS-SN	L10-E/M11	iv-v Spit Occupation/dump/occupation	unfinished ring?
F74 Pb31	E72	sp66	45	LS-SN	L10-E/M11	iv-v Spit Occupation/dump/occupation	sheet
F74 Pb23	E32	sp67	45	LS-SN	L10-E/M11	iv-v Spit Dump & occupation	
F74 Pb25	E29	sp71	45	LS-SN	L10	iv-v Spit Levelling dump	
F74 Pb21	E9	sp72	45	LS-SN	E-M/L11	v-vi Spit Dump	
F74 Pb18	AZE	t167	54	SN	L11-M12	v Dumps assoc with Str T18	
F74 Pb12	AZX	t68	58	SN	E/M11-E/M12	vi Levelling dump	
F74 Pb13	AUW	t70	59	SN	E-M/L11	vi Str T20	
F72 Pb63	AJP	t81	63	SN	M/L11-E/M12	vii Levelling dump	
F74 Pb11	AUO	t81	63	SN	M/L11-E/M12	vii Levelling dump	
F74 Pb8	ATS	t81	63	SN	E/M11-L11-E12	vii Levelling dump	sheet
F74 Pb9	AQQ	t81	63	SN	E/M11-L11-E12	vii Levelling dump	sheet
F72 Pb66	APB	t91	67	SN	E/M-M12	vii Str T25 Floor	
F74 Pb10	AUL	t299	70	SN	E-M/L11	vii Pit F707	sheet edge
F74 Pb1	AEE	t99	71	EM	M/L11-E/M12	viii Levelling dump	
F74 Pb3	AKP	t160	72	EM	E/M-M12	viii Dump assoc with Str T27	
F74 Pb7	ALZ	t113	78	EM	E/M-M12	ix Str T33	
F72 Pb59	ZL	t121	82	EM	M/L12-E/M13	x Levelling dump	

Table 38: Catalogue of lead scrap and waste from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Description
F72 Pb60	ABE	t121	82	EM	M/L12-E/M13	x Levelling dump	
F72 Pb62	AFY	t229	88	EM	12	x Pit F718	
F72 Pb29	MC	t122	90	EM	E/M-M/L12	xi Levelling dump	weight
F72 Pb67	AFC	t230	95	EM	E/M12-E13	xi Pit F719	
F72 Pb61	ABP	t245	95	EM	L11-E12	xi Pit F734	
F72 Pb57	ABB	t141	98	EM	12	xii Str T46	
F72 Pb51	PC	t142	98	EM	12	xii Str T46 Hearth F72	
F72 Pb56	YZ	t143	105	EM	L12-E/M13	xii Dumps assoc with Str T46 & T51	
F72 Pb54	XU	t149	105	EM	L12-E/M13	xiii Str T51	
F72 Pb55	XG	t149	105	EM	L12-E/M13	xiii Str T51	
F72 Pb1	AS	s1	108	EM-HM	E13-M14	Levelling dump	rod
F72 Pb53	SZ	s1	108	EM-HM	12-M13	Levelling dump	
F72 Pb52	ZF	s3	109	EM-HM	12-13	Bldg E	
F72 Pb20	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb39	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb41	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb44	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb48	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb49	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb50	LV	s168	119	LM	13-15	Bldg E Pit F65	weight
F72 Pb13	LU	s47	119	LM	L14-L15	Bldg E Pit F64	weight
F72 Pb28	LU	s47	119	EM-HM	L14-L15	Bldg E Pit F64	
F72 Pb30	JH	s87	130	LM	M-L15	Accumulation above Bldg E	
F72 Pb7	FE	s87	130	LM	M-L15	Accumulation above Bldg E	
F74 Pb2	AEW	999	N/A	N/A	N/A	Unphased	miscast weight
F72 Pb8	+	-	-	-	-	Unstratified	
F74 Pb20	+	-	-	-	-	Unstratified	
F74 Pb39	+	-	-	-	-	Unstratified	sheet

APPENDIX 8 CATALOGUE OF SLAG

In Appendix 8 the additional columns are:

Cu?:	colour = characteristic red colour due to the presence of copper noted	
	Metal = corroded copper alloy noted	

Elements detected by XRF

Cu	copper	)
Zn	zinc	)
Pb	lead	) elements detected by XRF
Sn	tin	)

Table 39: Catalogue of slag etc from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Description	Cu?
F74 Ae109	AIO	t99	71	EM	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae45	AIO	t99	71	EM	L11-E12	vii Levelling dump	fuel ash slag	colour
F74 Ae94	AIO	t99	71	EM	L11-E12	vii Levelling dump	fuel ash slag	
F72 Ae279	AMJ	t91	67	SN	L11-M12	vii Str T25 Floor	fuel ash slag	
F74 Ae119	AOM	t81	63	SN	L11-E12	viii Levelling dump	fuel ash slag	
F74 Ae121	AOM	t81	63	SN	L11-E12	viii Levelling dump	fuel ash slag	
F74 Ae80	AOM	t81	63	SN	L11-E12	viii Levelling dump	fuel ash slag	
F74 Ae130	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae137	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	colour
F74 Ae138	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae190	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae195	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae234	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae267	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae273	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae312	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	colour
F74 Ae362	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae365	AON	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae230	AOV	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae243	AOV	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	
F74 Ae192	ART	t68	58	SN	L11-E12	vi Levelling dump	fuel ash slag	
F74 Ae541	ARW	t81	63	SN	L11-E12	vii Levelling dump	fuel ash slag	metal / colour
F74 Ae132	ASY						fuel ash slag	colour
F74 Ae269	AUN						fuel ash slag	
F74 Ae140	AVF	t88	66	SN	E/M-M12	vii Str T24 Floor	fuel ash slag	
F74 Ae155	AVG	t88	66	SN	E/M-M12	vii Str T24 Floor	fuel ash slag	colour
F74 Ae193	AVG	t88	66	SN	E/M-M12	vii Str T24 Floor	fuel ash slag	
F74 Ae279	AWO						fuel ash slag	colour
F74 Ae278	AWQ						fuel ash slag	
F74 Ae161	AWR	t68	58	SN	L11-E12	vi Levelling dump	fuel ash slag	
F74 Ae175	AWZ						fuel ash slag	

Table 39: Catalogue of slag etc from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Description	Cu?
F74 Ae360	AXL						fuel ash slag	colour
F74 Ae334	AZU						fuel ash slag	
F74 Ae313	AZX	t68	58	SN	L11-E12	vi Levelling dump	fuel ash slag	
F74 Fe1857	B100	sp44	44	LS-SN	L10	iii-v Spit Occupation	smithing slag	
F74 Ae316	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	fuel ash slag	
F74 Ae357	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	fuel ash slag	
F74 Ae361	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	fuel ash slag	
F74 Ae369	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	fuel ash slag	
F74 Ae370	BAB	t290	36	LS-SN	E-M/L11	vi Pit F674	fuel ash slag	colour
F74 Fe2409	BCL	r104	32	LS	E/M-M10	Dump	fuel ash slag	
F76 M12	BDM						smithing slag	
F76 M15	BDS	r90	25	LS	L9-E10	Levelling dump	smithing slag	
F76 Fe18	BEA	t30	35	LS	E/M-L10	ii Road surface	fuel ash slag	
F76 M19	BEU						fuel ash slag	
F76 M20	BEU						smithing slag	
F76 M18	BEX						fuel ash slag	
F76 M13	BGA						smithing slag	
F76 M17	BGA						smithing slag	
F76 M35	BHS						smithing slag	
F76 M26	BML						smithing slag	
F76 SS22	BNH						smithing slag	
F76 M23	BNI						tap / flowed slag	
F76 M32	BOH						tap / flowed slag	
F76 M39	BRS						smithing slag	
F76 M23	BVI						smithing slag	
F74 Ae288	BVU						fuel ash slag	colour
F72	CH						smithing slag	
F72 M16	CK						smithing slag	
F74 Fe2324	E13	sp113	36	LS-SN	E/M-M/L11	vi-vii Spit Pit F13	fuel ash slag	
F74 Ae450	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	fuel ash slag	colour
F74 Fe2151	E28	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	smithing slag	

Table 39: Catalogue of slag etc from Flaxengate

Finds No	Cxt	cg	LUB	Period	Date	Context description	Description	Cu?
F74 Fe1888	E48	sp68	45	LS-SN	L10-M/L11	iv-v Spit Dump	tap / flowed slag	
F74 Ae399	E8	sp69	45	LS-SN	E/M-M/L11	iv-v Spit Dump & pit	fuel ash slag	stained
F74 Ae400	F19						fuel ash slag	
F74 Fe2254	F50	sp36	38	LS	M10-E/M11	iii Spit Dump & occupation	smithing slag	
F74 Ae487	F86	sp49	44	LS-SN	L10-E/M11	iii-v Spit Occupation	fuel ash slag	metal / colour
F74 Fe2293	F94	sp26	44	LS-SN	E/M-L10	iii-iv Spit Occupation	smithing slag	
F74 Fe2297	F98						smithing slag	
F72 Ae93	FH	s141	137	PM	E-M/L16	Levelling	fuel ash slag	metal
F72 Ae80	FR						fuel ash slag	
F74 Fe1677	G11						smithing slag	
F74 Ae406	G17						fuel ash slag	
F74 Fe1662	G18						smithing slag	
F74 Fe2087	G32	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	fuel ash slag	
F74 Fe2135	G32	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	smithing slag	
F74 Fe2555	G36						fuel ash slag	
F74 Fe2236	G51	sp58	45	LS-SN	E-E/M11	iii-iv Spit Dump & occupation	smithing slag	
F74 Fe2291	G52						smithing slag	
F74 Fe2491	G69						tap / flowed slag	
F74 Fe2301	G71						fuel ash slag	
F74 Fe2371	G87	sp3	42	LS	E/M-M10	ii-iii Spit Occupation	fuel ash slag	
F72 M40	GE						smithing slag	
F72 M43	GP						smithing slag	
F74 Fe2511	H38						fuel ash slag	
F74 Ae520	H54						fuel ash slag	
F72 Ae85	HD						fuel ash slag	
F72 M32	HE	s142	143	MOD	M/L16-E17	ii-iv Dump	smithing slag	
F74 Ae532	J29						fuel ash slag	
F76 M46	+						fuel ash slag	metal
F76 M48	+						tap / flowed slag	

Table 40: Catalogue of slag etc from Silver Street (data from Wilthew 1982)

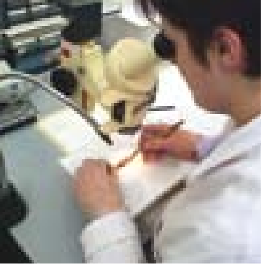
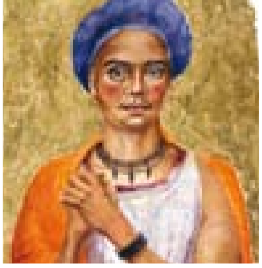
Site code (no Finds Nos)	RN	Cxt	cg	LUB	Period	Date	Context description	Identification and comment	Elements detected by XRF
LIN73si AI	20	8						hearth lining + wood/charcoal	Cu Pb Sn
LIN73si AI	955	48						smithing slag? + wood/charcoal	
LIN73si AI	856	51						tap slag	
LIN73si AI	1435	125						vitrified ceramic, refractory and coarse fabric; possibly part of tuyere, 10-20mm diam	
LIN73si BI	135	8						iron slag + vitrified hearth lining	
LIN73si BI	134	9						ironstone	
LIN73si BI	269	10						tap slag	
LIN73si BI	406	15						ironstone	
LIN73si BI	266	21						smithing slag	
LIN73si BI	339	26						porous tap slag	
LIN73si BI	405	28	B36	42	EM-LM	M-L12	Pit	tap slag	
LIN73si BI	657	28	B36	42	EM-LM	M-L12	Pit	2 pieces tap slag (one very porous), one piece ironstone	
LIN73si BI	624	31	B109	39	LS-SN	M-L10/11	Pit	tap slag	
LIN73si BI	1538	31	B109	39	LS-SN	M-L10/11	Pit	tap slag	
LIN73si BI	1605	31	B109	39	LS-SN	M-L10/11	Pit	tap slag	
LIN73si BI	404	35						ironstone	
LIN73si BI	625	35						hearth lining	
LIN73si BI	626	35						fired clay?	
LIN73si BI	776	36						tap slag	
LIN73si BI	623	39						ironstone	
LIN73si BI	628	39						ironstone	
LIN73si BI	687	40	B113	39	LS-SN	L10-M/L11	Pit	iron (? smithing) slag	
LIN73si BI	1824	41	B112	39	LS-SN	M-L10	Pit	tap slag	
LIN73si BI	1023	47						?glassy slag	
LIN73si BI	1062	50						tap slag	
LIN73si BI	1168	52						ironstone	
LIN73si BI	1537	52						tap slag	

Table 40: Catalogue of slag etc from Silver Street (data from Wilthew 1982)

Site code (no Finds Nos)	RN	Cxt	cg	LUB	Period	Date	Context description	Identification and comment	Elements detected by XRF
LIN73si BI	1607	52						Fired clay	
LIN73si BI	872	54						tap slag	
LIN73si BI	1608	75						tap slag	
LIN73si BI	1606	85						ironstone	
LIN73si BI	689	88						ironstone	
LIN73si BI	873	106						tap slag + wood charcoal, fired clay and ? smithing slag	
LIN73si BI	1385	112						ironstone	
LIN73si BI	1388	112						hearth lining	Pb Cu Zn Sn
LIN73si BI	1707	116						ironstone	
LIN73si BI	220	15A						tap slag	
LIN73si BI	267	15B	999	N/A				iron (?tap) slag	
LIN73si BI	690	15B	999	N/A				tap slag	
LIN73si BI	1171	15B	999	N/A				tap slag	
LIN73si BII	268	3						porous tap slag	
LIN73si BII	341	4						ironstone	
LIN73si BII	403	4						tap slag	
LIN73si BII	340	6						tap slag	
LIN73si BII	774	8						hearth lining	
LIN73si BII	775	8						ironstone	
LIN73si CI	136	11						ironstone	
LIN73si CI	686	36						smithing slag	
LIN73si CI	777	68						tap slag	
LIN73si CI	688	71						hearth lining and smithing slag	
LIN73si CI	627	72						hearth lining	
LIN73si CI	959	81						smithing slag	
LIN73si CI	1021	82						tap slag	
LIN73si CI	1022	83	C67	68	LR	L3	Rampart dump	tap slag	
LIN73si CI	1389	83	C67	68	LR	L3	Rampart dump	ironstone	

Table 40: Catalogue of slag etc from Silver Street (data from Wilthew 1982)

Site code (no Finds Nos)	RN	Cxt	cg	LUB	Period	Date	Context description	Identification and comment	Elements detected by XRF
LIN73si CI	954	87						ironstone	
LIN73si CI	952	89						ironstone	
LIN73si CI	1270	92						pot sherd	
LIN73si CI	953	98						ironstone	
LIN73si CI	1167	106						ironstone	
LIN73si CI	1170	107						ironstone	
LIN73si CI	1387	113						smithing slag	
LIN73si CI	1169	116						iron slag + wood/charcoal	
LIN73si CI	1386	119						ironstone	
LIN73si CI	270	249						smithing slag	



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- *Archaeological Projects (excavation)*
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