PART I

The Artefact Reports

1.1 INTRODUCTION

ADRIAN COX

The material from the main excavation encompasses a broad date range, mainly reflecting the site's occupation from the medieval period until recent times, although a lithic assemblage of prehistoric date was also present. The finds from the Queensberry House excavation provide additional insights, particularly into the later periods of activity on the site.

The full catalogue of the finds is deposited in the RCAHMS Archive, and a selective catalogue, including all the illustrated objects and most other diagnostic finds, is included here. There are separate catalogues for the finds and the pottery which are denoted here by the respective abbreviations no. 1, 2 etc and Pot no. 1, 2 etc. Since the main site excavation and much of the post-excavation work was completed before the Queensberry House work was commissioned, a second archive has been constructed for the Queensberry House material. In this, as for the main site, there are separate catalogues for the finds and the pottery. These are denoted here by the abbreviations QH no. 1, 2 etc and QH Pot no. 1, 2 etc. The pottery and finds from the main excavation are described first, followed by those from the excavation at Queensberry House.

1.1.1 Summary of the artefact and ceramic evidence

ADRIAN COX AND DEREK HALL

Although almost no major concentrations of artefacts strongly diagnostic of particular functions and activities occurred anywhere on the site, the evidence highlights changes in the nature of the site's occupation and use through time, and illuminates aspects of daily life. A large majority of the recovered artefacts came from deposits and features in the western half of the site, and many came from the extensive medieval and post-medieval 'garden' soils. Finds from the site's eastern end, formerly occupied by the Scottish & Newcastle Breweries complex, were scarce.

In compiling this brief overview of the recovered evidence, reference has been made to the work of all the contributing specialists. For more detailed accounts of individual artefacts and material assemblages, the reader should refer to their detailed reports (below). Measurements in the catalogue are generally expressed to the nearest 1mm; where appropriate they have been expressed to the nearest 0.1mm.

Period 1 (12th–14th centuries)

Few finds were associated with this period, although there was some evidence of metallurgical activity. Among the other artefacts recovered is a horseshoe nail (no. 58), of a form generally thought to have been in use until the 13th century, although finds from Perth indicate that similar nails may have remained in use into the 14th century. The excavations yielded a total of 44 pieces of struck stone (mainly flint), although probably none was in a primary context. Two bipolar flakes of quartz (nos 143 & 144) came from the natural silting in the boundary ditch 754 located along the southern edge of excavation, and a hard-hammer flake (no. 145) was found in a gravel deposit in this period.

This period produced a small amount of pottery (24 sherds in total), comprising jugs and cooking pots of Scottish White Gritty Ware, presumably of local production. Of most interest is the single sherd that is apparently from a local copy of a Yorkshire seal jug (756; Pot no. 13). If this identification is correct, the context that produced this sherd, namely backfill within the large boundary ditch 754, can date no earlier than the 13th or 14th centuries.

Period 2 (14th–15th centuries)

Period 2.1

Even fewer finds were associated with Period 2.1, associated with the formal division of the site, than was the case in Period 1. Among those recovered was the earliest of a number of iron horseshoe fragments (no. 54). Other horseshoes were recovered from Periods 2.2 and 2.3.

Period 2.2

Associated with the accumulation of medieval 'garden soil' deposits and associated features in this period is a varied assemblage of artefacts, representing a diverse array of craft activities and domestic pursuits. As also in Period 1, a number of finds provide tentative evidence of the types of buildings which existed on or near the site. Among this evidence are two lead alloy window came fragments, indicating glazed windows. Found in the upper fills of the Period 1 boundary ditch 754, a fragment representing the edge of an inlaid floor tile (no. 122) probably came from a prestigious building, possibly with a religious function.

There is some limited artefactual evidence of non-ferrous metal-working. A fragment of lead alloy waste, rolled up and possibly intended for re-use (no. 51), came from one of the garden soil deposits, and a possible lead alloy offcut (no. 47) was found with the window came fragments referred to above. As well as being in demand to make cames, workers in lead would have been involved in the fabrication of roofs for ecclesiastical buildings and other large structures, and in the manufacture of pewter tableware, tokens and other artefacts (Ewan 1990, 34). Evidence for the cold working of sheet metal survives in the form of a riveted fragment of copper alloy sheet, probably representing a vessel repair patch (no. 35), which was found in the fill of the boundary ditch 810 on the east side of Plot 2.2. This may have been fabricated on the site, although the vessel may possibly have been brought to the site in its repaired condition.

Analysis of the industrial debris from the site revealed a sustained accumulation of iron smelting/smithing waste in an area to the south of Queensberry House in Periods 2.2–2.3 and Period 3, possibly indicating that metallurgical activities were concentrated in this area during the medieval and post-medieval periods.

Many town-dwellers probably produced much of their domestic requirements themselves. Indeed, documentary sources reveal that many people owned spinning wheels and other weaving equipment. Many would have clothed themselves with home-produced textiles. A decorated spindle whorl (no. 140), found in the fill of a well (1567, Plot 2.4)

in this period, represents one of the artefact types associated with this kind of activity most likely to survive in the archaeological record. Generally only on waterlogged sites, where anaerobic conditions occur, are textiles and organic components of weaving equipment preserved. No. 140 is paralleled by finds from 13th- to 15th-century contexts elsewhere in Scotland. Spindle whorls were used in the production of fairly small quantities of yarn by the drop-spinning method. As Peter Yeoman (1995, 75) notes, the evidence recovered from Scottish urban excavations, in terms of spinning and weaving equipment, and of textiles, suggests that most domestic cloth production was simple and small-scale.

Limited evidence of costume survives in the form of dress accessories, such as a double-looped buckle from this period (no. 3), again recovered from a cultivated soil deposit, and dating from the mid 14th century or later. This buckle may have been used in conjunction with a spur. The individual who wore it may therefore have been someone of at least moderate means, and perhaps the same can be said of the person who owned a copper alloy mount of cruciform shape (no. 16), which may have been worn on leather or textile clothing.

Alongside subsistence and any commercial activities, the site's inhabitants must have found time for leisure pursuits. The smallest of four stone discs from the site (no. 136), again recovered from a cultivated soil deposit, may represent a gaming counter. The earlier of two bone dice (no. 189) was also found in Period 2.2. Dice could be used in different ways, either by themselves in games of chance, or to determine the movement of pieces on a gaming board.

This period marks the first appearance of sizeable quantities of pottery on the site (1979 sherds). Scottish White Gritty Ware is the most common fabric, with smaller elements of the later local fabrics, Reduced Gritty Ware and Oxidised Redware. The largest number of sherds of Yorkshire-type Ware was recovered from this period, including sherds from the fill of a slot (333, Plot 2.1) and a pit (746, Plot 2.2) which were located in the property running adjacent to Reid's Close. Rhenish Stoneware (14th/15th centuries) first appears in this period, with sherds from Raeren and Siegburg vessels from industrial feature 1520 (Plot 2.4) and sump or feeder channel (767, Plot 2.2) respectively. Industrial feature 1520 also produced a single sherd of 16th/17th-century Weser Slipware which would place the backfilling of this feature towards the end of this period. The only sherd of green-glazed stoneware (15th century) from the excavation was found in the fill of a well (1567, Plot 2.4). It is of interest that even at this early stage the imported pottery present includes high-status stoneware and slipware.

Period 2.3

Scottish White Gritty continues to be the most common fabric in this period, with Reduced Gritty Ware and Oxidised Redware also well represented. The proximity of high-status buildings is suggested by a single sherd of Beauvais Double Sgraffito Ware from the backfill of a stone tank 843 in Plot 2.1 and four sherds from Spanish olive jars from surface 1104 on the Canongate frontage in Plot 2.4.

Based on the diagnostic fragments recovered, the glass assemblage from Periods 1 to 2.2 dates from the 15th century or earlier, whereas that from Period 2.3 dates from the late 15th to early 16th centuries. The evidence from documentary sources indicates that, by the late 15th century, there were some wealthy and substantial dwellings bordering the Canongate's main street.

Finds of costume accessories become more numerous in this period. Two copper alloy lace tags (nos 11 & 12), designed to prevent the ends of clothing and shoe laces and thongs from fraying, came from ditch 913 on the west side of Plot 2.3. The same feature produced a small, copper-alloy, D-shaped buckle of 15th- or 16th-century date (no. 4).

Documentary records reveal that workshops, wells and gardens were situated to the rear of many burgage plots. Skinners, tanners, shoemakers, cutlers, masons and brewers all held property on the south side of the Canongate. The frontages of the plots offered opportunities for commercial enterprises, with booths serving as retail outlets. Some recovered artefacts may have been associated with industrial or craft-working activities, although there were no diagnostic concentrations of artefact types. Clay-lined stone tank 775 (in Plot 2.2), thought to have been used in a tanning process, contained a possible knife blade (no. 61) in its fill. The primary fill of stone-lined tank 843, also in Plot 2.2, contained the heavily corroded iron head of a large, three-pronged fork (no. 60). The fork may simply represent a component of discarded waste material, thrown into the feature once it had gone out of use. However, given its location in the primary fill, a connection with the feature's primary function is a possibility. Perhaps the fork was used to agitate the contents of the tank. On the boundary between Plots 2.1 and 2.2, a possible hone fragment (no. 142) was found in the fill of rubbish pit 722.

Documentary evidence points to an abundance of gardens and orchards in the medieval burgh, and many people kept their own livestock. Artefactual evidence for the keeping of animals is scarce, although the only complete horseshoe recovered from the site (no. 56) was found in clay surface 1104, located near to the frontage in Plot 2.4.

Period 3 (16th–17th centuries)

During the 16th century, the Canongate may have gained in prestige due to the presence of royalty, although it suffered at the hands of the Earl of Hertford's expeditionary forces in the years after James V's death in 1542. Artefact evidence, such as the different types of decorated floor tiles recovered, indicates the presence of prestigious buildings in the vicinity of the site during the medieval and post-medieval periods. The floor tiles were not concentrated in a particular area, but found in different parts of the site, and therefore are difficult to relate to particular buildings.

There is still a large group of Scottish White Gritty Ware present in this period, which must suggest that a lot of the features and deposits producing it are more likely to date to the earlier end of the medieval period. Imported wares are represented by sherds of Low Countries Tin-glazed Earthenware from the fill of drain 757, located on the west side of Plot 3.3, and a sherd of Siegburg Stoneware from drain 1524 (Plot 3.4). All these sherds are from features associated with the burgage plots that run back from the Canongate. Of most interest in this period is the piece of 16th-century ceramic stove tile from the fill of garden feature 1683 (Plot 3.5, Pot no. 74, fig. 18.3). This feature lies in the part of the Parlia-

ment site that may originally have been part of the monastic precinct of Holyrood Abbey and as these ceramic stoves are more commonly found related to religious buildings this may imply the proximity of such a building on this part of the site.

Documentary sources reveal that young men from all parts of Scotland were sent to the Canongate in the 16th century to serve as apprentices among the burgh's hammermen, who included blacksmiths, cutlers, lorimers, braziers and jewellers. Merchants and craftsmen would have derived benefits from living close to Holyrood Palace, where they could readily have found outlets for their various skills. Among the assemblage of copper alloy artefacts there appears to be some evidence of tailoring activity. Such finds include a thimble of open form (no. 20); a type used for specialised tasks such as sewing canvas and in tailoring, and generally preferred by tailors for heavier work. Copper alloy pins were also found in this period, as was a probable needle fragment, although a greater concentration of pins appeared in Period 4.1.

Although 16th-century Edinburgh suffered from overcrowding, the burgh of Canongate was not so built-up, and fine private residences were being constructed at that time (Turner Simpson & Holmes 1981, 49). The presence of two Nuremburg jetons, one of late 15th to mid 16th-century date, the other of late 16th to early 17th-century date, lends support to the notion of at least moderately wealthy residents on the site at this time.

Along with increasing evidence of wealth, there is increasing evidence of recreational activity. Part of a disc or counter, derived from a sherd of Reduced Greyware pottery (no. 120), found in rubble overlying stone-capped culvert 757 in Plot 3.3, was probably used as a gaming counter. The fabric of this object indicates that it dates from the 15th or 16th century, and it was found with window glass of a similar date. A small bone die (no. 188) was also found in this period.

The earliest clay pipes from the excavation date from the period *c* 1620–40, and can be compared with examples found in a pre-1637 context beneath Edinburgh's Tron Kirk (Gallagher 1987a). One of the stratigraphically earliest is a polished bowl from a garden soil deposit in this period (no. 225). Other early examples come from Period 4.1. Of over 900 pipe fragments recovered from the site, the majority were manufactured between *c* 1630 and 1680, a period in which there was a rapid growth in the fashion for pipe-smoking in Edinburgh.

Period 4 (17th–18th centuries)

Period 4.1

The amounts of Reduced Gritty Ware and Oxidised Redware finally overtake Scottish White Gritty Ware in this period. Interestingly, the most common ceramic cooking vessel represented in the Oxidised Redware fabric is the handled skillet (Pot nos 37–41). A wide variety of imported wares are present in this period largely dating to the 16th or 17th centuries; many of these are from cultivation features and soils within the formal gardens of Queensberry House, Plot 4.2, and Haddington House (Plot 4.1).

These fabrics include a second sherd of Beauvais Double Sgraffito Ware, sherds of Frechen Stoneware and a small group of slipwares that may be locally produced. The garden features (1610, 1616) associated with Lothian Hut, Plot 4.3, contain sherds from Loire jugs. This period produced the only two sherds of Mediterranean Green and Brown Redware and Saintonge Palissy-type Ware from a levelling deposit within a terrace (643, Plot 4.2), and the backfill of boundary ditch 661 (Plot 4.2). Both sherds are from very ornate pottery vessels and it is tempting to suggest that they both originate from Queensberry House itself. A unique vessel in an unidentified fabric, present in the backfill of a stone-lined industrial tank (1637, Plot 3.6), appears to be an apothecary's cup, presumably used for measuring small quantities of liquid into the tank.

The Confession of Faith, signed in 1638 by a large number of Canongate's residents, indicates a broad cross-section of craftsmen living locally. For example, more than 50 tailors signed, along with 32 wrights, 25 weavers, 15 dyers and 8 saddlers (Turner Simpson & Holmes 1981, 50). There is tentative artefactual evidence from the excavation to support the presence of craftsmen, and also evidence of increasing wealth and sophistication, although many poorer and less fortunate residents would have lived alongside the wealthier members of society.

Of the 11 copper alloy pins recovered from the site, all but two are from Period 4.1. Their form indicates a probable 17th-century date. Four of the pins came from the fill of a stone-capped culvert 919 (Plot 4.2) likely to have led from the kitchens of a house fronting on to the Canongate. Other pins came from the underlying and overlying deposits. This concentration of pins would appear to be significant, and may indicate tailoring activities, either in the house from which this drain led, or in a property occupying the vicinity of the drain, probably in the second half of the 17th century. Part of a small pair of iron shears (no. 62), from a garden soil deposit, may have performed a variety of household functions or been used by a tailor working on or near the site.

Among the coins recovered from the site, the largest group is of 17th-century copper coinage. The burgh's location, on the main routes from the port of Leith to both Holyrood and Edinburgh, encouraged thriving commercial activity.

Finds from the Period 4.1 garden soils include a fragment of a copper alloy rumbler bell (no. 1), probably of 16th- or 17th-century date, which may have been worn as a costume accessory, on horse harness or on the collar of an animal. A decorative buckle (no. 2), dating from the mid 17th to 18th centuries, was also recovered, along with numerous clay pipe fragments dating from the second half of the 17th century, and glass of similar date. Overall, the glass assemblage from Periods 3 and 4.1 dates from the early 16th to early 18th centuries. One of the garden soil deposits produced a ceramic wig curler of probable 18th-century date (no. 121).

Two decorative copper alloy mounts of domed form were found in this period. No. 14 was found in a garden soil deposit, while no. 15 came from a levelling deposit for a terrace (Plot 4.2). Two copper alloy studs of the kind used on furnishings in the 16th and 17th centuries were also found.

The earliest clay pipes from this period date from the period 1630–50 (eg nos 226 and 228). One of these (no. 226) came from a garden soil deposit under Haddington House (Plot 4.1). Closely-dated clay pipes from primary contexts provide particularly useful dating evidence, for example, a pipe bowl dating from *c* 1660–1700, found in the packing for terrace wall 629 (Plot 4.2).

Period 4.2

Numbers of artefacts decline in Period 4.2, possibly as a result of changes in the use of the site at this time. Despite being present throughout Periods 2, 3 and 4.1, almost all evidence of the deposition of iron-working waste disappears at this point.

The glass recovered from Period 4.2 dates from the later 18th to the 19th centuries. There is a surprising scarcity of glass (both vessel and window) of 18th-century date in the assemblage. Wine bottles, in particular, were manufactured and used in very large numbers in the middle of the 18th century, yet a relative lack of fragments of this date has been noted from this site, possibly indicating a change of site usage after the 17th century.

Very few clay pipes from the site post-dated 1700. Snuff-taking appears to have replaced pipe smoking as the usual method of tobacco consumption after *c* 1730, and pipes dating from the remainder of the 18th century are uncommon in much of Scotland. Twenty pipe bowls dating from *c* 1640–80 were found in a make-up deposit inside Haddington House (Plot 4.1) in this period.

By this period the amount of pottery present has begun to decline, possibly reflecting a change in the rubbish-disposal pattern and the use of the southern part of the site as gardens. Of most significance are the sherds from Loire jugs in a feature associated with the construction of the Lothian Hut in Plot 4.3 (1785) and a rimsherd from a late 16th-/early 17th-century Weser Ware dish from drain 601 (Plot 4.2).

PERIOD 5 (18TH–20TH CENTURIES)

Period 5.1

In Period 5 the pottery assemblage is dominated by 18th- and 19th-century china, possibly associated with the military occupation of the site. Apart from a small group of Low Countries Tin-glazed Earthenware from the floor make-up of the Quartermaster's store (536), all the remaining pottery is liable to be residual.

Among the finds from Period 5.1 were two conjoining fragments of a glazed ceramic carpet bowl (no. 119). These were found in the fill of a shallow pit within Haddington House. This represents further evidence of leisure pursuits on the site, which appears to be a continuing small-scale theme throughout its occupation since medieval times. Parlour games such as carpet bowls would have been popular in wealthier Victorian households.

The carpet bowl fragments were accompanied in the pit fill by a flat-bottomed, iron hanging vessel (no. 67), probably of 19th-century date, which may have served a partly ornamental function. Also found in this fill was a leather shoe of riveted construction, probably dating from the 1850s or later. Boots or shoes of riveted construction usually had front lacing, and three further leather fragments with lace-holes from this period are from footwear of a similar style and construction method.

Smaller quantities of clay pipes came from make-up deposits in this period, as compared with Period 4.2. Pipes from the make-up of the floor of the Quartermaster's store have a date range of *c* 1680–1710. The glass assemblage from Period 5 dates from the 19th and 20th centuries.

Period 5.2

The Canongate's fortunes had declined through the 17th and 18th centuries, and by the 19th century the burgh contained derelict and overcrowded slums (Turner Simpson & Holmes 1981, 50). Nevertheless, one particular find from this phase may be an indicator of the presence of a prestigious household: this is a German porcelain tobacco pipe bowl, of 19th-century date, depicting a young woman reading a book while resting on a plinth (no. 348). This find came from the backfill of a Period 4 well to the rear of Haddington House (231, Plot 4.1), which also contained two copper alloy buttons and a ceramic alley (no. 116).

Alleys such as no. 116 formed components of the closure mechanisms for glass bottles in the 19th century, but they were also often claimed as marbles by children, once the bottles had been used. Many manufactured items by this time bore the maker's or seller's name. A stoneware bottle top (no. 118) bearing the mark of J Stewart & Sons, a firm based on the Canongate, was found in a service trench in this period. Among the finds from the kitchen of Queensberry House is the body of a mineral water bottle embossed with a legend indicating a connection with Dr Struve's mineral waters business (QH no. 10).

Physical evidence for the nature of structures on the site in this latest phase of its occupation includes an iron strap hinge, of 19th-century date, from a cupboard or shutter (no. 59). This too, came from the fill of a service trench.

1.2 POTTERY

DEREK W HALL

The excavations produced 4,873 sherds of pottery ranging in date from the 12th to the 19th centuries (figs 1.1–1.4). This material has been examined by eye and where possible assigned to a recognised fabric name. Thin sectioning and ICPS analysis were undertaken on selected sherds of Scottish White Gritty Ware (Jones et al 2003).

1.2.1 SCOTTISH AND ENGLISH FABRICS (TABLE 1.1)

SCOTTISH WHITE GRITTY WARE (POT NOS 1–30, FIG. 1.1)

Recent work has identified three potential production centres for this fabric in Lothian, Borders and Fife regions (Haggarty 1984; Hall 1997). However, a programme of chemical sourcing is beginning to suggest that kilns producing this fabric may have been more widespread than had previously been thought (Jones et al 2003). It has been found in Perth in association with 12th-century fabrics and appears to predate the Scottish East Coast Redware industry. It may no longer have been made by the 15th century (Hall 1996a, 127). It is usually highly fired to a white or grey colour and contains quartz inclusions. This fabric is the most common pottery type from the Holyrood excavations (2,658 sherds; 54% of the total), and is present in all phases of the site. The most common vessel type present is the glazed jug, and there is a bodysherd from context 756, the backfill of Period 1 boundary ditch 754, which has the remains of a seal on it. This device is bordered by a raised

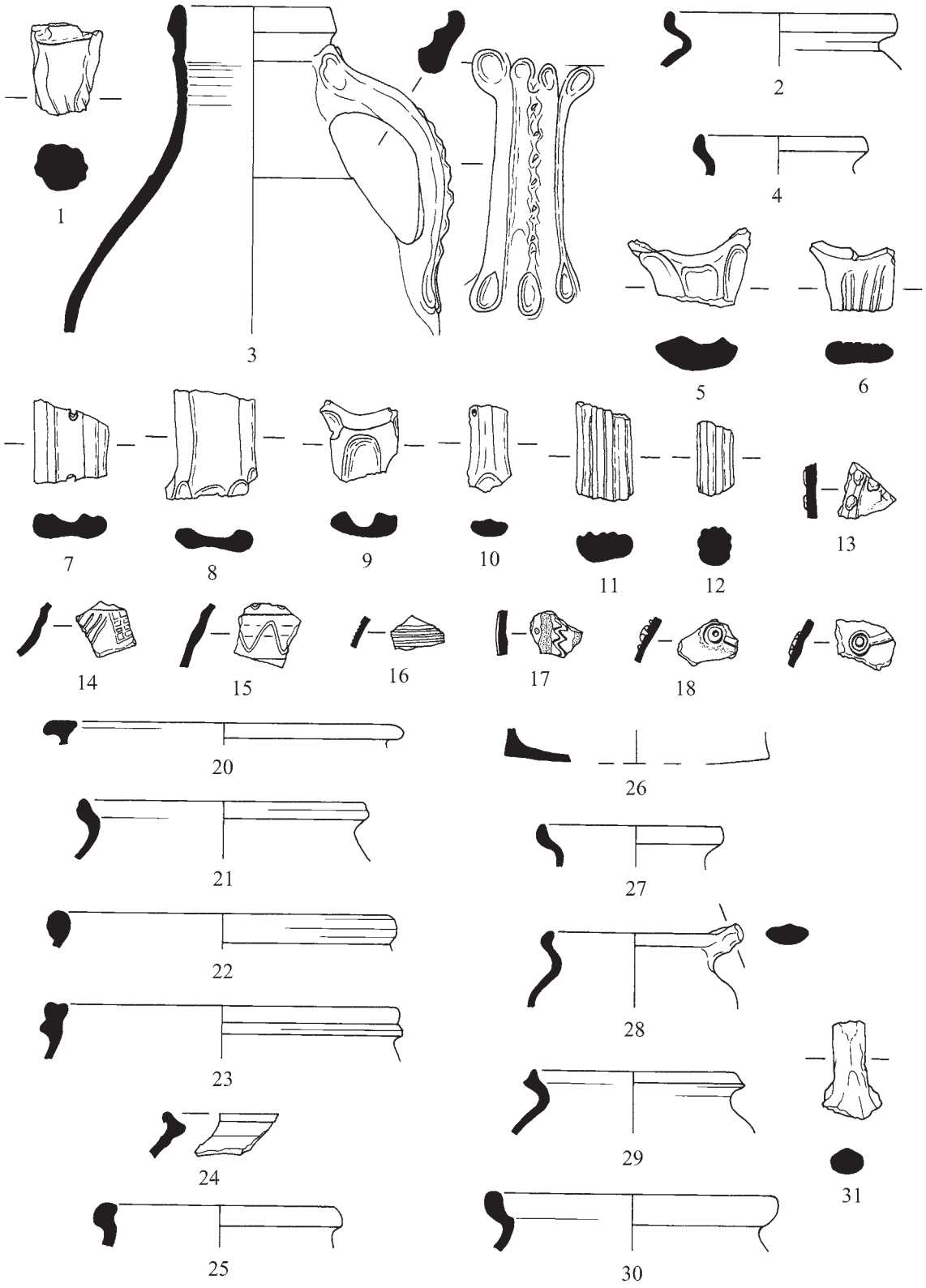


Fig. 1.1 Pottery (Pot nos 1–30) (scale 1:2)

line and pellets and surrounds an incised letter 'K' (Pot no. 13). This is presumably the remains of an inscription and may suggest that this vessel is an attempt to copy Yorkshire-type Ware seal jugs of the 13th/14th centuries (McCarthy & Brooks 1988, 235).

Scottish Post-Medieval Reduced Greyware (Pot nos 47–54, fig. 1.2)

This fabric type was first identified in excavations at Stirling Castle in the late 1970s (Haggarty 1980). It represents a late

Table 1.1 Pottery: Scottish and English fabrics by period

Period	Wg	SPMRG	SPM Oxr	Yo
1	24	0	0	0
2.1	142	2	0	0
2.2	914	85	71	13
2.3	476	185	88	3
3	658	161	70	5
4.1	349	378	381	1
4.2	77	92	94	0
5.1	11	32	23	0
5.2	7	34	21	0

Wg: Scottish White Gritty Ware; SPMRG: Scottish Post-Medieval Reduced Greyware; SPM Oxr: Scottish Post-Medieval Oxidised Redware; Yo: Yorkshire-type Ware

medieval transition from the Scottish East Coast Redware tradition and dates from the mid 15th to mid 18th centuries. It is the second most common fabric from these excavations, with 969 sherds from Periods 2.2 to 5.2. The most common vessel form in this fabric is the green-glazed jug.

Scottish post-medieval Oxidised Redware (Pot nos 31–46, figs 1.1 & 1.2)

This later Redware tradition dates from the 15th to 18th centuries and is often called 'Throsk-type Ware' as it resembles the material being produced by the Throsk kiln site, near Stirling, in the 17th and 18th centuries (Caldwell & Dean 1992). It is represented by 748 sherds from Periods 2.3 to 5.2. The most common vessel form represented in this fabric is the handled skillet. These cooking vessels are internally glazed and have very distinctive folded handles.

Yorkshire-type Ware (Pot nos 55–57, fig. 1.2)

Vessels in these distinctively glazed fabrics are the most common imports in the east coast burghs in the 13th and 14th centuries (McCarthy & Brooks 1988, 227–52). There are only 22 sherds from this whole assemblage, with the largest group being from Period 2.2. The sherds from this period come from the fills of a slot (333, Plot 2.1), a pit (746, Plot 2.2) and two deposits of garden soil 298 and 612. The sherds from Periods 2.3, 3 and 4.1 are liable to be residual in context.

1.2.2 Fabrics imported from the Low Countries (table 1.2)

Low Countries Greyware (Pot no. 66, fig. 1.3)

It is now becoming clear that vessels in this fabric were amongst the most popular of the imported wares in 12th-century Scotland. Previous work in Perth has suggested that their dominance of some assemblages may reflect the nationality of the site's inhabitants (Hall 1996b, 952–9). It has been argued that although Greyware vessels were arriving in Scotland in the 12th century, they were scarce and did not really start appearing in quantity until the 13th century (Verhaege 1983). There are only seven sherds of this fabric in the Holyrood assemblage from a deposit on the frontage of Plot 4.2 (Context 187, Period 4.2). These sherds are distinguished by being very smoke-blackened and may belong with the 'blackware' variant of this pottery which is dated to the late 13th/early 14th centuries (Janssen 1981, 172). This material was mixed with fabrics of post-medieval date and is therefore residual.

Low Countries highly decorated Redware (Pot no. 67, fig. 1.3)

This very distinctive fabric (formerly known as Aardenburg Type) has a white slip under its glaze. There is a single sherd from one of these distinctive vessels, which are thought to date to the early 14th century, from pit fill 859 in Period 4.1 (Pit 935, Plot 4.2). It seems likely that the white slip that is often applied to some of the Scottish East Coast Redwares may be an attempt to copy this decorative style (see above).

Low Countries Tin-glazed Earthenware (Pot nos 68–73, fig. 1.3)

There is a small group of Tin-glazed Earthenware of Anglo-Netherlandish origin from culvert 757 (Plot 3.3), cultivation slot 557 in Plot 4.2 and the make-up for the Quartermaster's store floor 536 in Period 5.1 (five sherds), which dates to the 17th century. There is another small group that is unprovenanced and of 18th-century date from Periods 4.1 and 4.2 (four sherds).

1.2.3 Fabrics imported from France

Beauvais Earthenware

In the late 15th and 16th centuries the Beauvais potters of northern France were producing very fine white wares of a superior quality to most other fabrics being produced in north-west Europe at the time. Essentially there are two types of this fabric: lead-glazed wares with a single overall glaze, or glazed inside one colour and outside another, and Sgraffito forms (Hurst et al 1986, 106).

Table 1.2 Pottery: European imported fabrics

Period	LCR	LCG	LCT	Sgr	Beauv	Loire	SaPa	Lang	Frech	Sieg	Raer	West	GG Sieg	Werra	Weser	Med Green and Brown	Olive Jar	Local Slip	Stove Ti	Enc
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2	0	0	0	0	1	0	0	0	2	1	1	0	1	0	1	0	0	0	0	0
2.3	0	0	0	1	0	0	0	1	1	1	4	0	0	0	0	0	4	0	0	0
3	0	0	2	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0
4.1	1	0	2	1	0	5	1	0	5	1	2	1	0	0	2	1	0	12	0	0
4.2	0	7	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U/S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1

Total 4873 sherds

LCR: Low Countries Redware; LCG: Low Countries Greyware; LCT: Low Countries Tin-glazed Earthenware; Sgr Beauvais Double: Sgraffitto; Beauv: Beauvais Green-glazed; Loire: Loire Jugs; SaPa: Saintonge Palissy Type; Lang: Langwehe Stoneware; Frech: Frechen Stoneware; Sieg: Siegburg Stoneware; Raer: Raeren Stoneware; West: Westerwald; GG Sieg: Green-glazed Siegburg Stoneware; Werra: Werra Slipware; Weser: Weser Slipware; Med Green and Brown: Mediterranean Green and Brown Redware; Olive Jar: Spanish Olive Jar; Local Slip: Local Slipware; Stove Ti: Stove Tile; Enc: Encrusted Ware

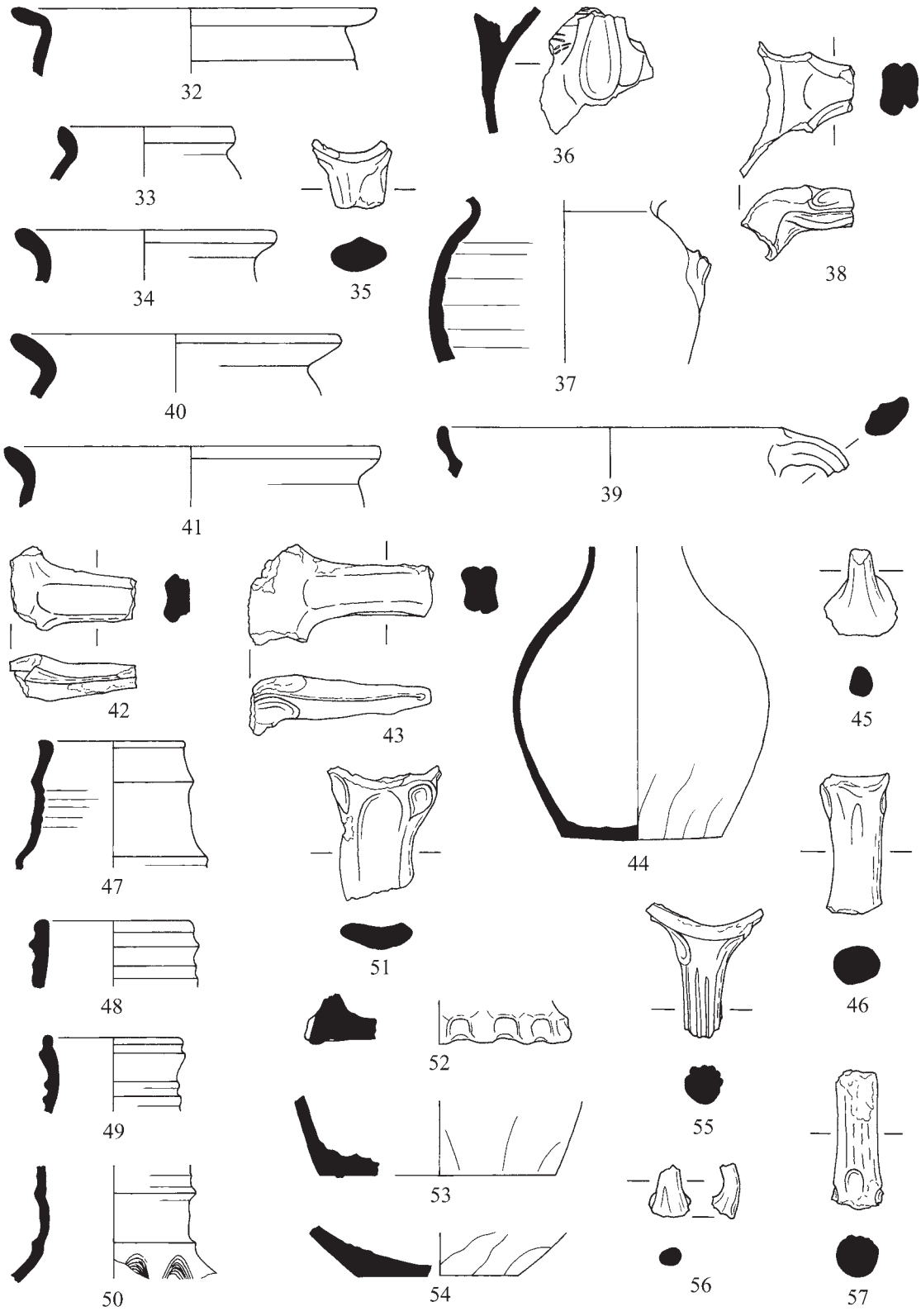


Fig. 1.2 Pottery (Pot nos 32–57) (scale 1:2)

Beauvais Overall Green-glazed (Pot nos 60–62, fig. 1.3)

There are two sherds from a narrow-necked vessel in this Beauvais fabric from the fill of the construction trench for a wall (190, Period 3) and another sherd from medieval garden soil 612 (Period 2.2).

Beauvais Double Sgraffito (Pot nos 58–59, fig. 1.3)

This pottery was manufactured in large quantities at Beauvais in the 16th century (Hurst et al 1986, 108). It has a very fine white fabric which is first covered with a red slip and subsequently with a white slip. Decoration is then scored

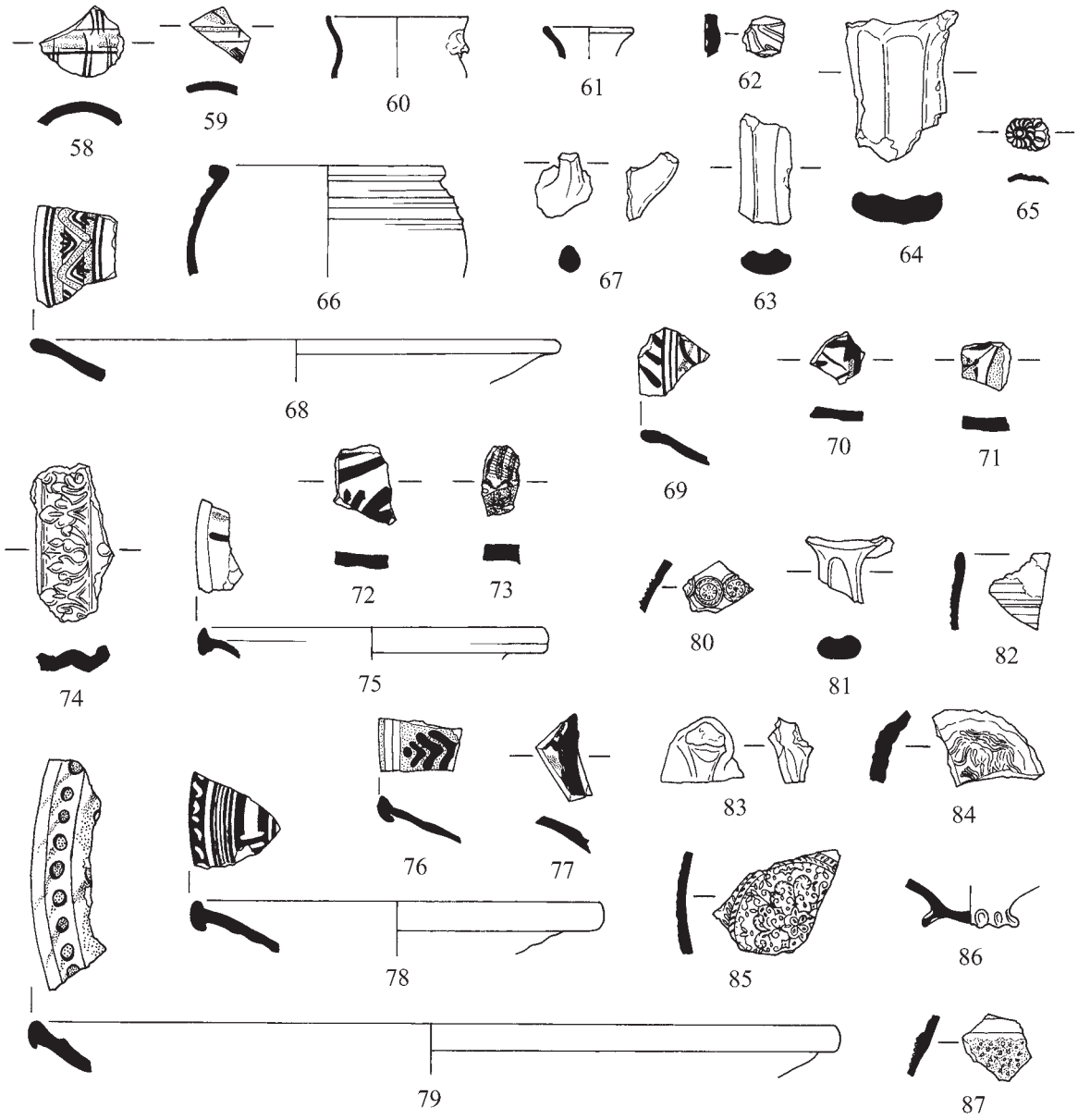


Fig. 1.3 Pottery (Pot nos 58–87) (scale 1:2)

through the white slip to expose the red and it is finally glazed green. The two sherds from Holyrood are amongst the only examples of this vessel type in this fabric from Scotland and may be from albarelli (drug jars). One of these comes from the fill of a stone tank (843) in Plot 2.2 and the other from garden soil within the formal gardens of Queensberry House (540, Period 4.1).

Loire Jugs (Pot no. 63, fig. 1.3)

There are five sherds from these vessels in contexts 1610 and 1616, the fills of Plot 4.3 garden features and a further three from the fill of a feature possibly related to the construction of Lothian Hut in the same plot (1783). They are manufactured in a very fine off-white fabric with occasional patches of yellow glaze and are a very common find from 16th-century archaeological deposits in Scotland (Hurst et al 1986, 100; Haggarty 2006, file 32).

Saintonge Plain (Pot no. 64, fig. 1.3)

These plainer types of vessels were traded along with the fine-glazed decorated wares and are more common in the second half of the 15th and first half of the 16th centuries (Hurst et al 1986, 76, 77). The single piece from these excavations is a strap handle from a jug or *pegau* and comes from an unstratified context.

Saintonge Palissy Type (Pot no. 65, fig. 1.3)

There is a single tiny sherd from the fill of a Cowgate boundary ditch (661, Plot 4.2) which may be from one of these very ornate vessels which date to the late 16th/mid 17th centuries. The sherd appears to be a decorative rosette from a scalloped bowl, similar to an example published in the Rotterdam Papers (Hurst et al 1986, 91, Fig. 40).

1.2.4 Fabrics imported from Germany

Rhenish Stonewares (Pot nos 80–86, fig. 1.3)

These distinctive, very hard-fired imported fabrics began to be imported into Scotland in the 14th and 15th centuries (Hurst et al 1986). They originate from the production centres of Langerwehe, Siegburg, Frechen and Raeren. The earliest appearance of these fabrics on site is in Period 2.2, where there are two sherds of Frechen Stoneware from cultivation layers 671 and 612 and single sherds of Siegburg and Raeren Stoneware from the fill of sump 767 (Plot 2.2) and industrial feature 1520 (Plot 2.4). Period 2.3 contains four sherds of Raeren Stoneware from two pits on the boundary between Plots 2.1 and 2.2 (669 and 728), the fill of tank 843 (Plot 2.2), and a cultivation soil (652). This period also contains single sherds of Frechen, Siegburg and Langerwehe Stonewares from stone tank 775 (Plot 2.2), boundary wall 653 (on the east side of the possible vennel) and pit 722 (on the boundary between Plots 2.1 and 2.2). Period 3 contains a sherd of Siegburg from the fill of a drain (1524, Plot 3.4), a sherd of Raeren Stoneware from midden 1620, a sherd of Frechen Stoneware from garden soil 215 and a sherd of Langerwehe Stoneware from garden soil 563. Period 4.1 contains five sherds of Frechen Stoneware from features associated with the construction of the formal gardens of Queensberry House (540, 888, 558, & 643; Plot 4.2) and Haddington House (307, Plot 4.1). There are also two sherds of Raeren Stoneware from the fill of a drain in the garden of Lothian Hut (1604, Plot 4.3) and the fill of a pit below the terrace of Queensberry House (935, Plot 4.2). This period also produced the only sherd of ornately decorated Westerwald Stoneware from garden soil 242 and a single sherd of Siegburg Stoneware from cut 1786 (Plot 4.3).

Green-glazed Siegburg Stoneware

There is a single sherd of this distinctive fabric from the fill of a well (1567, Plot 2.4). It dates to the 15th century (Hurst et al 1986, 129) and is a rare find from Scotland; the only other sherds are from Linlithgow Palace, Kildrummy Castle (Gaimster 1997, 87), Virginia Street, Aberdeen (Cameron & Evans 2001, 162) and Deer Abbey, Aberdeenshire. These vessels were fired twice to produce a glossy green-glazed stoneware fabric which was impervious to liquids.

Weser and Werra Slipwares (eastern Germany) (Pot nos 75–78, fig. 1.3)

Werra Ware has a red-brown sandy fabric and was manufactured at a number of sites in the valley of the River Weser in the 16th and 17th centuries. The two sherds from this excavation come from an unstratified deposit and modern backfill (104). The unstratified sherd is a rimsherd from a dish which is glazed brown with white slipped lines and decoration glazed light green. These vessels often have dates on them and the sherd from Holyrood is very like a published dish of 1597 from the Netherlands (Hurst et al 1986, Plate XIV). The stratified sherd is from a dish with a central incised anthropomorphic figure (J Hurst pers comm).

Weser Ware has an off-white to buff-brown fabric and was manufactured in the area between the Weser and Leine rivers between 1580 and 1630. There are four sherds in the Holyrood assemblage from Periods 2.2, 4.1 and 4.2 and one piece is unstratified. The sherd from the fill of an industrial feature (1520) in Plot 2.4 is from a Weser Wavy Bands Dish similar to a published example from the Netherlands (Hurst et al 1986, Colour Plate XV). The sherd from the fill of a drain (601, Plot 4.2) is from a similar vessel with a different design.

Mediterranean Green and Brown Redware (Pot no. 79, fig. 1.3)

The provenance of this ware is uncertain but a Mediterranean origin is preferred by John Hurst (Hurst et al 1986, 74). It has a red-brown sandy fabric and is glazed yellow-brown on a white slip. The single piece from Holyrood is from a Period 4.1 levelling deposit (643, Plot 4.2) and is from the rim of a bowl that is decorated with brown and green-glazed blobs in its stepped flange. This vessel is another example of a rare high-quality import found at Holyrood (J Hurst pers comm).

1.2.5 Fabrics imported from Spain

Seville Coarse Wares (olive jars)

These distinctive amphora-like vessels were manufactured in Seville in Spain from the 13th century onwards (Gerrard et al 1995, 284). The sherds from Holyrood are later 16th-century Middle and Late Style olive jars, which reflect the increase in the export of olive oil to north-west Europe during this period. They were found in a charcoal and clay deposit associated with a blacksmith's property on the Canongate frontage (1104, Plot 2.4).

1.2.6 Fabrics imported from unknown sources in northern Europe

Stove tile (Pot no. 74, fig. 1.3)

Holyrood is only the fourth site in Scotland to produce a piece from one of these ornately decorated medieval central heating systems which are dated to the 15th, 16th and 17th centuries (Gaimster 1990, 4). The other pieces were found from excavations at St Nicholas leper hospital, St Andrews (Haggarty 1999), an excavation at Calton Road, Edinburgh (Haggarty forthcoming) and excavations inside St Giles Cathedral, Edinburgh (Hall & Haggarty 2006). The sherd from Holyrood is from the decorated border of an imported smokeless ceramic stove, a type of central heating that was popular among elite society in Britain in the 16th century (Gaimster & Hughes 1999, 185). It comes from the backfill of a pit in Plot 3.5 (1682, not illustrated). This single fragment may originate in the Baltic (D Gaimster pers comm).

Encrusted Ware (Pot no. 87, fig. 1.3)

There is a single sherd from an unstratified context in this very distinctive fabric which is essentially a whiteware that

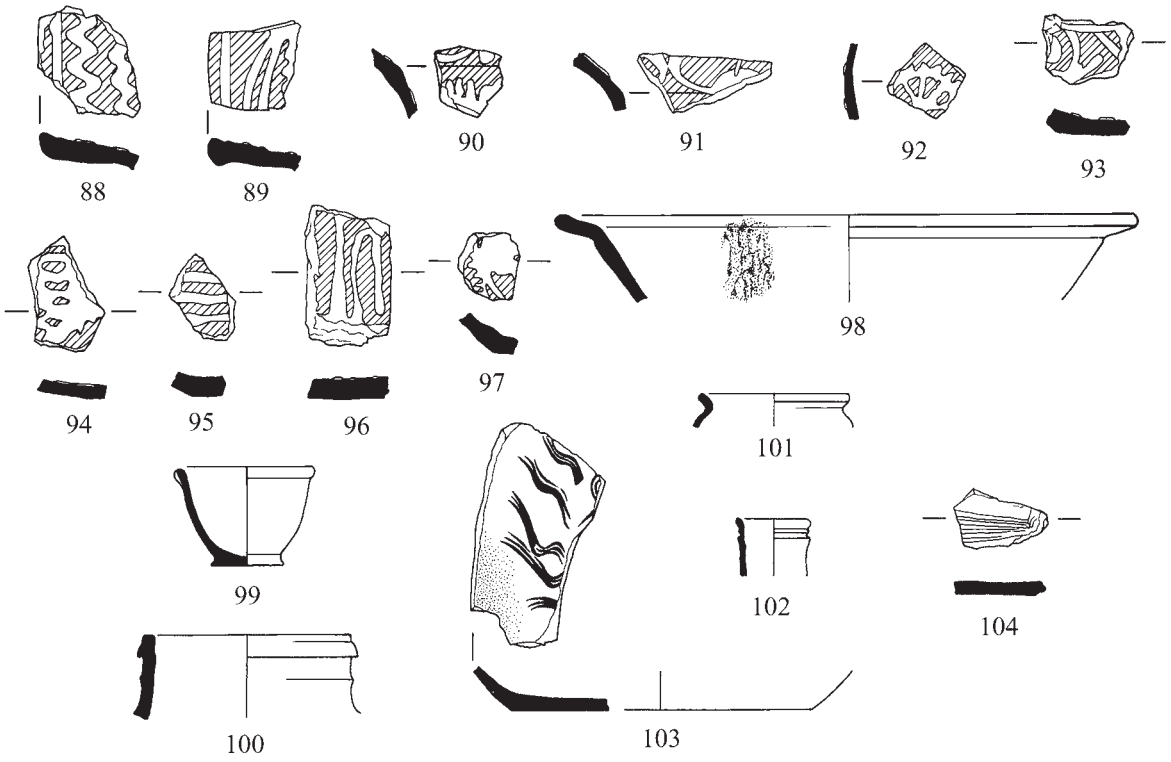


Fig. 1.4 Pottery (Pot nos 88–103) (scale 1:2)

has been decorated with stone chippings. This style was widespread in Germany in the late 16th and early 17th centuries and was copied in England in the 17th century, which makes it almost impossible to identify the source (Hurst et al 1986, 237). It has been suggested to the author that the quality of the manufacture of this piece makes it more likely to be of Rhenish production (J Hurst pers comm).

Slipwares (Pot nos 88–98, fig. 1.4)

There is a small group of decorated slipwares from Period 4.1 which may be of either Dutch or local origin (12 sherds). All these sherds are associated with the garden features in this period. These sherds are all made in an orange-red fabric with purple-red outer surfaces and are glazed red-brown with yellow-glazed decorative strips on a white slipped background. They all come from open dishes or bowls. The absence of any green colouring on these sherds makes a Dutch provenance unlikely (J Hurst pers comm).

Unidentified (Pot no. 99, fig. 1.4)

Of most interest amongst this small group of material is a complete vessel from the fill of industrial tank 1637 (Plot 3.6). This small vessel (5cm in diameter and 5cm high) is unglazed and has a small pulled spout on its rim. It would appear to have been used in some process that involved the careful measuring of a liquid. This vessel was found in association with both Oxidised Redware and Scottish White Gritty Wares and the absence of later material would seem to imply that a date of the 15th or 16th centuries should be assigned to the backfilling of this tank.

1.2.7 Conclusion

Perhaps the most striking feature of the ceramic assemblage from the excavations at Holyrood is the importance of the information provided by the later medieval and post-medieval wares. Such assemblages are rare discoveries in the Scottish burghs simply because deposits of that date have rarely survived the development boom of the 19th century, when digging of cellars removed earlier deposits. Of the few other excavations in Edinburgh, John Schofield's work on the south side of the High Street in the mid 1970s is the only work to have produced a sizeable assemblage of imported wares; intriguingly, that site only produced a large group of Rhenish Stonewares of late 15th-century date (Clarke & Hurst 1978, 206–11). The excavations inside St Giles Cathedral in 1981 produced a small group of imported material from Yorkshire, the Low Countries, Spain and Germany (Hall & Haggarty 2006).

The quality of the later medieval and post-medieval wares in the Holyrood assemblage is very high and presumably can be used as an indicator of the status of the inhabitants of the buildings on the Canongate frontage and Queensberry House. This is particularly true of objects such as the sherds from a stove tile, an encrusted vessel and the tiny sherd of Palissy-type Ware. The excavations inside Queensberry House found sherds of Westerwald Stoneware which come from a very ornate drinking vessel (Pot no. 16) dating to the late 16th century and pieces of Netherlands Maiolica dating to the 16th or 17th centuries (Pot no. 14). It may also be argued that the presence of Spanish olive jars in the main site assemblage indicates the culinary preferences of the site's occupants. From the ceramic specialist's point of view, the

most frustrating aspect of this assemblage is that, although it is possible to identify some rare Scottish examples of high-status European imports, the sherds of these vessels recovered from the site are very small. From the point of view of the local pottery industry the presence of a group of potential local slipwares from Period 4.1 is of interest and this possibility will hopefully be tested in a future sourcing programme. These excavations have demonstrated that archaeological deposits survive at this end of the Canongate which contain important material evidence of the 16th, 17th and 18th centuries.

1.2.8 Selected catalogue of pottery from the main Parliament site (figs 1.1–1.4)

Scottish White Gritty Ware

1) Rim and twisted rod handle junction with traces of green glaze. Context 809; Period 2.2.
2) Rimsherd from small vessel internally glazed green with traces of external smoke-blackening. Context 814; Period 2.3.
3) Joining bodysherds from green-glazed jug with complete strap handle decorated with notched central strip. Context 1638; Period 4.1.
4) Rimsherd from jug with patches of green glaze on interior surface. Context 859; Period 4.1.
5) Rimsherd and strap handle junction from jug with patch of dark green glaze. Context 992; Period 4.1.
6) Rimsherd and ribbed strap handle junction from unglazed jug. Context 1000; Unstratified.
7) Strap handle fragment glazed green with deep central groove and two drilled holes. Context 745; Period 2.1.
8) Fragment of strap handle externally glazed yellow green. Context 778; Period 2.1.
9) Strap handle junction from unglazed vessel. Context 652; Period 2.3.
10) Narrow strap handle with patches of green glaze. Context 1648; Period 4.1.
11) Narrow ribbed strap handle glazed green. Context 794; Period 2.3.
12) Fragment of ribbed rod handle with traces of green glaze. Context 735; Period 2.3.
13) Bodysherd from green-glazed jug with remains of applied seal including incised letter 'K'. Context 756; Period 1.
14) Bodysherd from green-glazed jug decorated with incised line decoration. Context 612; Period 2.2.
15) Bodysherd from green-glazed jug decorated with incised wavy line. Context 704; Period 2.2.
16) Bodysherd from yellow-green glazed vessel with incised line decoration. Context 681; Period 2.3.
17) Bodysherd from green-glazed jug decorated with wavy incised line and applied strips glazed green. Context 345; Period 3.
18) Bodysherd from green-glazed jug decorated with applied line and ring and dot circle glazed brown. Context 667; Period 2.2.
19) Bodysherd from green-glazed jug decorated with applied line and ring and dot circle glazed brown. Context 794; Period 2.3.
20) Rimsherd from jar with slight traces of external smoke-blackening. Context 734; Period 2.1.
21) Rimsherd from jar with patches of green glaze. Context 612; Period 2.2.
22) Rolled rimsherd from jar. Context 059; Period 3.
23) Ribbed rimsherd from jar. Context 330; Period 3.
24) Rimsherd from jar. Context 348; Period 3.
25) Rimsherd from jar. Context 888; Period 4.1.
26) Basesherd from jar with external smoke-blackening. Context 682; Period 3.
27) Rimsherd from skillet internally glazed green with traces of external smoke-blackening. Context 911; Period 3.
28) Rimsherd and handle junction from skillet internally glazed green and externally smoke-blackened. Context 129; Period 4.1.
29) Rimsherd and handle junction from skillet internally glazed green and externally smoke-blackened. Context 1612; Period 4.1.
30) Rimsherd from skillet internally glazed green with traces of external smoke-blackening. Context 617; Period 4.2.

East Coast Redware

31) Rod handle junction from jug with patches of brown glaze. Context 992; Period 4.1.

Scottish Post-Medieval Oxidised Redware

32) Rimsherd from vessel glazed brown internally and externally. Context 298; Period 2.2.
33) Rimsherd from vessel with patches of green-brown glaze internally and externally. Context 835; Period 2.3.
34) Rimsherd from vessel glazed green internally and externally. Context 859; Period 4.1.
35) Rim and strap handle junction from narrow-necked green-glazed jug. Context 859; Period 4.1.
36) Sidewalls and handle junction from green-glazed jug. Context 133; Period 4.1.
37) Sidewalls and handle junction from skillet internally glazed green and externally smoke-blackened. Context 807; Period 2.3.
38) Rimsherd and handle junction from skillet internally glazed green-brown and externally smoke-blackened. Context 215; Period 3.
39) Rimsherd and handle junction from skillet glazed green internally with traces of external smoke-blackening. Context 129; Period 4.1.
40) Rimsherd from skillet internally glazed brown with patch of external brown glaze and smoke-blackening. Context 222; Period 4.2.
41) Rimsherd from skillet glazed brown internally and externally smoke-blackened. Context 1572; Unphased.
42) Folded skillet handle glazed green. Context 617; Period 4.2.
43) Complete folded skillet handle and rim junction glazed green. Context 1000; Unstratified.
44) Neck to base profile of green-glazed jug with flat base. Context 1638; Period 4.1.
45) Rod handle junction from pipkin with external smoke-blackening. Context 563; Period 3.
46) Narrow strap handle with traces of brown glaze from jug. Context 1000; Unstratified.

Scottish post-medieval Reduced Greyware

47) Rim and neck from green-glazed jug with external raised cordons. Context 814; Period 2.3.
48) Rimsherd from jug glazed green-brown with external cordons. Context 540; Period 4.1.
49) Rimsherd from green-glazed jug with external raised cordons. Context 509; Period 5.2.
50) Neck and sidewall from green-glazed jug decorated with incised wavy lines. Context 1000; Unstratified.
51) Strap handle junction from green-glazed jug. Context 859; Period 4.1.
52) Frilled basal angle from green-glazed jug. Context 794; Period 2.3.
53) Basal angle from green-glazed jug with kiln stacking scar on base. Context 845; Period 2.3.
54) Basal angle from internally green-glazed vessel. Context 643; Period 4.1.

Yorkshire-type Ware

55) Rim and ribbed rod handle junction from jug glazed lustrous green. Context 740; Period 2.2.
56) Decorative handle from vessel glazed lustrous green. Context 612; Period 2.2.
57) Abraded rod handle from jug glazed lustrous green-brown. Context 334; Period 3.

Beauvais Double Sgraffito

58) Bodysherd from albarello slipped white on red and glazed lustrous green with Sgraffito decoration. Context 811; Period 2.3.
59) Bodysherd vessel slipped white on red and glazed lustrous green with Sgraffito decoration. Context 540; Period 4.1.

Beauvais Green-glazed

60) Rimsherd from narrow-necked vessel glazed green internally and externally. Context 190; Period 3.
61) Rimsherd from narrow-necked vessel glazed light-green externally and green-white internally. Context 283; Period 5.1.
62) Bodysherd from open vessel form decorated with internal raised strips and glazed green. Context 888; Period 4.1.

Loire Jug

63) Handle and rim junction from Loire jug. Context 974; Period 4.1.

Saintonge Plain

64) Strap handle and rim junction from Saintonge Plain jug. Context 1000; Unstratified.

Saintonge Palissy Type

65) Fragment of applied rosette decoration glazed yellow with green border from scalloped bowl. Context 634; Period 4.1.

Low Countries Greyware

66) Rim and sidewalls from smoke-blackened vessel with externally rilled surface. Context 187; Period 4.2.

Low Countries Highly Decorated Redware

67) Decorative arm or handle from vessel glazed speckled green on a white slip. Context 859; Period 4.1.

Low Countries Tin-glazed Earthenware

68) Rimsherd from bowl or dish externally glazed grey-brown and internally glazed white with blue and yellow decoration. Context 558; Period 4.1.
69) Rimsherd from bowl or dish glazed white internally and externally with blue decoration. Context 590; Period 4.1.
70) Bodysherd from Maiolica dish or plate externally glazed grey-brown with internal dark blue glazed decoration. Context 911; Period 3.
71) Bodysherd from Maiolica dish or plate externally glazed grey-brown with internal dark blue and light green decoration. Context 307; Period 4.1.
72) Bodysherd from Maiolica dish or plate externally glazed grey-brown with internal dark blue glazed decoration. Context 1000; Unstratified.
73) Basesherd from Maiolica dish or plate externally glazed grey-brown with internal dark blue glazed decoration. Context 557; Period 4.1.

Stove tile

74) Border fragment decorated with floral pattern and glazed brown. Context 1682; Period 3.

Weser Slipware

75) Rimsherd from bowl or dish glazed yellow and decorated with green and brown stripes. Context 617; Period 4.2.
76) Rimsherd from bowl or dish glazed brown decorated with yellow border and green 'tree' decoration. Context 1000; Unstratified.
77) Bodysherd from 'wavy bands' dish glazed brown with yellow and green decoration on a white slip background. Context 1500; Period 2.2.

Werra Slipware

78) Rimsherd from bowl or dish glazed brown and decorated with light green glazed stripes on a white slip background. Context 1000; Unstratified.

Mediterranean Green and Brown Redware

79) Rimsherds from bowl or dish glazed light yellow and decorated with brown and green glazed 'blobs'. Context 643; Period 4.1.

Westerwald Stoneware

80) Bodysherd from vessel decorated with stamped pads,

glazed dark blue externally and light grey-blue internally. Context 242; Period 4.1.

Raeren Stoneware

81) Handle junction from vessel externally glazed grey and internally glazed brown. Context 668; Period 2.3.

Frechen Stoneware

82) Rimsherd from vessel glazed grey-brown internally and externally with external rilling. Context 799; Period 2.3.
83) Bodysherd and handle junction from vessel glazed light grey with brown patches. Context 643; Period 4.1.
84) Bodysherd from 'Bartmann' jug with remains of lower half of bearded face. Context 685; Unphased.

Cologne/Frechen Stoneware

85) Bodysherd from brown glazed Bartmann jug decorated with a medallion. Context 540; Period 4.1.

Siegburg Stoneware

86) Frilled base from small unglazed vessel. Context 763; Period 2.2.

Encrusted Ware

87) Bodysherd from vessel internally and externally glazed light green with stone chippings embedded in glaze surface. Context 1000; Unstratified.

Local/Dutch Slipwares

88) Rim and bodysherd from bowl or dish glazed brown with yellow-glazed white slipped lines. Context 558; Period 4.1.
89) Rimsherd from bowl or dish glazed green-brown with yellow-glazed white slipped decoration. Context 512; Period 4.1.
90) Bodysherd from bowl or dish glazed brown with yellow-glazed white slipped decoration. Context 540; Period 4.1.
91) Bodysherd from bowl or dish glazed brown with yellow-glazed white slipped lines. Context 558; Period 4.1.
92) Bodysherd from vessel glazed brown internally and externally and decorated with yellow-glazed white slipped decoration. Context 1000; Unstratified.
93) Basesherd from bowl or dish glazed brown with yellow-glazed white slipped lines. Context 558; Period 4.1.
94) Basesherd from bowl or dish glazed brown with yellow-glazed white slipped decoration. Context 690; Period 4.1.
95) Basesherd from bowl or dish glazed brown with yellow-glazed white slipped decoration. Context 558; Period 4.1
96) Basesherd from dish glazed brown with yellow-glazed white slip lines and externally smoke-blackened. Context 1000; Unstratified.
97) Basesherd from bowl or dish glazed green-brown and decorated with yellow-glazed white slipped decoration. Context 1000; Unstratified.

Slipware

98) Rimsherd from bowl glazed cream white on a white slip with remains of brown glazed tree decoration. Context 540; Period 4.1.

Unidentified

99) Complete unglazed measuring vessel or crucible. Context 1638; Period 4.1.
100) Rimsherd from unidentified unglazed vessel form. Context 696; Period 2.3.
101) Rimsherd from small vessel white-slipped internally and externally. Context 345; Period 3.
102) Rim and sidewalls from very small vessel internally glazed light brown with occasional patches of external brown glaze. Context 145; Period 4.1.
103) Basesherd from open vessel glazed light yellow on a white slip with brown glazed Sgraffito decoration. Context 540; Period 4.1.
104) Basesherd from open vessel glazed light green on a white slip with incised lines forming part of unidentified design. Context; Unstratified.

1.3 METAL OBJECTS

ADRIAN COX

1.3.1 Copper alloy objects (fig. 1.5)

A range of activities is represented by the copper alloy artefact assemblage. The objects include costume fittings such as buckles, buttons, lace tags and mounts, textile equipment such as needles and thimbles, and a moderately large group of pins. The assemblage is discussed below within functional groupings.

Costume fittings

Rumbler bells like no. 1 were made from two pieces of sheet copper alloy, joined together along projecting flanges. They contained a loose 'pea', often of iron, and were particularly common in the medieval period. There is little to distinguish rumbler bells worn as costume accessories from those attached to horse harness or the collars of animals (Egan & Pritchard 1991, 337). Medieval horse harness straps could be ornamented with a wide variety of fittings such as mounts, suspended pendants and bells, as the representation of a horseman in the Hereford Cathedral *Mappa Mundi* (*c* 1300) illustrates (Griffiths 1995, 62).

No. 1, recovered from a post-medieval garden soil deposit, represents a single hemisphere from a rumbler bell, having broken along its flanged edge. It includes the characteristic dumbbell-shaped perforation, which appears to be a long-lived feature, appearing, for example, on bells of both late 13th-century and 1-6th-century date from Southampton (Harvey 1975, 255, 262). On many excavated examples, a suspension loop also survives, as it does on a slightly smaller rumbler bell recovered from a late medieval context at Mill Street, Perth

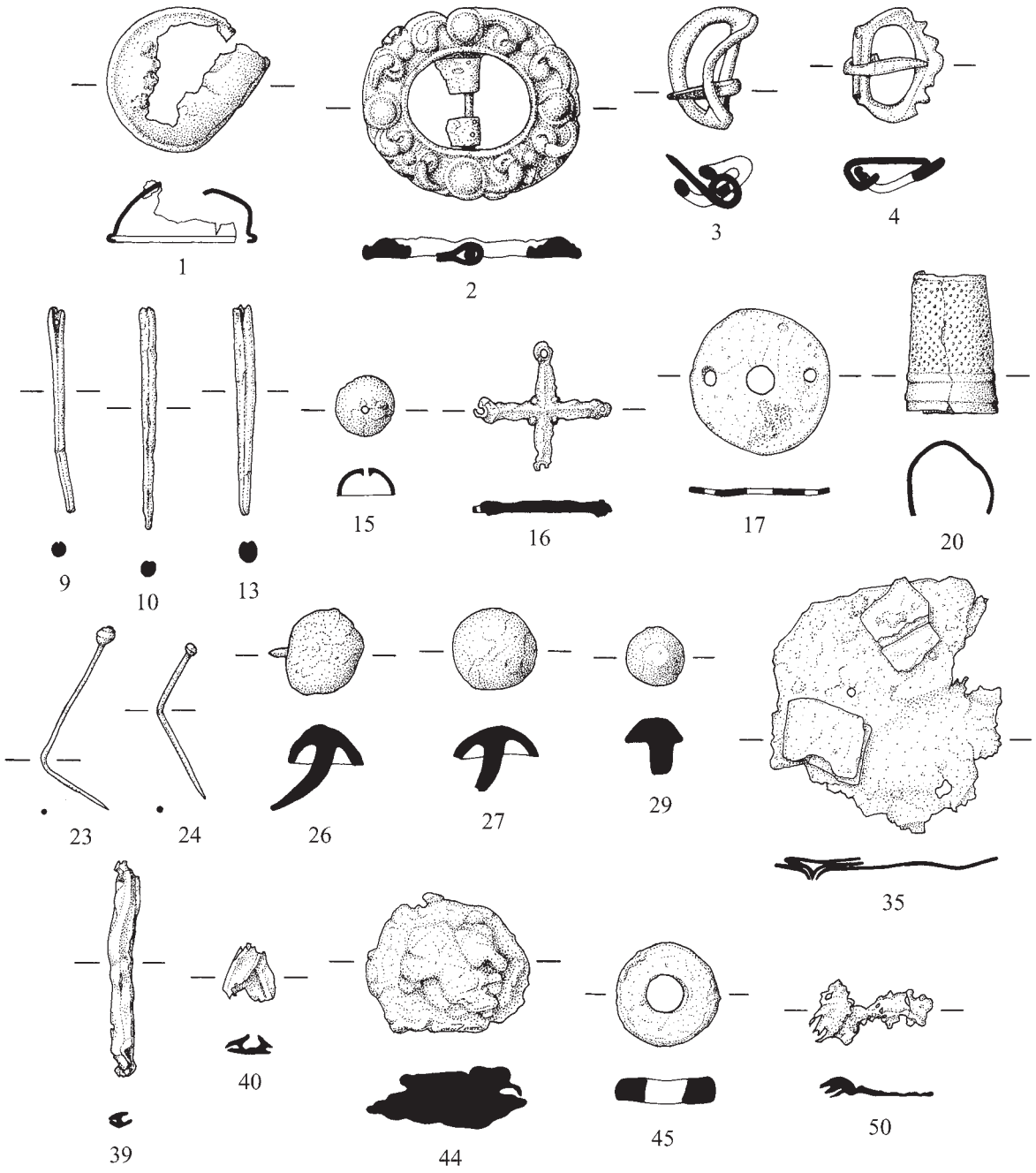


Fig. 1.5 Copper-alloy and lead objects (scale 1:1)

(Ford 1995, 959, Fig. 19, No. 1). No. 1 is likely to be of 16th- or 17th-century date.

1) Bell fragment. Original diameter *c* 21mm; thickness of wall 1mm.
Fragment of a rumbler bell, representing a single hemisphere, roughly broken at the flanged edge and around the originally dumbbell-shaped perforation. Traces of ferrous corrosion products adhering to the interior surface may represent a remnant of an iron pea. The exterior surface is undecorated. Heavily corroded.
Context 242; IADB 558; Period 4.1.

No. 2 is a two-piece buckle with a broad, oval frame. Decorative buckles with oval frames were fashionable from around the middle of the 17th century into the 18th century, and were worn as jewellery as well as being functional. The frame of this example is decoratively moulded, and appears to have traces of gilding in one area. The buckle came from a garden soil deposit in Period 4.1, and associated clay pipe evidence indicates a date range of 1640–1700, while glass from this context dates from the late 17th to mid 18th centuries.

Found in a cultivated soil deposit in Period 2.2, no. 3 is a small buckle with a circular frame, bisected by a pin bar. This type of buckle is not closely dateable, as similar forms

were in use over a long period, and possibly had a variety of functions. The type occurs in representational art from around the middle of the 14th century, and was still in use in the 17th century. It is suggested that a buckle from London, very similar to no. 3, may have been used on a spur (Egan & Pritchard 1991, 65, Fig. 40, No. 214), and an example from Goltho, also interpreted as a spur buckle (Goodall 1975, 91, No. 7), has a plate around the central pin bar for attachment to a strap. Two similar buckles were found near Lindores Abbey in Fife (Cox & King 1997, 195–7, Fig. 4, No. 12).

A small buckle from the fill of a linear cut in Period 2.3 (no. 4) has a serrated edge and a pin of very simple form, made from a tapering strip. D-shaped buckles with serrated and scalloped edges are generally dated to the 15th and 16th centuries. This example was found in association with two lace tags (see nos 11–12, below). Its frame is slightly distorted.

2) Buckle. Length 37mm; width 29mm; thickness 3mm.
Two-piece buckle with a broad oval frame, bisected by a slender pin bar of trapezoidal cross-section. Fragments of a buckle plate survive where they were looped around the pin bar, although no trace of a pin survives. The frame is decoratively moulded, with circular bosses at the ends of the pin bar and the ends of the frame, with smaller bosses between these, interspersed with foliate or scrolling ornament, all in relief. Traces of gilding survive between the raised elements on one part of the frame.
Context 227; IADB 1243; Period 4.1.

3) Buckle. Diameter 18mm; thickness 2mm.
Double-looped annular buckle, bisected symmetrically by the pin bar. The frame is plain, with sub-rectangular cross-sectioned edges. The pin is in the form of a plain, rectangular cross-sectioned, tapering strip, simply looped around the central bar. Distorted.
Context 667 (Sample 1106); IADB 3636; Period 2.2.

4) Buckle. Length (including pin) 15mm; width 17mm; thickness 3mm.
Small buckle of approximately D-shaped form, with a serrated outer edge and a narrow flange along the pin bar. The pin is in the form of a plain, rectangular cross-sectioned, tapering strip, simply looped around the buckle frame. Slightly distorted.
Context 912 (Sample 2789); IADB 2855; Period 2.3.

The four buttons found on the site (nos 5–8) are all associated with the later phases of its occupation. Nos 5 and 6 both came from the fill of a well in Period 5.2. No. 5 is a decorative button, bearing the arms of Seton of Touch (the Lord Lyon King of Arms pers comm), surmounted by a ship in full sail. This example was manufactured by Kirkwood of Edinburgh. No. 6 is of plainer design, incorporating four thread holes. No. 7 was found on a possible slate floor within Haddington House and is part of a two- or three-piece button. Also from a button of multi-piece construction is no. 8, representing only the face. These buttons are all probably of 19th- or early 20th-century date, possibly with the exception of no. 7, which could be a little earlier.

Lace tags such as nos 9–13 were used to terminate laces or thongs, to prevent their ends from fraying and to facilitate threading. They were used on a wide variety of clothing throughout the late medieval period and into the 17th century. It was common for numbers of tags to be used even in a single costume: the number used on an individual doublet and hose, for example, varied between two and twelve pairs (Cunnington & Cunnington 1969, 108). Examples have been recovered from excavations throughout Scotland (Cox 1996a, 56). The tags recovered here are associated with medieval activity on the site.

Each tag was made from copper alloy sheet, rolled tightly around the end of the lace or thong. In a study of a large group of lace tags from Northampton, Oakley (1979, 262) identified two types of seams. Oakley's Type 1 tags have edge-to-edge seams, while the later Type 2 tags have their edges folded inwards along their length. Both types are represented here. The shape of the sheet from which a tag is fabricated can have a bearing on the nature of the seam, with tapering sheets leading to overlapping seams, examples of which are also represented here.

No. 9 has an edge-to-edge seam, but also incorporates a small, copper alloy rivet, hammered into its upper end, securing the lace or thong within the tag. The rivet has been hammered between the edges of the sheet, parting them, so that the enclosed remnant of the lace or thong is exposed. The rivet does not fully pierce the tag, penetrating only one side. Riveted tags were also found in Northampton (Oakley 1979, 262) and Scottish examples come from excavations at the Abbot's House, Dunfermline (Cox 1996b, 92, Fig. 15, No. 9). Two tags (nos 11 & 12, not illustrated) were found in the same context, a linear feature in the northern part of the site. No. 13 appears to have a finished narrower end, with the end of the sheet neatly bent inwards. This may have been achieved by filing around the end of the tag, or by rotating it under pressure while the tag was held at an angle against a flat surface.

9) Lace tag. Length 31mm; max. diameter 2mm.
Complete lace tag, made from thin sheet, with an edge-to-edge seam. A small, circular cross-sectioned copper alloy rivet has been hammered through the tag near the upper end, exposing a remnant of the enclosed lace or thong. There is a break in the tag near its lower end but all parts survive. Undecorated.
Context 140; IADB 83; Unphased.

10) Lace tag. Length 33mm; max. diameter 2mm.
Almost complete lace tag, made from thin sheet, with an edge-to-edge seam. A possible remnant survives of the lace or thong it enclosed. There is slight breakage at both ends and the tag is corroded. Undecorated.
Context 612; IADB 2463; Period 2.2.

13) Lace tag. Length 32mm; max. diameter 2mm.
Complete lace tag, made from thin sheet. The edges are folded inwards along the entire length of the tag, and the narrower end appears to have been finished. Undecorated.
Context 1536; IADB 3872; Period 2.3.

The four mounts recovered (nos 14–17, 14 not illustrated) represent a range of forms. It is likely that mounts such as these performed a mainly decorative function, although it can be argued that no. 17 also served to protect the edges of a perforation in a leather strap. Small mounts were used on leather girdles and straps, and probably also on harness equipment. Some would also have been worn on textile garments. Their overall decorative effect may have depended

on groups of mounts being used together, spaced along a strap for example. On sites where leather straps decorated with mounts survive, the excavated evidence also indicates that mounts of different forms were sometimes used alongside each other, in repeating patterns. Although less apparent from the archaeological record, mounts may also have been used on book covers, wooden furniture, boxes, caskets and other items.

Nos 14 and 15, although of different sizes and slightly different forms, probably served similar functions. Both are of domed form, with a perforation at or near the apex to accommodate a pin or rivet for attachment. No. 14, from a garden soil deposit, is the larger of the two, and appears to be of oval outline with a projecting flange. This type of mount is not closely datable. Examples of medieval date have been found in Perth (eg Cox 1996c, 761, Fig. 17, No. 2), but similar mounts may have been in use over a long period. No. 15, from a levelling deposit for the Hatton House terrace, is a smaller mount, of circular outline. A similar mount was found in a topsoil deposit at Castlecliffe, St Andrews (Caldwell 1996a, 638, Fig. 27, No. 17). Clay pipes associated with both nos 14 and 15 indicate possible 17th-century dates, although both could be residual finds.

Recovered from a medieval garden soil deposit, no. 16 is a mount in the form of an equal-armed cross, with rounded, expanded terminals, through which rivets were inserted. This object may have been attached to leather, textile or possibly wood. Unusually, iron rather than copper alloy rivets were used for its attachment. The method of its attachment, by small rivets through terminal lobes, resembles that of some of the bar mounts from medieval London (Egan & Pritchard 1991, 213–4), although no similar cruciform mounts were found. Bar mounts were attached transversely to leather straps in rows. They are depicted on men's waist belts and sword belts in contemporary illustrations (ibid, 209). Cruciform pendants have been recovered from excavations in Perth (Cox 1996c, 767, Fig. 18, No. 90) and at Urquhart Castle (Samson 1982, 472, Fig. 6, No. 77).

No. 17 is a circular mount with a central perforation and two smaller ones to accommodate rivets for its attachment, probably to a leather strap or belt. Similar mounts have been recovered from medieval contexts in London, where they are interpreted as possible surrounds for holes for buckle pins in straps (Egan & Pritchard 1991, 167, Fig. 107, Nos 795–6).

15) Mount. Height 4mm; diameter 9mm.
Plain, circular mount of hollow, domed form, with a circular perforation (diameter 1 mm) at the apex.
Context 888; IADB 3160; Period 4.1.

16) Mount. Length 20mm; surviving width 19mm; thickness 1mm.
Mount in the form of an equal-armed cross, with arms of approximately D-shaped cross-section and small pellets in the angles between the arms. The object was formerly secured by iron rivets through small perforations (<1mm) through the rounded, expanded terminals. A remnant of one of the rivets survives and another two are attested by the presence of corrosion products. Parts of all four terminals survive, although two are broken across their rivet holes. The rear of the mount is flat. Corroded.
Context 612 (Sample 1615); IADB 3627; Period 2.2.

17) Mount. Diameter 21mm; diameter of central hole 4mm; thickness 0.8mm.
Circular mount with a central, circular perforation and two smaller ones (diameter 2mm) at either side of it.
Context 660; IADB 1313; Period 3.

Textile equipment

Two fragments probably representing the points of needles (nos 18 & 19) came from Periods 2.1 and 3 respectively. Longitudinal seams are visible on both objects, indicating that they were fabricated from tightly rolled sheets.

The two thimbles recovered (nos 20 & 21) are of different forms, reflecting their different functions. No. 20 is an open or ring form. Using this type of thimble leaves the end of the finger free, and the needle is pushed with the side of the finger. Open thimbles were used for specialised tasks such as sewing canvas, and in tailoring. They were generally preferred by tailors for heavier work (Holmes 1988, 1). Complete open thimbles are not commonly found in archaeological contexts and undistorted examples, such as those from King's Lynn and Exeter (Geddes & Carter 1977, 289, Fig. 130, No. 31; Goodall 1984, 345, Fig. 194, Nos 214 & 216), are rare. This thimble bears closely-spaced, machine-made indentations, indicating a probable 17th-century date. The machine-knurling of indentations was first practised in the Netherlands in the early 17th century (Holmes 1988, 3). Some post-medieval thimbles continued to be made by hand, using a bow-drill. This technique was illustrated in the early 15th century in the *Mendelschen Hausbuch* (*c* 1425).

No. 21, in contrast, is a thimble of closed or domed type. Using this type of thimble entails pushing the needle with the tip of the finger, the indentations serving to guide and control the head of the needle. This example has been crushed and is heavily corroded. Furthermore, the upper part of the thimble is largely missing, although a detached fragment from near its apex survives. The indentations on this thimble are more broadly spaced and less regular than those on no. 21, and were punched by hand.

20) Thimble. Height 20mm; original max. diameter *c* 15mm.
Tapering thimble of open form, with machine-knurled indentations on the upper 60–70% of the body, with a plain band below. The object is distorted and part of the wall is missing.
Context 660; IADB 1184; Period 3.

21) Thimble. Surviving height 18mm; original max. diameter *c* 15mm.
Thimble of slightly tapering, domed form, with broadly spaced, possibly punched indentations on the surviving upper part of the body, with a plain band below. The top of the thimble is largely missing, although a small, detached fragment survives and appears to bear indentations. The object has been crushed almost flat and is heavily corroded.
Context 812; IADB 2282; Period 2.3.

Pins

Eleven pins were recovered, and their details are presented in table 1.3. All appear to be of the same general type, made

Table 1.3 Copper alloy pins

No.	Context	IADB	Period	Completeness	Length	Head Type	Head Width	Shaft Diameter	Bent
–	130	3602	–	shaft only	12mm	–	–	0.5mm	no
–	562	3619	4.1	shaft only	18mm	–	–	0.5mm	yes
22	643	2755	4.1	complete	23mm	w-w	1mm	0.6mm	yes
–	643	2983	4.1	complete	34mm	w-w	2mm	0.9mm	yes
23	738	1711	3	complete	35mm	w-w	2mm	0.6mm	yes
–	888	4543	4.1	tip missing	8mm	w-w	1mm	0.6mm	no
–	888	4544	4.1	tip missing	11mm	w-w	2mm	0.5mm	no
24	921	4724	4.1	complete	25mm	w-w	1mm	0.7mm	yes
25	921	4725	4.1	complete	23mm	w-w	1mm	0.6mm	no
–	921	4726	4.1	complete	22mm	w-w	1mm	0.5mm	no
–	921	4727	4.1	tip missing	13mm	w-w	1mm	0.7mm	no

Notes: pins are listed in context order, and within contexts in IADB number order; w-w = wound-wire head.

from drawn wire, with the head formed by winding a small coil of wire around the top of the shaft, and secured by either an adhesive substance or by soldering. On some excavated examples, a white metal (probably tin) plating survives, as in the case of no. 25. Pins of this type have been recovered from medieval and post-medieval contexts across Scotland (Cox 1996a, 57).

At Holyrood, all but two examples are from Period 4.1, and are associated with activity of 16th- to 17th-century date. The form of these pins indicates a date in the latter part of that range, probably in the second half of the 17th century. Four pins came from the fill of a stone-capped drain, likely to have led from the kitchens of a house fronting onto the Canongate. Another two pins came from a levelling deposit into which this drain was cut, and another example was from the deposit overlying its stone capping. This represents a significant concentration of pins in and around a single feature, which may provide clues regarding the function of the building from which the drain led. Small pins of this type were used in large numbers by tailors, essentially as dress pins, although they performed a range of other functions involving securing textiles, for example in shroud burials. A connection with tailoring activities on the site is a possibility in this case.

23) Pin. Length if straightened 35mm; width of head 2mm; diameter of shaft 0.6mm.
Pin with an almost spherical, wound-wire head and a circular cross-sectioned shaft, the top of which stands slightly proud of the head. The shaft is bent to an acute angle. Corroded.
Context 738; IADB 1711; Period 3.

24) Pin. Length if straightened 25mm; width of head 1mm; diameter of shaft 0.7mm.
Pin with a pinched, wound-wire head and a circular cross-sectioned shaft, which is bent just above mid-shaft.
Context 921 (Sample 2825); IADB 4724; Period 4.1.

Studs

Three studs (nos 26–28, 28 not illustrated) and a possible stud or rivet (no. 29) were found. Nos 26 and 27, both from Period 4.1, are of a similar type, with a hollow, domed, circular or slightly oval head and a square cross-sectioned shank. They are both probably of 17th-century date. A good parallel for this form was excavated at Niddry Castle in West Lothian (Aliaga-Kelly 1997, 827, Fig. 27, No. 1035). Cast studs like these, with broad heads and relatively short shanks, were probably used on furnishings, attaching leather or fabric upholstery to wooden frames. Upholstered furniture became more common in the 16th and 17th centuries, as did textile wall-hangings, which may also have been secured using studs. No. 28, from an earlier context, is of a slightly different form with a smaller head and a broader, longer shank. This example was probably also driven into wood. No. 29 represents a stud or a rivet, with a small, solid head and a circular cross-sectioned shank. Objects like this may have had a variety of uses. Small studs were sometimes used on leather straps and horse harness equipment.

26) Stud. Length 12mm; max. width of head 13mm.
Stud with a domed, roughly oval head and a slightly bent, central, square cross-sectioned shank.
Context 232; Sample 262 (retent); Period 4.1.

27) Stud. Length 9mm; diameter 13mm.
Plain, circular stud of hollow, domed form, with a flat rim and a tapering, square cross-sectioned shank, which is broken and slightly misaligned.
Context 307; Sample 777 (retent); IADB 1541; Period 4.1.

29) Stud or rivet. Length 8mm; diameter 8mm.
Plain, circular stud with a solid head of domed form and an off-centre, circular cross-sectioned shank. The shank is blunt-ended, possibly its original form.
Context 1750; Sample 4402 (retent); Period 4.1.

Miscellaneous

A curved strip fragment recovered from an extensive medieval garden soil deposit (no. 30) may be part of a loop or chain attachment. Fittings of this size appear, for example, on strap-distributors used on horse harness. No. 31 is a ferrule or a chape, possibly used on the tip of a wooden cane or to terminate a scabbard. Recovered from the fill of a well in

Period 5.2, it is probably of post-medieval or early modern date. No. 32, from an unstratified context, is also of post-medieval date. This smaller, faceted ferrule was probably used on a walking cane or similar object.

Recovered from an infill deposit in Haddington's Entry, no. 33 appears to be a fragment from a cast vessel. Cast copper alloy cooking pots only became common in late medieval times, and were frequently repaired or the metal reused (le Patourel 1973, 91). Fragments of cast copper alloy vessels have been found in medieval contexts in Perth (Ford 1987a, 127–9; Cox 1996c, 770, Fig. 20, No. 205). From an unphased context, no. 34 is possibly part of a buckle plate. There is no trace of surface decoration on this fragment. Glass of early 18th-century date was found in association with it.

A riveted sheet fragment, found in the fill of a medieval boundary ditch in Period 2.2 (no. 35, fig. 1.5) is probably from a repair patch, possibly used on a vessel. Two sheet metal rivets, often referred to as 'paperclip' rivets, made from lozenge-shaped sheets, perforate this fragment and would have secured it to the repaired object. Sheet metal repair patches for vessels have previously been excavated at Mill Street and at Meal Vennel, Perth (Ford 1995, 961; Cox 1996c, 768–70), in St Andrews (Caldwell 1996a, 636; Maxwell 1997a, 73) and at Castle Park, Dunbar (Cox 2000a, 121). Part of a heavily patched bowl was found at Linlithgow (Stones 1989, 160). All of these examples include paperclip rivets in situ.

Part of an elongated staple, with its surviving arm tapering to a point (no. 36) was found in a stone-capped drain in Period 3. This type of staple was probably used to secure items to structural timbers or fencing. No copper-alloy sheet offcuts, the presence of which would indicate the cold working of copper alloy, were found. Lengths of circular cross-sectioned wire were used in the fabrication of a variety of artefact types, including pins and wire loops. Concentrations of wire in medieval contexts can be indicative of manufacturing activity and of metal-workers' stock, but only two very small pieces of wire were recovered here.

1.3.2 Lead alloy objects

The small assemblage of lead alloy objects comes from Periods 2.2 to 4.1. Some (for example the window cames and an object representing caulking) may be associated with building construction and repair work, although the small quantity of this material present suggests that lead alloy construction materials were not fabricated in large quantities on the site. Lead alloy waste was easily and routinely reused, and among the assemblage are two objects, a came fragment (no. 42) and a piece of waste sheet (no. 51), that have been rolled up, probably with the intention of reusing.

Window cames like nos 39–42 (fig. 1.5) were used to join and support individual pieces of glass within a window, and they have a characteristic H-shaped cross-section. Two cames were recovered from Period 2.2 and two from Period 4.1. Three individual panes of glass would have been in contact with No. 40 (fig. 1.5), which represents a corner join. The angle of the corner is consistent with the insertion of a diamond-shaped pane. At least five pieces of glass, at least some of them diamond-shaped, were in contact with no. 42 when it was in use. Diamond-shaped or 'quarry'-shaped pieces of glass characterise domestic glazing in the 16th and 17th centuries, with triangular pieces used at the edges of window frames. Examples of both were recovered from the excavation (see Part 1.5). A lattice of cames was used to join pieces of glass together within a window, but the diamond lattice construction was generally replaced by paned sash windows in the 18th century.

The came fragments also provide evidence of the thicknesses of the panes of glass they supported. No. 42 held panes of *c* 5mm in thickness, and no. 41 a pane of *c* 4–5mm. The two later fragments (nos 39–40), however, supported thinner pieces of glass, with thicknesses of *c* 3mm in both cases.

39) Came. Length 66mm; width 7mm; thickness 3mm.
Window came fragment with an H-shaped cross-section, broken at both ends and flattened.
Context 1654; IADB 4823a; Period 4.1.

40) Came. Length 18mm; width 16mm; thickness 5mm.
Window came fragment representing a corner join.
Context 1654; IADB 4823b; Period 4.1.

An object with a central, rectangular recess (no. 43) was probably used as caulking around an iron object such as a masonry cramp, a hinge pivot or a candlestick, to secure it within a rebate in stonework. The use of lead alloy caulking in this way helped to prevent the iron from rusting and splitting the stone into which it was inserted. Another example was found during recent excavations at Murraygate, Dundee (Cox 2000b, 53).

43) Caulking or plug. Length 33mm; width 19mm; thickness 20mm.
Possible caulking, with an open, rectangular recess at its centre and a strip projecting from the base of this recess. Regular, rectangular indentations (length *c* 4mm) appear on the flat surface of the object.
IADB 268; Unstratified.

No. 44 (fig. 1.5) represents a vessel repair patch, used on a pottery vessel with a wall thickness of *c* 6mm where the patch was applied. Both the exterior and interior surfaces of the patch are present and, although crude, it appears to have been worked on from both sides. The interior surface has been more carefully finished. This surface is broader and slightly convex, and is thinned at the edges, possibly in order to prevent it from standing proud of the interior of the vessel wall. With a weight of 137g, this represents a substantial repair patch and the repaired vessel is also likely to have been substantial. A surviving remnant of the vessel wall, held in position within the repair patch, is of medieval East Coast White Gritty Ware fabric (D Hall pers comm), indicating that this object is possibly residual in Period 3.

44) Vessel repair patch. Length 50mm; width 41mm; max. thickness 8mm. Weight 137g.
Roughly oval repair patch, with a small sherd of East Coast White Gritty Ware held in position.
Context 348; IADB 1939; Period 3.

A perforated, discoid object (no. 45, fig. 1.5), found in the bedding deposits for a cobbled surface in Period 3, may have functioned as a weight (eg a loomweight) or as a spindle whorl. The former interpretation may be the more likely, as

the object is rather crudely finished. However, no wear marks diagnostic of either function are present. A very similar, although slightly larger, object was associated with a 15th- to 16th-century phase of activity at Blackfriars House, Perth (Ford 1995, 961, Fig. 20, No. 170). No. 45 was found in association with a clay pipe bowl of late 17th-century date.

45) Weight or spindle whorl. Diameter 30mm; thickness 7mm.
Plain, circular weight or spindle whorl with a central, circular hole (diameter 12mm). Weight 42g.
Context 1514; IADB 3865; Period 3.

The only evidence of the cutting of lead alloy sheet on the site survives in the form of two small, tapering offcuts (nos 46 & 47). No. 46 has certainly been trimmed, whereas this is less clear in the case of no. 47, which was found in association with two window came fragments (nos 41 & 42, above) in the backfill of a rectilinear feature in Period 2.2. No. 46 is from an unphased context containing clay pipe fragments of 17th-century date.

No. 48, a curved strip fragment terminating in an irregular flange, was possibly part of a decorative strip pattern, for example on a window or mounted on a wooden object. It may represent a discarded waste piece from the casting of such decorative strips. The flanged end has the appearance of having been melted, possibly in a fire. Nos 49 and 50 (fig. 1.5) represent pieces of once-molten waste, produced either during the melting or casting of lead alloy objects, or accidentally in a fire. No. 49 incorporates a convex face with a pitted appearance, possibly indicating that the molten lead alloy solidified upon a rough, sandy or sanded surface. No. 50, associated with clay pipe evidence of mid 17th- to early 18th-century date, is a thin piece that also appears to have resulted from molten lead alloy landing upon an uneven surface and solidifying. No. 51, from a medieval garden soil deposit, is a rolled and slightly flattened sheet fragment, possibly intended for re-use. Artefactual evidence of the re-use of lead alloy has been recovered from medieval contexts elsewhere, for example at Urquhart Castle (Cox 1999).

50) Waste. Length 32mm; width 20mm; thickness 5mm.
Waste piece of irregular form.
Context 540; IADB 644; Period 4.1.

1.3.3 Iron objects (fig. 1.6)

The iron artefacts recovered from this site are generally in poor condition, possibly due to the well-aerated, damp soil conditions. However, a range of functional categories is represented, including horse equipment, structural ironwork and tools. A large part of the assemblage came from the medieval and post-medieval garden soils. In addition to the items discussed below, a number of small fragments of corroded iron objects was recovered.

Horse equipment

Parts of horseshoes (nos 52–56) were recovered from Periods 2.1–2.3 and 4.1, although, with the exception of no. 56, all are small fragments and their details have mostly been recorded with the assistance of X-radiography. Horses' hooves grow continually and they need to be regularly trimmed and re-shoed, particularly if the horse is taken on hard surfaces. This involves the periodic removal of horseshoes, whether worn or not. Frequent re-shoeing may account for numbers of discarded horseshoes, and in addition to this, shoes could have been accidentally lost as horses crossed muddy ground. Although the evidence from this site is fragmentary, a number of features of the horseshoes can be briefly discussed.

No. 52 represents the terminal of a branch of a shoe, with a rectangular nail hole set within a fullered groove. This feature, a groove around the ground surface of the shoe in which the nails sit, is a post-medieval innovation (Clark 1986, 1), occurring, for example, on a group of 17th-century horseshoes from Sandal Castle (Goodall 1983, 251).

No. 56, from a charcoal and clay deposit in Period 2.3, is the only complete horseshoe recovered. This example has an asymmetrical arrangement of nail holes, with four on one branch and three on the other. The shoe also has a pronounced calkin on one branch. Calkins, thickened or downturned terminals, can provide an improved foothold on soft ground and uneven roads. They are not in use today, and their benefits were being questioned even in the 17th century (Clark 1995, 82). An examination of the large collection of medieval horseshoes from London (ibid) revealed that the use of calkins declined fairly steadily from the 13th century through the 14th and 15th centuries, although most shoes in the 13th century included them. Calkins could be used on either both branches of the shoe, or just one, as in no. 56. The other fragments on which the terminal survives (nos 53 & 55) do not have calkins. No. 54, stratigraphically the earliest shoe in this group, survives only as a fragment, with few diagnostic features. No. 55 was found in association with a group of late 17th-century clay pipes.

52) Horseshoe. Length 74mm; max. width 23mm; thickness 7mm.
Horseshoe fragment representing the terminal of one branch, broken across a single sub-rectangular nail hole, set within a fullered groove. Heavily corroded. X-radiography reveals no additional nail holes in this fragment.
Context 540; IADB 447; Period 4.1.

53) Horseshoe. Length 54mm; max. width 24mm; thickness 4mm.
Horseshoe fragment representing part of one branch, including the terminal. X-radiography reveals that the object has broken across a rectangular nail hole.
Context 612; IADB 2635; Period 2.2.

54) Horseshoe. Length 58mm; max. width 24mm; thickness 3mm.
Horseshoe fragment representing part of one branch, heavily corroded, and with part of the outer edge missing. Parts of three rectangular nail holes survive.
Context 760; IADB 2680; Period 2.1.

55) Horseshoe. Length 73mm; max. width 24mm; thickness (not including nail) 5mm.
Horseshoe fragment representing part of one branch, including the terminal. A single rectangular nail hole is visible, and is occupied by part of a nail with a rectangular head. A second nail hole can be discerned only by X-radiography.
Context 888; IADB 3294; Period 4.1.

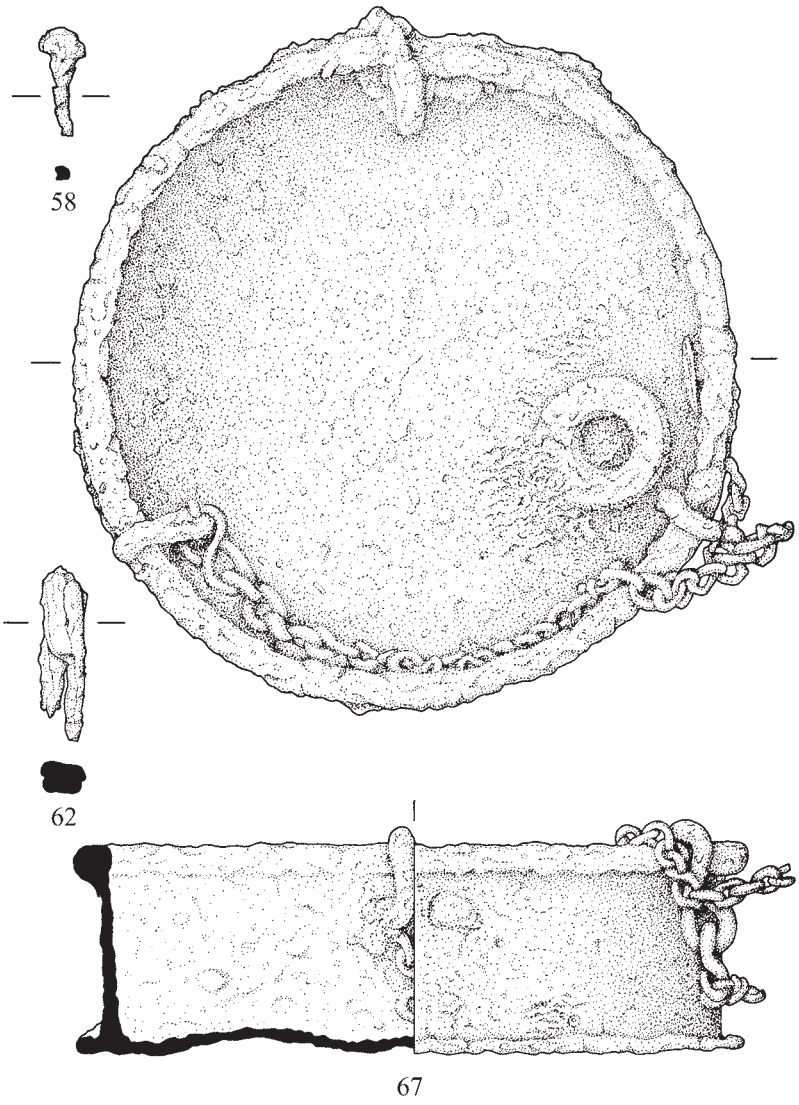


Fig. 1.6 Iron objects (scale 1:3)

56) Horseshoe. Length 121mm; max. width 30mm; thickness 7mm.
Complete horseshoe. X-radiography reveals seven rectangular nail holes, arranged asymmetrically. There is a calkin on one branch only. Heavily corroded.
Context 1104; IADB 3427; Period 2.3.

Four complete or almost complete horseshoe nails, and several fragments of such nails, were recovered from Periods 1–4.1. The two examples described below (nos 57 & 58) have contrasting head forms. That of no. 57 is approximately trapezoidal, and has a flat top, whereas no. 58 has a more semi-circular head (fig 1.6). No. 58 is an example of a type generally thought to have been used from as early as the 9th century until around the middle of the 13th century (Clark 1986, 2), although the dating of three examples from Perth, based on associated pottery, indicates that the type was still in use in the 14th century (Ford & Walsh 1987, 137). No. 57, along with the other recovered examples, is a later form.

57) Horseshoe nail. Length 29mm; width of head 10mm; thickness 7mm.
Almost complete horseshoe nail, missing only its tip. The head is of approximately trapezoidal form.
Context 681; IADB 2270; Period 2.3.

58) Horseshoe nail. Length 29mm; width of head 13mm; thickness 4mm.
Almost complete horseshoe nail, missing only its tip, in three conjoining pieces. The head is of lobed, semi-circular form. X-radiography indicates that the nail tip was clenched.
Context 790; IADB 2325; Period 1.

Structural fitting

No. 59 is a strap hinge, probably from a shutter or a cupboard. The hinge arm narrows and is then broken across the beginnings of an expansion, hence it may have incorporated a decorative terminal. Found in the fill of a service trench in Period 5.2, this object probably dates from the 19th century.

59) Strap hinge. Length 153mm; width 77mm; max. thickness 6mm.
Strap hinge with a tapering arm, with three nail holes, one of which it has broken across. The arm narrows and then is broken across the beginnings of an expansion.
Context 1042; IADB 2941; Period 5.2.

Tools

The head of a large fork (no. 60) was found in the primary fill of a stone-lined tank in Period 2.3. Whether the fork is related to the function of this feature is uncertain. A large fork such as this may have been used for horticultural work or in digging or clearing pits and ditches, although it could also have been used to mix or agitate the contents of a tank, for example. The fork is very heavily corroded, hence the measurements below are approximate.

No. 61 appears to be a blade from a whittle tang knife. The term whittle tang denotes a tang inserted into a solid handle (whereas scale tang denotes one onto which plates or scales are riveted, forming a composite handle). This example was recovered from the backfill of a clay-lined, stone structure in Period 2.3, possibly used in a dyeing or tanning process.

A fragment representing part of a pair of shears (no. 62, fig. 1.6) was recovered from a post-medieval garden soil deposit in Period 4.1. The object includes the upper parts of both blades, overlapping in the closed position and corroded together. Parts of both handle arms also survive. The basic components of a pair of shears are two blades, joined by handle arms to a sprung bow. Whereas the junction of scissor blades incorporates a rivet, about which the blades pivot, X-radiography confirms that this fragment consists of overlapping blades unconnected by a rivet.

No. 62 is from a fairly small pair of shears, and, in common with many excavated examples from the medieval period, they could have served a variety of domestic purposes, including hair-cutting and thread-trimming, although examples with relatively long blades could have been used for cloth-cutting and sheep-shearing. The relative proportions of the blades and handle arms of no. 62 are uncertain, but this reflected the use to which shears were put. Proportionately longer handles than blades meant that greater leverage could be achieved, and more pressure exerted in the cutting action. Long, slender blades were preferred for accurate and continuous cutting. Small shears that could only be held in the palm of the hand were not suitable for continuous cutting, but were suitable for single cuts, such as in cutting thread (de Neergaard 1987, 58). This pair of shears, probably dating from the 17th century on the basis of associated clay pipe evidence, may have been used in a domestic context or by a tailor working in the vicinity of the site.

60) Fork. Length *c* 420mm; max. width *c* 205mm; max. thickness *c* 65mm.
Head of a large fork, with three parallel prongs of equal length, rounded shoulders and an approximately circular-cross-sectioned handle. One of the prongs is broken but all parts survive. Very heavily corroded.
Context 837; IADB 2373; Period 2.3.

62) Shears fragment. Length 46mm; max. width 14mm; thickness 7mm.
Fragment representing overlapping parts of the blades of a pair of shears, along with parts of the handle arms. The latter are of approximately circular cross-section.
Context 540; IADB 674; Period 4.1.

Miscellaneous

No. 63 possibly represents part of the frame of a rectangular buckle, although from these surviving fragments alone, this identification is uncertain. Associated clay pipe evidence indicates a late 17th-century date. No. 64 is a heavily corroded bar, broken at both ends. X-radiography of no. 65, a fragmentary buckle or strap fitting, reveals that it may have included a pronged arrangement on the central bar, rather than a pin. It would have been used on a fairly broad strap (*c* 40–45mm in width). No. 66 possibly functioned as a point or ferrule on the end of a wooden rod. X-radiography reveals that it is of hollow form, possibly containing mineralised wood remains. Associated clay pipes indicate a late 17th-century date.

Recovered from the fill of a shallow pit in Period 5.1, no. 67 (fig. 1.6) is a circular, flat-bottomed vessel, which had been suspended by chains attached at equal intervals around its rim. A flat-bottomed vessel like this may have held an oil lamp or supported a candle-holder. Alternatively, it may have served an ornamental function. It is probably of 19th-century date.

65) Buckle or strap fitting. Length *c* 49mm; width 27mm; thickness 3mm.
Five fragments from an elongated, rectangular buckle or strap fitting, including one side of the frame and the central bar. Heavily corroded.
Context 540 (Sample 2548); IADB 2710; Period 4.1.

67) Vessel. Diameter at rim 171mm; diameter at base 176mm; depth 56mm.
Circular, flat-bottomed vessel with approximately vertical sides and a rounded rim. The base appears to have been separately made and its edge projects from the vessel sides in the form of a narrow flange. At equal intervals around the rim, chains are secured by means of broad, S-shaped links. Several detached chain links were found in close association with this vessel, and recorded as IADB 714.
Context 294; IADB 718; Period 5.1.

1.4 IRON-MAKING AND -WORKING

EFFIE PHOTOS-JONES

1.4.1 Introduction: setting the scene

The present section aims to assess the nature, composition and distribution of the metallurgical debris derived from the excavations at Holyrood as a means of understanding iron-making and -working practices in the east of Scotland, within the urban confines of the Canongate and the capital as a whole. Given the chronological span of the deposits (12th–19th centuries), the amount of slag and associated fuel waste recovered was relatively small (*c* 35kg). Most of the Holyrood metallurgical waste originated from garden soils and was often found in association with metal artefacts. Its presence raises interesting questions. What does the waste

represent? Does it reflect smelting or smithing practices, or both, and at which periods? Was it produced locally or was it brought from elsewhere, in either case as part of a smith's midden deposit? Assuming that there is evidence for primary smelting practices, what is to be learnt regarding the procurement of raw materials and energy resources available?

In order to set the metallurgical waste in its proper historical context it is important to give a brief overview of Scottish bloomery practices. Scotland is richly endowed with iron deposits and most of them were exploited in one way or another by the 19th century. Historically, it is the 'chance discovery' of clayband and blackband iron ores, the iron carbonates of the Lanarkshire, Ayrshire, Fife and Lothian fields in the 18th and 19th centuries respectively, which is thought to have contributed to Scotland's participation as a major player in the development of the British iron and steel industry in the early part of the 19th century. The importance of the metallurgical waste from Holyrood lies in the fact that it reveals, for the first time, that from the medieval and post-medieval periods the east coast urban centres were already using these locally available but complex ores, in which coal was an integral part of the ore rather than merely being added as a fuel. As Schubert (1957, 333) has written, 'the transition from charcoal to mineral coal and coke was closely connected with the rise of the clayband iron ores'. The evidence for the use of these ores at Holyrood raises two interesting points. First, the presence of coal in the bloomery must have been problematic since it introduced sulphur into the metal. Second, with the appearance of the hitherto scarcely visible medieval manufacturer of iron, *vis à vis* the ubiquitous smith, were the smith and the smelter the same person? And did these people work for the abbey or the burgh? We are fortunate that the metallurgical waste gives the opportunity to address both points. The diachronic distribution of metalworking waste over roughly the same area from the medieval to the post-medieval period suggests that production must have been local and in all likelihood, at least in the early periods, associated with the abbey.

The following sections present the archaeological background, the location and availability of local resources, and the distribution and analysis of the metallurgical waste from Holyrood.

1.4.2 The Scottish bloomery

Presently, the earliest bloomery furnace in Scotland is thought to be the one excavated at Tarras Farm, Forres, near Inverness, dated to cal 198 BC–cal AD 49 and cal 378 BC–cal AD 17 (Will 1999; Photos-Jones 1999a). It was a simple bowl-type furnace dug into the ground and lined with stone slabs, and probably covered with a clay/charcoal superstructure, to ensure prevalence of oxygen-poor conditions, leading to the effective smelting of the ore. The product was workable low-carbon iron for most uses.

Despite its antiquity, the bloomery is a chemically complex process involving the reaction of a solid lump of ore (iron oxide) with carbon monoxide from the burning of the fuel (charcoal). The process is difficult to control, yields are uncertain, and furthermore, a large amount of iron is lost in making slag, the non-metallic component or waste.

Metal artefacts in the form of raw metal or finished objects are a rare occurrence at bloomery sites, but occasional finds do shed light into what the end product, the bloom, might have been; essentially a low-carbon malleable iron (wrought iron), which could be shaped into tools, weapons or decorative artefacts. A complete 5kg bloom from Stiddrigg, Dumfriesshire (Photos-Jones 1997), fragments of a bloom from Rothesay Castle, Isle of Bute (Photos-Jones 2000), a billet (shaped bloom) from Caerlaverock Castle, Dumfriesshire (Photos-Jones 2001), a currency bar from the Isle of Arran, and a forge-welded bar of iron from Woodend, Dumfriesshire (Atkinson & Photos-Jones 2000, Fig. 8) testify to metal-working practices widely available and often of great technical expertise. These metallurgical wastes and artefacts from Scotland from the second century BC onwards suggest prolonged experience with the making of iron and a widespread availability of a variety of both energy resources and raw materials.

Regarding actual bloomeries, or the workshops where iron was produced, there are those associated with the small but ubiquitous bloomery mounds of the Scottish Highlands (Photos-Jones et al 1998; Atkinson & Photos-Jones 2000), the medieval and post-medieval 'smithies' of burghs like Perth (Photos-Jones & Atkinson 1998), and those attached to abbeys like Arbroath or castles like Rothesay and Caerlaverock (Photos-Jones 2000; 2001). Most date to the post-medieval period.

Conventional thinking trends might argue that most metallurgical debris within urban contexts must be of the smithing type. This is primarily because the methodological approach traditionally used, namely classification based on typology, does not lend itself to the testing of different hypotheses (Spearman 1988). In other words, the question of whether urban ironsmiths were also manufacturers of the raw metal is a complex one to address and the answer must be sought in the technical examination of industrial waste.

In reference to medieval Perth, Photos-Jones and Atkinson (1998), argued that there would be little need for dependency of the medieval smiths on their Highland counterparts for the procurement of the raw metal in that burgh, since bog-iron ore would have been readily available in the Perth countryside. Given the limited technical requirements of the bloomery, at least in its pre-waterpower-driven phase, and the abundance of the raw materials, most Scottish medieval ironsmiths living in urban centres would have been capable of making their own iron. Dennison's description of 'the rural atmosphere in the medieval town' where there is little pressure on space and potentially with direct access to the source of raw materials, supports this argument (HAPT, Chapter 4.5).

We must therefore ask, is there smelting slag amongst the metallurgical waste, and, who was producing it and where? Craft specialisation within the medieval town has been well documented. For 15th-century London, 'almost a quarter of the crafts . . . were concerned primarily with metal' (Keene 1996, 96). An insight into this specialisation can also be glimpsed by the archives for medieval Nottingham (Egan 1996; MacCormick 1996). Among the ironsmiths, there are included armourers, arrowsmiths, blacksmiths and bladesmiths and farriers, all listed as forging iron and steel. On the other hand, locksmiths, lorimers and some blacksmiths are thought to have simply hot-and cold-worked iron and steel (MacCormick 1996, table 1). In addition to these crafts, there

were cutlers and grinders who would be simply grinding and polishing blades without necessarily the need for a hearth installation. Most of these craftsmen would have belonged to an incorporation of hammermen, a guild for those working in both ferrous and non-ferrous metals. In reference to the hierarchy within the metal-working occupations, Keene (1996, 95) has argued, on the basis of London tax assessments, that ironmongers (merchants in iron), had a status second only to goldsmiths, while smiths and other metal manufacturers were at the bottom of the 'pecking order'. Did that include manufacturers of the raw metal as well? To our knowledge, there is no reference to makers of iron as living and working together with any of the above specialised iron-making occupations.

1.4.3 Energy sources and natural resources

Scotland is richly endowed with iron ore deposits which have been considered both from a geological (McGreggor et al 1920) as well as an archaeological perspective (Hall & Photos-Jones 1998). Prior to the early 17th century, exploitation was small-scale and associated with iron seepages or encrustations (bog-iron ores) characterised by the presence of manganese and phosphorus and low potassium and calcium contents (Hall & Photos-Jones 1998). The use of these regenerative sources of iron ore (they can re-form at a considerable thickness over a period of about 30 years) was first studied in association with the post-medieval bloomery mounds of the Scottish Highlands (Photos-Jones et al 1998, table 1).

Another type of ore used in the early bloomeries was siderite or carbonate ore which, when pure, contains 48.3% Fe (iron). Within this group there exist two types of ores, ironstones of the Carboniferous Age, found within the Limestone Coal Group, and are from the claybands and blackbands of Lanarkshire and Ayrshire, Fife and the Lothians. The clayband ores have a considerable amount of clayey material or shale, the ore ranging in colour from white to black. The blackband ores contain little clay and a considerable amount of coal. They are fossiliferrous and contain up to 30% Fe. Analyses of both types of ores used in the 19th century have been well documented in Sexton (1902) and MacGregor (1982).

The first documented workers of coal were supposed to have been the monks of Newbattle Abbey. In 1291 a charter was granted to the abbot and convent of Dunfermline giving them privilege to dig for coal in the lands of Pittencrieff (Macadam 1887, 95), whether for domestic or industrial applications is not certain. Domestic use is demonstrated by Eneas Sylvius, of Scotland, in the 14th century, who wrote that people who begged at the church doors received for alms 'pieces of stone with which they went away contented . . . whether with sulphur or whatever inflammable substance it may be impregnated, they burn it in place of wood' (ibid, 95). Therefore the domestic use of coal, assuming proximity to resources, must in principle and not necessarily in practice have preceded its use in iron-making by far.

Coal, although used extensively in smithing from the Roman period (Dearn & Branigan 1995, 82), has always been considered inappropriate for smelting; large amounts of sulphur, when absorbed into the iron, render it hot-short (it fractures when hot hammered). Coking does not necessarily remove great amounts of sulphur, but low-sulphur coals can be used (Tylecote 1986, 225). Slag can also act as a desulphuriser in the blast furnace.

Turning to the sources that could have supplied Holyrood, the Midlothian coalfield extends to the west of the city of Edinburgh, between the Pentland Hills and a lower-lying ridge to the east. It runs in a NE/SW direction from the Firth of Forth, gently rising southwards to Auchencorth Moss. A number of collieries have been worked there until recently, extracting coal from the two great coal ring groups of Scotland, the Limestone Coal Group and the Productive Coal Measures. Within these coal measures, ironstone, both blackband and clayband, is found (especially at Loanhead Collieries 1, 2 and 3). The distance of Loanhead from Arthur's Seat is an obviously relatively short one, only about 4 miles (6km) away. We can see therefore that both coal and ironstone would have been available close to the Canongate. While there is no direct evidence, it is likely that the calorific value of these fuels would have been evident well before the medieval period. Is it possible that in the medieval period the procurement of the ore could have been organised by the abbey in the manner that the monks of Newbattle Abbey had acquired a charter giving them privileges to dig for coal?

1.4.4 Typology and distribution of the Holyrood metallurgical waste

Examination of the material with a low-powered stereo-microscope revealed four categories:

- Fuel: any type of combustible material, be it charcoal, coal or coke, whether untreated, charred or partly ashed.
- Slag: any type of metallurgical waste of siliceous and/or iron-silicate base of any date, shape or form.
- Magnetic residues: small magnetically active fine particles of slag, 'ore' or fragments of metal, magnetically separated from their contexts.
- Ferruginous (also referred to as metal/metallic fragment): usually small, unidentifiable fragments of any material, which is either naturally or artificially iron-rich.

The largest single category by weight was coal/charcoal (*c* 20.8kg), followed by slag (9.3kg), magnetic residues (3.6kg), and ferruginous materials (0.5kg). Therefore the total amount of iron-working material and fuel recovered from the site weighed no more than *c* 35kg, a relatively small amount considering that the site spans nearly 800 years of habitation.

Fuel constitutes the majority of the waste recovered. It could have derived either from domestic or industrial activities. At the start of the investigation, it was not clear how much of the fuel was charcoal, coal or something else. A number of contexts were therefore examined in detail with the stereo-microscope and four groups were identified: coal, charcoal, coke or porous and unidentified material (non-fuel). Some basic criteria were applied: charcoal was identified on the basis of its plantlike texture; coal on the basis of compactness and a platy structure; and 'coke' on the basis of porosity. The results (table 1.4) clearly suggest an overwhelming evidence for the use of coal. It should be noted here that by 'coke' we imply not the product of coking furnaces but rather the reduction of coal within the furnace and its localised-within-the-furnace-conversion to coke.

Table 1.4 Iron-working: distribution of charcoal/coal/coke from 12th- to 19th-century contexts

Context	Charcoal	Coal	Coke	Other
1109: Period 2.1/Formal division of site with establishment of burgh	0	0.5	3.5	0.5
332: Period 2.2/Accumulation of medieval garden soil and associated features	0	9	4	1
612: Period 2.2/Accumulation of medieval garden soil and associated features	0	77	16	40
330: Period 3/Accumulation of post-medieval garden soil and associated features	0	8	1.5	0.5
563: Period 3/Accumulation of post-medieval garden soil and associated features	2	110	27	67.5
1513: Period 3/Accumulation of post-medieval garden soil and associated features	1	19	4	8
540: Period 4.1/Post-medieval features	0	86	36	30

Table 1.5 Iron-working: the first ten contexts with the largest concentrations of fuel

Context	Period	Description	Fuel weight (g)
563	3	Post-medieval garden soil covering most of the site with a depth of 0.25m in thickness.	2069.5
540	4.1	Stone wall and culvert 0.5m to 0.9m in height, unknown length.	1520.7
612	2.2	Medieval garden soil. Extensive and fairly homogeneous deposit.	1334
558	4.1	Cultivation slot fill, cut 566. N–S aligned feature, 6m long and 1m wide.	1110.9
215	3	Post-medieval garden soil. Extensive layer stretching across much of trench 22.	847.1
888	4.1	Levelling layer of Hutton House terrace, lay to N of terrace wall 635.	675.7
187	4.2	Surface of occupation detritus 0.03m.	539
307	4.1	Garden soil under Haddington House 0.5m thick.	511.6
667	2.2	Cultivation layer, N of 629. A spread of garden soil in N of area, 7.3m N–S.	443.6
912	2.3	Fill of linear cut 913. Extends N–S for 3.2m with a width of 0.6m.	416.9
		TOTAL	9469

Table 1.5 summarises the first ten contexts which gave the largest concentrations of fuel, table 1.6 those of slag, table 1.7 the ten largest concentrations of magnetic residues and table 1.8 those of ferruginous materials. Overall the contexts that have produced the largest collection of materials are the following: 563 (Period 3), 612 (Period 2.2), 558 (Period 4.1), 307 (Period 4.1), 222 (Period 4.2), 807 (Period 2.3), 888 (Period 4.1), 187 (Period 4.2), 667 (Period 2.2) and 912 (Period 2.3).

In the examination of this material the following assumptions were made: contexts which contained a combined accumulation of slag, magnetic residues and coal were thought to reflect smelting activities (light-grey shade) (fig. 1.7). Contexts which contained magnetic residues in association with coal were assumed to reflect smithing activities (medium-grey shade). No definite assumptions could be made about contexts containing fuel only (dark-grey shade). In other words, these contexts can reflect either domestic or industrial activities. Roughly equal amounts of smithing/smelting and domestic waste are recorded for the medieval and post-medieval periods, or about 14kg:12kg respectively.

The distribution of the fuel and metallurgical waste throughout the excavated site points to most of the debris/activities concentrating to the south of Queensberry House, in the garden soil at the corner between Reid's Close and Holyrood Road. The relative distribution of these contexts suggests that there was a sustained accumulation of smelting/smithing waste from Periods 2, 3 and 4 (14th–18th centuries) in the same general area. Can these contexts be representing the dumping ground (midden deposits) of metal-working waste over a prolonged period of time (medieval–post-medieval)? Furthermore, there seems to be a typological difference between metallurgical waste from the medieval and post-medieval periods.

1.4.5 Holyrood fuel and metallurgical waste: slag morphology and slag analysis methodology

A number of samples were chosen for analysis from the main chronological periods, Period 1 (12th–14th centuries), Period 2 (14th–15th centuries), Period 3 (transition between medieval and post-medieval, 16th–17th centuries), Period 4 (post-medieval, 17th–18th centuries) and Period 5 (19th century). The samples have been prepared as polished blocks for examination with the optical microscope and with the SEM-EDAX (table 1.9).

All samples have been mounted on metallographic resin. They were ground and polished with 6μm and 3μm diamond paste and subsequently carbon-coated. Bloomery slags, whether smelting or smithing, are characterised by a number of distinct mineralogical phases. These include dendrites of wustite (FeO), long or broken-up needles of fayalite ($2FeO.SiO_2$), angular grains of hercynite ($FeO.Al_2O_3$) and a glassy phase, which grows interstitially within the other phases. Smithing slags are dominated by wustite and magnetite as well as fayalite. The mineralogy of modern/industrial period slags is quite different. The slags are glassy rather than crystalline and they contain relatively little iron oxide (less than 10%

Table 1.6 Iron-working: the first ten contexts with the largest concentrations of slag

Context	Period	Description	Slag weight (g)
222	4.2	Infill/makeup in Haddington's Entry, 0.4m thick; homogeneous infill.	837.4
612	2.2	Medieval garden soil. Extensive and fairly homogeneous deposit.	819.1
563	3	Post-medieval garden soil covering most of the site with a depth of 0.25m in thickness.	700.3
540	4.1	Stone wall and culvert 0.5m to 0.9m in height, unknown length.	576.9
215	3	Post-medieval garden soil. Extensive layer stretching across much of trench 22.	430.5
807	2.3		411.4
307	4.1	Garden soil under Haddington House, 0.5m thick.	379.6
652	2.2	Cultivation soil. Garden soil spread 665. Loose sandstone rubble with silting; 10.07m long.	307
298	2.2	Medieval garden soil. An extensive deposit identified over most of the trench.	222
794	2.3	Fill of waste pit cut 796. Diameter of approximately 2m and a depth of 1.05m.	186.5
		TOTAL	4870

Table 1.7 Iron-working: the first ten contexts with the largest concentrations of magnetic residues

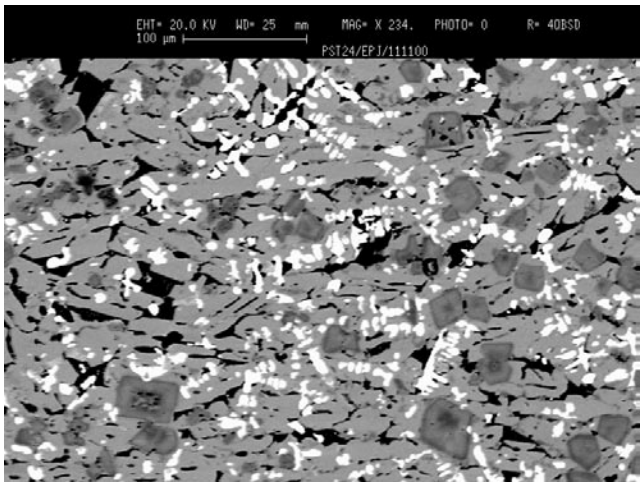
Context	Period	Description	Magnetic residue weight (g)
612	2.2	Medieval garden soil. Extensive and fairly homogeneous deposit.	229.1
187	4.2	Surface of occupation detritus, 0.03m.	131.3
215	3	Post-medieval garden soil. Extensive layer stretching across much of trench 22.	98.8
853	2.1	Accumulation in drain 768. Dimensions 12m N–S, 0.15m wide and 0.08m deep.	82
559	4.1	Cultivation slot fill, cut 567. Linear feature; 2.7m N–S, 1.15m E–W and 0.22m thick.	79.3
734	2.1	Fill of ditch, cut 759. Dimensions: 30m N–S, 1.3m E–W and 0.47m deep.	79.3
312	4.1	Fill of cultivation slot. Depth 0.5m. Feature damaged during the matching out.	66.3
763	2.1	Fill of sumps. Fill 1.05m deep. The top 0.2m was predominantly a silty clay.	62.5
681	2.3	Fill of pit cut 680. 1.8m in diameter and 0.2m in depth, very mottled deposit.	60.8
269	5.1	Fill of drain 265 0.18m thick homogeneous fill.	60.4
		TOTAL	949

Table 1.8 Iron-working: the first ten contexts with the largest concentrations of metal residues/ferruginous material

Context	Period	Description	Metal/ferruginous material weight (g)
2	3	Garden soil/midden type deposit. This is a dark deposit containing charcoal.	239.6
236	4.1	Fill of cultivation slot. 2m wide and 0.4m deep.	74.3
1000	–	U/S or overburden.	56.6
187	4.2	Surface of occupation detritus 0.03m.	15.4
540	4.1	Stone wall and culvert 0.5m to 0.9m in height, unknown length.	13.5
1766	3	Dark brown garden soil with midden material fill in rectangular cut 1765.	
219	4.1	Fill of cultivation slot.	7.7
7	3	Fine ash deposit filling pit 006. Contains charcoal, bone and shell.	6
912	2.3	Fill of linear cut 913. Extends N–S for 3.2m with a width of 0.6m.	4.2
269	5.1	Fill of drain 265 0.18m thick homogeneous fill.	3.6
		TOTAL	421

Table 1.9 Iron-working: list of samples

Sample No.	Typology	Context	Plot No.	IADB	Period	Description
PST1	Fragment of heavy dense slag.	811	2.2	2510	2.3	Backfill of twin tank cut 843. Sub-rectangular spread of silt and rubble.
PST2	Single fragment of dense heavy slag.	811	2.2	2516	2.3	Backfill of twin tank cut 843. Sub-rectangular spread of silt and rubble.
PST3	Large lump of heavy dense slag.	682	3.2	2258	3	Construction backfill over drain 692. Fill of drain cut.
PST5	Single fragment of heavy dense slag.	563	–	1858	3	Post medieval garden soil.
PST6	Single fragment of heavy dense slag.	612	–	3314	2.2	Medieval garden soil.
PST8	Many fragments of heavy dense slag.	280	4.1	2616	2.3	Domestic refuse fill of pit 290.
PST9	Fragment of coal with 'envelope' of slag, result of reaction with slag.	819	2.2	4044	2.3	Fill of pit cut 815.
PST10		809	2.2	4036	2.2	Fill of ditch cut 810.
PST13	Slag + coal, with lumps of trapped coal and iron.	215	4.1	762	3	Post-medieval garden soil.
PST14	Slag/clinker? (Bag identification).	2	–	216	3	Garden soil/midden type deposit. This is a dark deposit containing charcoal.
PST16	Slag and coal with lumps of trapped coal and iron.	1657	3.6	4683	4.1	Compact clayey silt located beneath capping 1665 in a stone-lined tank structure.
PST17	Slag and coal adhering onto conglomerate stone.	280	4.1	838	4.2	Domestic refuse fill of pit 290.
PST21	Charcoal/coal	612	–	2813	2.2	Medieval garden soil.
PST23	Charcoal/coal	563	–		3	Post-medieval garden soil.
PST24	Slag	790	N/A	2437	1	Natural silting in early boundary ditch.
PST25	Slag	892	N/A	2871	1	Fill of sub-circular feature cut 893.
PST26	Slag	1109	2.4	4686	2.1	Fill of hearth 1110.
PST27	Slag	54	–	234	2.1	Upper fill of medieval feature. 'Greasy' type fill with small stones.
PST28	Slag	612	–	2157	2.2	Medieval garden soil.
PST29	Slag	814	2.2	2281	2.3	Fill of pit 815. Midden backfill.
PST30	Slag	206	2.4	57	2.3	Hearth fill
PST31	Slag	1552	3.4	3943	3	Primary fill of pit 1553. Midden-like fill.
PST34	Slag	187	4.2	3973	4.2	Surface of occupation debris
PST35a	Slag	222	–	392	4.2	Infill/makeup in Haddington's Entry.
PST35b	Slag	222	–	392	4.2	Infill/makeup in Haddington's Entry.
PST38	Slag	807	Possible vennel, Period 2	2427	2.3	Fill of cut 808.
PST39	Slag	807	Possible vennel, Period 2	2403	2.3	Fill of cut 808.
PST40	Slag	215	–	1056	3	Post-medieval garden soil.
PST42	Slag	222	–	392	4.2	Infill/makeup in Haddington's Entry.
PST43	Slag	752	2.2	2209	2.2	Primary pit (753) fill.



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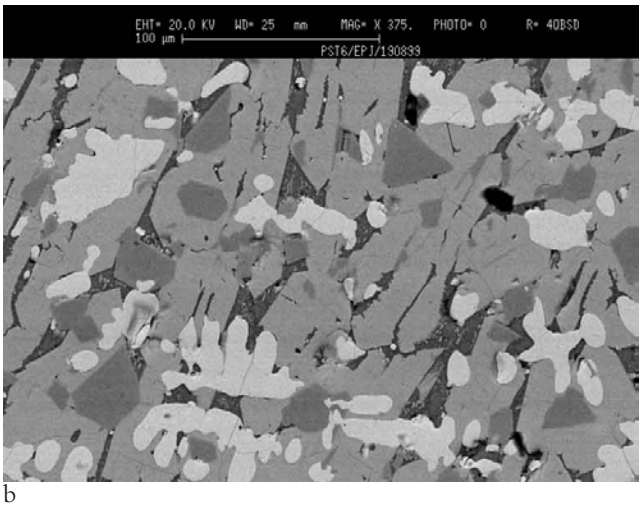
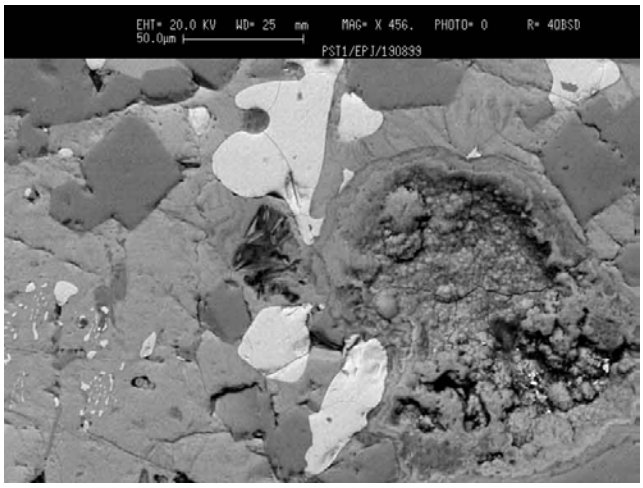
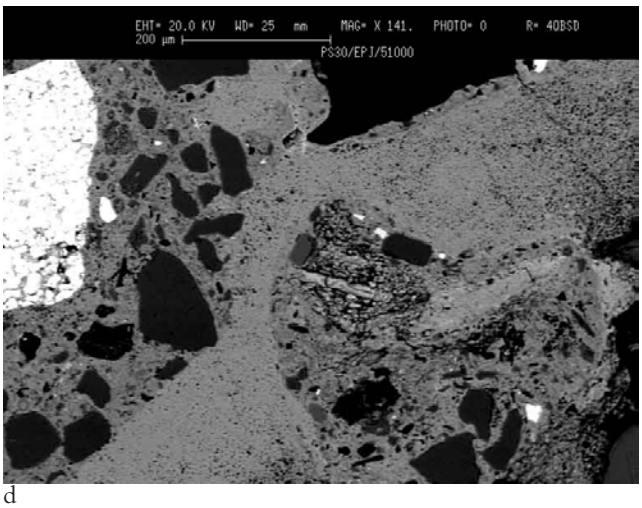


b



c



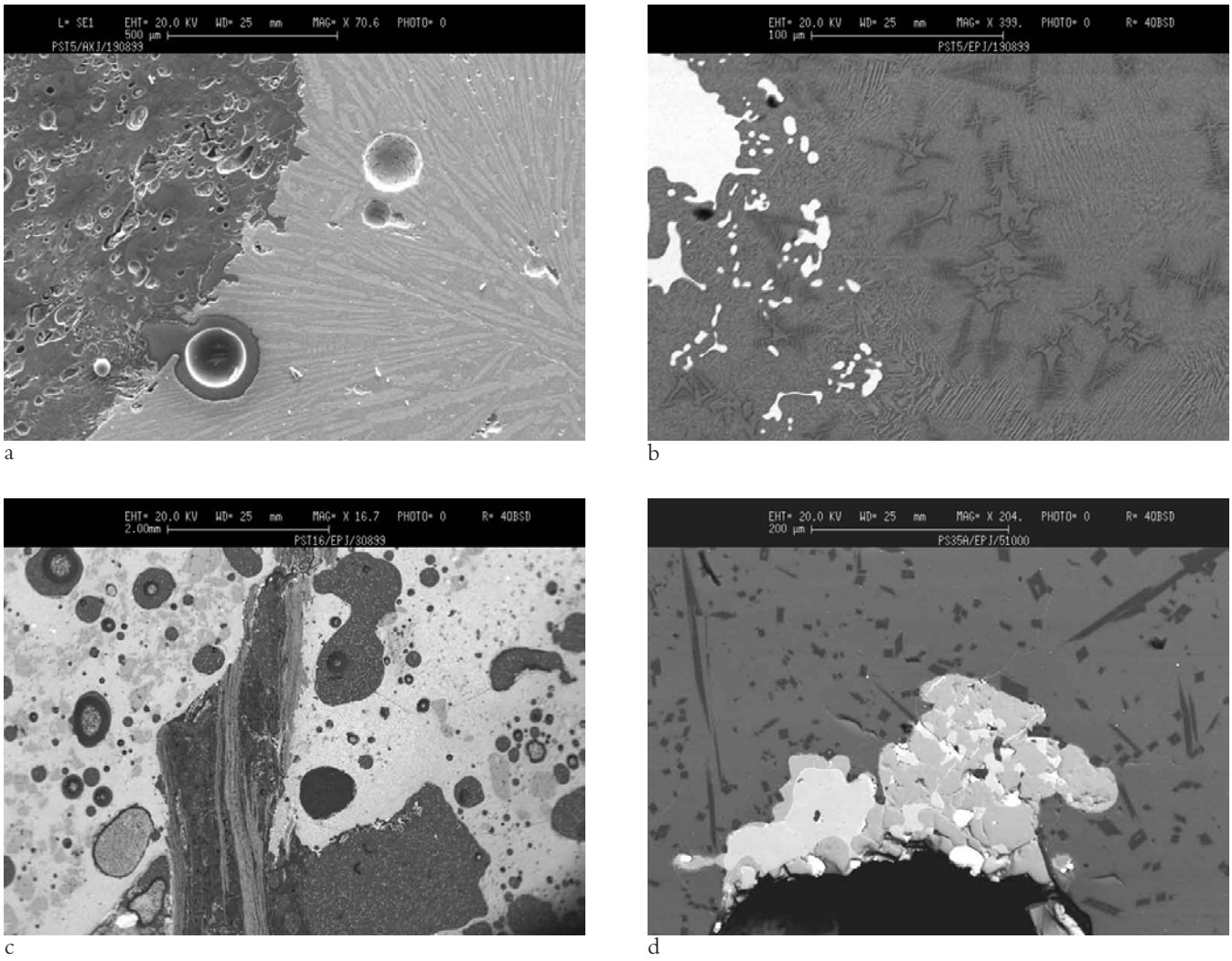
d

Fig 1.7 Iron-working: a, SEM-BS image of PST24 showing dendrites of wustite, well defined needles of fayalite, angular grains of hercynite in an intestitial glassy phase (bar=100µm; ×234); b, SEM-BS image of PST6 revealing an alumino-silicate slag consisting of the four mineralogically distinct phases shown, finger-like fayalite (medium grey), globular wustite (light grey) and angular hercynite (dark grey) and an interstitial glassy matrix which consists of two phases (bar=100µm; ×375); c, SEM-BS image of PST1 with the four characteristic phases of shiny wustite, angular hercynite, fayalite and the interstitial glass. In addition; also a fragment of partially reduced ore (bar=50 µm; ×456); d, SEM-BS image of sample PST30 highlighting the co-existence of fragments or charcoal (centre of the picture) and coal, corroborating the observation made in the discussion that charcoal must have been used as fuel in the medieval bloomery but coal found itself in the furnace accidentally as part of the clayband iron stone (bar=200µm;×141)

FeO as opposed 60–70% FeO in the bloomery). Within the glassy matrix, usually round metallic iron prills are trapped, indicating that the iron had melted.

The metallurgical waste can be divided into two morphologically distinct groups which correspond roughly to the two major chronological subdivisions, the medieval and the post-medieval slags. The former are bloomery slags, spongy-looking, black and dense with charcoal imprints or fragments of charcoal trapped within. The post-medieval and later material consists primarily of porous and dense slag with large inclusions of coal, and patches of yellow mineralisation originating either from sulphur-rich precipitations or non-crystalline iron oxides, or a combination of both. There are examples of the first group (bloomery) within contexts dating to the post-medieval period but not the other way around. Some samples show 'dripping', as if they have locally melted. The embedded chunks of coal are large (1–2cm or more), suggesting partial heating.

Period 1 (12th–14th century) produced little metallurgical waste. Two samples were analysed with the SEM-EDAX (PST24 and PST25) (see table 1.10a). The samples originated from the fill of the ditch 754 and from the fill of cut 893 respectively. The samples point to a fayalitic type of slag with wustite and considerable amounts of aluminium so as to form a distinct mineralogical phase, hercynite (see fig. 1.7a). Alkali and alkaline earths derived from fuel ash while sulphur and titanium derived from the coal and the ore respectively. Sulphur occurs as small metallic iron sulphide inclusions of less than 1–2µm in diameter. PST24 is most certainly a fragment of smelting slag on account of the hercynite pointing to a clay-rich ore like a clayband ironstone. It was mentioned earlier that clayband ores have a considerable amount of clayey material or shale. Analysis of PST25 also dating to this period points to a wustitic slag, but with no hercynite. It is possible that it has derived from a smithing hearth. The argillaceous iron ores would have been the only ones locally available. If iron-making



a b c d

Fig. 1.8 Iron-working: a, SEM-BS image of PST5. The sample contains needles of fayalite growing at right angles to a fragment of coal (bar=500 µm; ×70); b, SEM-BS image of PST5. Vanadium and chromium-rich phases, snowflake-like phases are seen in elsewhere within the same sample. A considerable degree of unhomogeneity characterises this sample most likely originating from the smelting of blackband ironstone (bar=100 µm; ×=399); c, SEM-BS image of PST16 consisting of coal trapped within an iron–rich alumino-silicate matrix; unreacted quartz grains. Needles of fayalite with very small iron sulphide inclusions (bar=2mm; ×17); d, SEM-BS image of PST35A consisting of an aluminosilicate matrix with metallic inclusions of iron, vanadium and chromium (bar=200µm; ×204)

was carried out locally at the time – as it clearly was – then this would be the type of deposit exploited.

In Period 2 (14th–16th century), the bulk chemical composition of a number of samples deriving from medieval garden soil and medieval features confirmed the observation that the same type of clayband ores appears to have been used locally. SEM-EDAX examination and analysis of slags from the medieval period (Periods 2.1, 2.2, 2.3 and perhaps some of Period 3) samples PST1, PST6 and PST30 (see fig. 1.7b for PST6, fig. 1.7c for PST1 and fig. 1.7d for PST30) also revealed a fayalitic-type slag. Just as in PST24, samples PST1 and PST26 consist of finger-like fayalite (medium grey), globular wustite (light grey), angular hercynite (dark grey) and an interstitial glassy matrix. The high sulphur content – in terms of bloomery slags – testifies to the accidental presence of coal in the charge. Figure 1.7c shows the partially reduced fragment of clayband ore.

SEM-EDAX examination of PST30 (fig. 1.7d, table 1.10b) highlights the co-existence of fragments of charcoal (the beehive structure in the centre of the image) and coal, corroborating the observation made earlier in this discussion. It is possible that, given the absence of grains of hercynite, this sample could have originated either in the smelting furnace or a smithing hearth.

Although of the bloomery type, the Holyrood samples differ from their post-medieval Scottish Highland counterparts in both types of ore (on account of the high aluminium content) and furnace operating conditions (Hall & Photos-Jones 1998; Photos-Jones et al 1998). The relatively high aluminium content must have made the Holyrood slags rather viscous. Highland ores/slags are rich in manganese and phosphorus. Manganese substitutes iron in the slag and manganese-rich slags melt at relatively low temperatures. Normally higher temperatures would have been required to make the Holyrood slags free-running, but the presence of coal in the ore may have provided that extra energy.

For Period 2 there is evidence for both metal-making and metal-working activity. Although PST30 might be a fragment

Table 1.10a SEM-EDAX analyses of Period 1 HMW: composition in weight per cent

	Na_2O	MgO	Al_2O_3	SiO_2	SO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO	BaO	PbO	NiO	AsO	Total	N/UN
PST24																	
PST24 area analysis 1	0.45	0.35	12.44	25.52	0.33	0.14	0.73	1.19	0.91	0.13	57.81	0.01	nm	nm	nm	100.01	N
PST24 area analysis 2	0.06	0.22	6.22	17.12	0.27	0.08	0.45	0.88	0.53	0	74.17	0	nm	nm	nm	100	N
PST24 iron oxide	0	0	0.67	0.67	0	0	0	0.04	0.6	0	97.96	0.06	nm	nm	nm	100	N
PST24 hercynite spot	0	0.46	22.57	0.51	0.12	0	0.05	0	1.51	0	74.79	0	nm	nm	nm	100.01	N
PST24 hercynite spot	0.08	1.17	41.78	0.36	0.09	0.14	0	0.05	0.55	0	55.79	0	nm	nm	nm	100.01	N
PST24 assimilated hercynite	0.15	0.31	0.52	24.38	0	0	0.02	0.3	0.12	0	74.18	0.02	nm	nm	nm	100	N
PST24 assimilated hercynite	0.12	0.27	27.07	0.89	0	0.03	0.04	0.02	2.1	0	69.35	0.11	nm	nm	nm	100	N
PST24 fayalite spot	0.93	0.45	0.5	23.55	0.06	0.06	0.21	0.2	0.1	0	74.95	0	nm	nm	nm	101.01	N
PST24 fayalite spot	0.1	0.41	0.37	25.26	0.08	0	0.04	0.09	0.17	0.1	73.37	0	nm	nm	nm	99.99	N
PST24 Fe inclusion within glass	0.17	0	3.22	10.53	23.84	0.34	1.55	2.72	0.16	0	57.45	0.02	nm	nm	nm	100	N
PST24 glass	1.2	0.06	9.46	30.91	4.37	1.61	5.51	9.1	0.05	0	37.21	0.52	nm	nm	nm	100	N
PST24 glass spot	0.29	0.23	14.52	41.95	0.89	0.31	2.11	2.44	1.53	0.07	35.59	0.08	nm	nm	nm	100.01	N
PST24 glass spot	1.1	0.13	9.37	28.03	5.5	1.23	5.4	8.94	0.4	0	39.43	0.48	nm	nm	nm	100.01	N
PST25																	
PST25 area analysis	0	0.61	11.86	25.42	0.11	0.13	0.76	2.62	0.74	0.07	57.69	0.01	nm	nm	nm	100.02	N
PST25 angular grain	0.26	0.52	16.9	6.04	0	0	0.33	0.65	1.62	0.03	73.65	0	nm	nm	nm	100	N
PST25 glass	0.3	0.25	17.44	45.86	0.43	0.45	2.07	7.88	0.61	0.06	24.43	0.23	nm	nm	nm	100.01	N

nm = not measured; n = normalised; un = unnormalised

Table 1.10b SEM-EDAX Analyses of Period 2 HMW (medieval period): composition in weight per cent

	Na_2O	MgO	Al_2O_3	SiO_2	SO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO	BaO	PbO	NiO	AsO	V_2O_5	Cr_2O_3	CuO	CiO_2	Total	N/UN
PST1 spot ana. on frgt. of ore	0.03	0	0.66	12.66	1.1	0.19	0.08	0.4	0	0	84.48	0.07	nm	0	nm	0.12	0	0.2	nm	99.67	N
PST2 area analysis 1	0.61	1.02	17.17	27.11	0.48	0.34	0.15	0.42	0.31	0.17	51.49	0	nm	nm	nm	nm	nm	nm	nm	99.27	N
PST2 area analysis 2	0.06	0.47	11.16	20.33	0.52	0.44	0.14	0.3	0.38	0.13	66.06	0	nm	nm	nm	nm	nm	nm	nm	99.99	N
PST2 wustite	0	0.17	0.83	0.7	0.01	0.12	0.05	0.02	1.44	0	96.43	0.23	nm	nm	nm	nm	nm	nm	nm	100	N
PST2 fayalite	0	0.52	1.36	34.65	0.41	0.35	0.01	0.26	0.03	0.19	62.17	0.04	nm	nm	nm	nm	nm	nm	nm	99.99	N
PST2 hercynite	0.15	1.03	46.16	0.31	0	0	0	0.02	0.44	0.02	51.87	0	nm	nm	nm	nm	nm	nm	nm	100	N
PST2 glassy matrix	0.15	0.1	6.82	35.1	4.43	2.94	0.39	0.77	0.82	0	48.45	0.03	nm	nm	nm	nm	nm	nm	nm	100	N
PST6 area analysis 1	0.55	0.42	6.51	16.51	0.73	0.5	1.03	1.4	0.21	0.73	71.29	0.13	nm	nm	nm	nm	nm	nm	nm	100.01	N
PST6 area anaysis 2	0.34	0.44	7.35	16.77	0.73	0.49	0.95	1.16	0.2	0.4	71.06	0.14	nm	nm	nm	nm	nm	nm	nm	100.03	N
PST6 area analysis 3	0.1	0.21	7.93	18.15	0.83	0.66	0.98	1.07	0.06	0.24	69.12	0.33	nm	0	nm	0.04	0.09	0.19	nm	99.68	N
PST6 wustite	0	0	0.63	0.6	0	0.08	0.08	0.05	0.87	0.06	97.55	0.08	nm	nm	nm	nm	nm	nm	nm	100	N
PST6 hercynite	0.52	1.37	39.79	0.33	0.04	0.07	0	0.01	0.67	0.3	56.91	0	nm	nm	nm	nm	nm	nm	nm	100.01	N
PST6 glass matrix	1.44	0.31	14.88	36.38	1.19	4.11	9.96	9.15	0.26	0.11	21.27	0.94	nm	nm	nm	nm	nm	nm	nm	100	N
PST8 area analysis	0.15	0.27	6.12	13.2	0.62	0.24	0.15	0.34	0.22	0.04	78.51	0.12	nm	nm	nm	nm	nm	nm	nm	99.98	N
PST9 matrix	0.38	1.19	15.81	43.12	0.35	0.29	2.26	2.47	1.07	0.25	32.55	0.25	nm	nm	nm	nm	nm	nm	nm	99.99	N
PST9 metallic inclusion	0	0.17	0.57	2.18	1.46	0.83	0.04	0.47	0.01	0.1	94.01	0.16	nm	nm	nm	nm	nm	nm	nm	100	N
PST10 area analysis	0.45	0.56	9.31	19.32	1.1	0.91	0.27	1.69	0.42	0.19	65.65	0.14	nm	nm	nm	nm	nm	nm	nm	100.01	N
PST10 wustite	0	0.08	0.61	0.5	0.07	0	0	0.04	1.04	0.14	97.3	0.22	nm	nm	nm	nm	nm	nm	nm	100	N
PST10 fayalite	0	0.33	0.49	26.23	0.15	0.36	0.03	0.53	0.15	0.34	71.41	0	nm	nm	nm	nm	nm	nm	nm	100.02	N
PST10 hercynite	0	1.03	43.77	0.51	0	0	0	0.1	1.01	0.18	53.4	0	nm	nm	nm	nm	nm	nm	nm	100	N
PST10 glass matrix	2.7	0.25	12.74	28.94	3.75	10.79	4.32	18.63	0	0	17.09	0.8	nm	nm	nm	nm	nm	nm	nm	100.01	N
PST26 area analysis 1	0	0.11	5.16	24.2	2.82	0.27	0.59	0.49	0.39	0.12	65.74	0.11	nm	nm	nm	nm	nm	nm	nm	100	N
PST26 area analysis 2	0	0.33	7.23	18.78	3.41	0.32	0.53	0.4	0.39	0.07	68.52	0	nm	nm	nm	nm	nm	nm	nm	99.98	N
PST26 hercynite	0	0.74	43.97	0.8	0.03	0	0	0.03	0.77	0.18	53.26	0.23	nm	nm	nm	nm	nm	nm	nm	100.01	N
PST26 iron oxide	0.05	0.1	0.5	0.55	0.02	0	0.05	0.01	0.7	0	97.81	0.22	nm	nm	nm	nm	nm	nm	nm	100.01	N
PST26 fayalite	0	0.72	0.2	30.92	0.28	0.29	0	0.5	0.06	0.17	66.73	0.15	nm	nm	nm	nm	nm	nm	nm	100.02	N
PST28 area analysis	0.18	0.48	6.29	17.08	0.72	0.39	0.56	1.26	0.28	1.57	70.81	0.12	0.18	0	0.06	nm	nm	nm	nm	99.98	N
PST28 wustite	0	0	0.59	0.43	0	0	0.03	0.01	0.39	0.82	96.97	0.15	0.45	0.17	0	nm	nm	nm	nm	100.01	N
PST28 fayalite	0.14	0.41	0.38	25.01	0	0	0.03	1.73	0.08	2.58	69.49	0	0	0	0.15	nm	nm	nm	nm	100	N
PST28 hercynite	0	0.42	39.97	0.38	0.03	0.05	0.03	0.03	1.43	0.81	56.35	0	0	0	0.51	nm	nm	nm	nm	100.01	N
PST28 two phase glass spot	1.29	0.1	10.62	32.53	1.73	1.74	6.35	10.61	0.24	1.08	32.15	0.59	0.96	0.01	0	nm	nm	nm	nm	100	N
PST28 spot ana. on frgt of ore	0.03	0	0.87	10.69	0.76	0.1	0.05	0.61	0.04	0.56	85.43	0	0	0.11	0.75	nm	nm	nm	nm	100	N
PST30 FeS inclusion in matrix	0	0.04	0.05	0.09	35.71	0.23	10.22	0	0.06	0	53.4	0	0	0	0.21	nm	nm	nm	nm	100.01	N
PST30 Fe-Si inclusion in matrix	0	0.21	3.16	10.72	5.76	1.62	1.35	1.19	0.12	0.02	75.4	0	0	0.06	0.38	nm	nm	nm	nm	99.99	N

nm = not measured; n = normalised; un = unnormalised

Table 1.10c SEM-EDAX Analyses of Period 3 HMW: composition in weight per cent

	Na_2O	MgO	Al_2O_3	SiO_2	SO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO	BaO	PbO	NiO	AsO	V_2O_5	Cr_2O_3	CuO	Total	N/UN
PST3 area analysis 1	0.1	0.37	8.89	13.95	0.57	0.38	0.3	0.48	0.26	0.04	74.92	0	nm	nm	nm	nm	nm	nm	100.26	N
PST3 area analysis 2	0	0.31	7.84	14.77	0.43	0.35	0.09	0.46	0.33	0.15	75.19	0.08	nm	nm	nm	nm	nm	nm	100	N
PST3 hercynite	0.14	0.84	45.18	0.36	0.13	0	0.01	0.04	0.29	0.05	52.88	0.08	nm	nm	nm	nm	nm	nm	100	N
PST3 fayalite	0.09	0.29	0.59	28.59	0.36	1.21	0.07	0.53	0.05	0.13	67.99	0.1	nm	nm	nm	nm	nm	nm	100	N
PST3 wustite	0.37	0.22	0.42	0.28	0.09	0	0	0.05	0.49	0	98.07	0	nm	nm	nm	nm	nm	nm	99.99	N
PST3 glassy matrix	0.01	0.14	3.89	44.27	2.89	0.48	0.61	2.26	0.21	0	37.28	7.96	nm	nm	nm	nm	nm	nm	100	N
PST3 glassy matrix	0.36	0.13	1.7	9.5	0.99	0.18	0.06	0.52	0.08	0	86.39	0.08	nm	nm	nm	nm	nm	nm	99.99	N
PST5 hercynite	0.07	0.9	49.25	0.24	0.03	0	0.03	0.03	0.31	0	50.08	0	nm	nm	nm	nm	nm	nm	100.94	N
PST5 Fe-rich inclusion in coal	0	0.28	1.35	5.24	0.61	0	0.62	0.85	0.4	0.03	15.06	0	nm	0	nm	0.03	0	nm	24.44	UN
PST5 coal area analysis	0.1	0.09	2.09	3.58	1.28	0.08	0.28	0.09	0.06	0.05	0.85	0.13	nm	0	nm	0.06	0.03	0	8.68	UN
PST5 coal area analysis	0.46	0.05	1.65	2.55	0.76	0.05	0.14	0.21	0.08	0.03	1.57	0	nm	0.04	nm	0.04	0.02	0	7.59	UN
PST5 matrix	0.8	0.23	16.05	46.46	1.88	0.63	2.82	4.38	1.17	0	25.29	0.23	nm	0	nm	0.05	0	nm	99.94	N
PST5 Cu-Fe inclusion	0	0.56	0.79	9.22	0.21	0.12	0.09	0.15	0.08	0	31.77	0	nm	0.22	nm	0.05	0.02	56.71	43.21	N
PST5 Fe-Ni inclusion	0.07	0	0.01	0.14	0.04	0.26	0	0	0	0	98.48	0.06	nm	0.77	nm	0.04	0.02	0.11	99.83	N
PST5 snowflake 1	0.3	1.57	40.98	14.06	0.25	0.04	0.6	0.39	0.32	0.12	38.9	0.43	nm	0.02	nm	1.23	0.79	0	97.98	N
PST5 snowflake 2	0.17	1.68	48.26	4.78	0.16	0.08	0.25	0.1	0.13	0.05	40.56	0.48	nm	0	nm	1.62	1.64	0.01	96.7	N

nm = not measured; n = normalised; un = unnormalised

Table 1.10d SEM-EDAX Analyses of Period 4 and Period 5 HMW: composition in weight per cent

	Na_2O	MgO	Al_2O_3	SiO_2	SO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO	BaO	NiO	Total	N/UN
PST7 area analysis 1	4	2.39	27.37	43.86	0.34	0.14	0.97	2.59	1.17	0.58	20.24	0.11	nm	103.76	N
PST7 area analysis 2	0.21	1.93	29.53	44.74	0.39	0.05	0.83	2.23	1.14	0.37	18.58	0	nm	100	N
PST7 area analysis 3	0.14	2.54	27.16	45.9	0.63	0.02	1.28	1.97	1.6	0.54	18.22	0	nm	100	N
PST7 small area analysis	0.23	1.57	29.98	54.33	0.13	0	1.36	1.3	1.67	0.26	8.81	0.02	nm	99.66	N
PST7 Fe-S metallic inclusion	0	0	0	0.06	49.65	0.21	0.02	0	0.13	0.09	49.83	0	nm	99.99	N
PST7 black crystal within matrix	0	0.49	70.04	27.32	0.07	0	0.01	0.14	1.02	0.02	0.9	0	nm	100.01	N
PST7 fine specs of Al-Si-Fe	0.3	3.9	41.97	28.89	0.13	0.02	0.52	1.49	1.01	0.35	21.32	0.1	nm	100	N
PST16 hercynite	0	1.34	51.15	2.4	0.1	0	0.05	0.05	1.25	0	43.38	0.27	0	99.99	N
PST16 faya	0.06	0.5	2.17	25.67	0.04	0.43	0.32	0.43	0.27	0.26	69.58	0.26	0	99.99	N
PST16 matrix	0.51	1.69	26.13	48.83	0.18	0.16	1.94	1.6	2.17	0.13	16.56	0.09	nm	99.99	N
PST16 matrix	0.35	0.11	20.4	49.76	0.43	0.72	1.7	1.05	2.6	0.08	21.59	1.12	0.07	99.98	N
PST16 spot X1 Fe-Ni inclusion	0	0.05	1.24	3.04	0.16	0.13	0.7	0.13	0.07	0	85.91	0.13	9.01	100.57	N
PST16 spot X2	0	0.13	4.65	6.46	0.28	0.15	0.19	0.18	0.15	0.11	81.84	0.11	5.75	100	N
PST16 coke inclusion	0.08	0.18	29.04	37.3	0.02	0.43	0.2	0.6	7.16	0	0.71	2.16	0.06	77.94	UN
PST16 coke inclusion	0.1	0.23	37.22	47.8	0.03	0.55	0.26	0.77	9.18	0	0.91	2.76	0.06	99.87	N
PST35A area analysis	0.4	0.66	21.89	51.32	1.87	0.24	2.72	2.02	1.46	0.09	17.33	0	nm	100	N
PST35A matrix spot 1	0.45	0.59	16.52	56.44	2.24	0.37	3.44	2.05	1.6	0.05	16.25	0	nm	100	N
PST35A matrix spot 2	0.59	0.63	16.75	56.1	2.06	0.25	3.27	2.1	1.26	0	16.97	0.03	nm	100.01	N
PST35A angular grain	0.14	0.64	67.2	27.07	0.23	0.01	0.03	0	1.23	0.3	2.27	0	nm	99.12	N
Military															
PST36 area analysis	0.74	0.82	19.8	45.32	0.17	0.33	2.17	2.24	1.48	0.01	26.86	0.06	nm	100	N
PST36 glass matrix spot	0.44	0.54	16.78	41.99	0.32	0.11	1.56	2.07	1.11	0	34.94	0.15	nm	100.01	N
PST36 Fe inclusion	0	0.01	0	0.16	0.03	1.51	0.03	0.02	0	0	98.24	0.01	nm	100.01	N
"Modern"															
PST37 area analysis	1.05	2.26	19.73	61.62	0.07	2.42	1.64	3.98	0.94	0.11	6.03	0.15	nm	100	N
PST37 angular grains spot analysis	0.85	0.45	28.83	49.7	0.1	0.14	0.47	17.47	0.12	0.12	1.73	0.02	nm	100	N

nm = not measured; n = normalised; un = unnormalised

of smithing slag, PST26 (from Plot 2.4) as well as PST6 and others are undoubtedly fragments of smelting slag. These activities concentrate on two plots, the back of Plot 2.2 and the front of Plot 2.4. Plot 2.4 contained, 'the only preserved area of Canongate frontage exposed during the excavation'. However, preservation was poor because of later building activity. 'Several other features including hearths (206, 1110 & 1115) were also recorded' (Part 3). Artefactual evidence like a horseshoe and features like hearths suggest that a combined workshop may have been in operation in Plot 2.4. There is no reason, other than our own preconceived ideas, why the two activities would not take place under the same roof and on a street frontage.

From Period 3 (16th–17th centuries) two samples (PST3, PST5) originating from the fill of drain 392 (Plot 3.2) and post-medieval garden soil appear to derive from a different type of metallurgical practice, distinguished by the lack of micro-crystallinity in the slags. The SEM-EDAX image of sample PST5 (fig. 1.7a) contains needles of fayalite growing at right-angles to a fragment of coal as well as metallic inclusions of different composition (Fe-Cu and Fe-Ni) trapped within the matrix (fig. 1.7b) reflecting the type of ore used. Vanadium and chromium-rich phases form 'snowflake'-type micro-phases within the same sample. PST5 suggests the use of blackband ironstones which contain, apart from low levels of alumina and silica, vanadium, nickel and chromium (table 1.10c).

The presence of the last three elements has been observed in slags from the large-scale 19th-century ironworks at Calderbank, North Lanarkshire, where local ores were charged in the blast furnaces (Photos-Jones 1999c) for the production of pig iron.

From Period 4 (17th–18th century) sample PST16 (fig. 1.8c; tables 1.9 and 1.10d) contains fragments of coal (centre of the image) set in a glassy matrix (light grey) with sub-angular, unreacted quartz grains scattered around the matrix, the whole sample being very vesicular. Very small metallic iron prills are also evident. PST35A, a highly siliceous slag, is potentially the waste product from the use of blackband ironstone, since it shows an aluminosilicate with metallic inclusions or iron, vanadium and chromium (see fig. 1.8d and table 1.10d).

What are the processes that generated these slags, which consist roughly of 15–20% Al_2O_3, 45–50% SiO_2 and 15–20% FeO (table 1.10d)? In Perth, Photos-Jones and Atkinson (1998) suggested that similar types of materials may have derived from the high bloomery or a smelting process somewhere in between the bloomery and the blast furnace, given the iron alumino-silicate nature of the glassy slag. It should be emphasised that these materials are definitely slags and cannot be confused with high-fired ceramics, which contain only a small amount of iron (*c* 5% FeO).

At present there is no evidence for urban bloomeries, in the sense of actual workshops. Furthermore, it is not possible to gauge the extent of the use of blackband ironstones in that period. The influence of the abbey must have waned and some private initiatives must have been set in place. In any case, this is the time when major initiatives are beginning to be established, such as the Carron Ironworks (1756) where clayband ores were being co-smelted with coke. Overall, the evidence for local production is not conclusive but is strongly suggested.

There was only a single find from Period 5 (18th–20th centuries), which bears many similarities with those derived from the post-medieval. Sample PST37 (see table 1.10d) is a fragment of argillaceous material which has been heated to high temperature. It contains unreacted fragments of coal (long needle-like fragments), also unreacted angular quartz inclusions, cracked and partly heated lumps of 'clay' within a glassy matrix, with unreacted clay on the left-hand side of the picture.

1.4.6 Discussion

There is no evidence for metal-working in the pre-burghal period, in other words, prior to the establishment of Holyrood Abbey by David I in 1128. With regard to the medieval period (Periods 1 and 2; 12th–16th centuries), could the metallurgical evidence assist in establishing a relationship between the abbey and the burgh? In reference to the post-medieval period, 1580–1707, what can the contents of the garden soils tell us about the urban precinct that developed around the Palace of Holyrood House? Finally regarding the early modern period, 1707–1825, could the metallurgical waste shed a little light on the activities at the Canongate?

In the medieval periods most of the metallurgical waste is associated with garden soils (Context 612), but medieval features as well. Very few can be strictly interpreted as metallurgical in nature. Activities were concentrated in the back of Plot 2.2 and the street frontage in Plot 2.4. In Plot 2.4, the associated presence of hearths with metallurgical waste may point to a combined workshop. PST26 is clearly a smelting slag and PST30 a smithing one, therefore there is no reason why the two activities, smelting and smithing, could not have taken place one next to the other under the same roof.

To what extent were the activities in these two plots carried out under the auspices of the abbey? We can only surmise. The abbey precincts are located only 50–100m to the east and the raw materials (both ore and fuel) could have been procured by the abbey. It is possible that the abbey had interests in the manufacture of the raw metal, selling it in the market together with other goods. Given that the medieval or later documentary sources do not appear to encompass (at least in an obvious way) makers of iron, it is not possible to place this group of people, visible in the archaeological record only by the waste they produced, in their proper context. Given the 'silence' of burghal documents, their activities are more likely to be associated with Holyrood Abbey, since it is only as 'servants to the abbey', or as part of the large infrastructure of an ecclesiastical establishment, that their invisibility can be explained.

In the post-medieval period (Period 3), analysis suggests that another type of ore is used where coal is an integral part of the ore and the fuel. These are the blackband ironstones which are characterised by fingerprinting elements such as vanadium, chromium and nickel. These elements have previously been encountered in the industrial waste from the 19th-century blast furnace installations at Calderbank, North Lanarkshire. The early smelting of these ores would perhaps require more elaborate facilities and perhaps also the use of water power for the driving of the bellows. There is no evidence of these activities within the excavated area of the Parliament site. It should be borne in mind that by the early 1600s Scotland had seen the introduction of charcoal-operated blast furnace in the Highlands, at Letterewe in Wester Ross (Donnelly et al 1999) and, in the 1750s, of a coke-operated blast furnace in the Lowlands, at Carron Ironworks in Falkirk (Watters 1998). This

is a period of technological transition and major innovation in iron-making, initiated by private enterprise, and the social and economic implications of the iron-making industry within the Canongate, if indeed there was any in situ, must be examined within this larger framework.

The Canongate was, and remains, a place separate and very different from Edinburgh. In the medieval period it acquired and maintained a status first as a marketplace for the financial survival of the abbey and secondly as a place for the royal court. The building of town houses with large gardens for the wealthy in the 17th and 18th centuries, their soils enriched metaphorically and literally by the ferruginous metallurgical waste of the local workshops of that and earlier periods, bears testimony to a close link between the abbey and its burgh. An unexpected bonus of this work turned out to be the evidence for the use of clayband and blackband iron ores – both closely associated with Scotland's industrialisation – considerably earlier than has previously been thought. The continuous exposure in the usage of local raw materials and energy resources can only reflect the long continuity of settlement at the Canongate from the early medieval period to modern times.

1.5 GLASS

ROBIN MURDOCH

Glass, until the beginning of the 18th century, was expensive and little used compared with pottery, and only sites of the very highest status are liable to yield glass dating to before around 1500. The range of types of glass from Holyrood is fairly typical for an urban site and consists of window glass, wine bottles, drinking vessels, medicine bottles and a few miscellaneous items (figs 1.9–1.12). Most of the shards are small and occur singly. Very few items are represented by more than one shard. This is not unusual and may be related to the fact that much broken glass was reused in historic times. In fact, this practice may be giving a falsely low impression of just how much glass was in general use.

In the analysis of a glass assemblage, especially when fragments are very small or do not retain manufacturing detail, condition can be helpful in giving a very rough assessment of date. Glass can, and does, decay, but the rate at which this happens is related to the chemistry of the glass itself, and that of its buried environment (Frank 1982).

Very briefly, when glass is made, a fluxing alkali is added to lower the temperature at which the batch will vitrify and can be worked. Historically, in simple terms, this alkali was either soda or potash, although each could (and generally did) contain a percentage of the other. Soda was derived from natural mineral sources or marine plants, potash from inland plants such as trees or ferns. For reasons which are still unclear, potash-fluxed glass is generally less durable than soda glass and the denaturing products have a different appearance. However, care must be taken when interpreting condition, since batch constituents other than the fluxing alkali can have a significant effect on durability.

The condition of the shards from Holyrood is typical of what is retrieved from Scottish sites where lime-mortared buildings have been present. An alkaline environment is generally more detrimental to glass than acidic. However, care must be taken not to assume consistent decay rates across the whole site. Moisture plays a large part in the decaying process and a shard that has lain in the basement of a building will generally survive much better than one in damper garden ground outside.

Wine bottles

Note: The term 'wine bottle' is generally used to describe a particular type of container as defined below. However, it is known that beer and ale bottles were made in forms virtually indistinguishable from these and the term is therefore used to describe all.

This category is considered first because it has good diagnostic dating characteristics and occurs almost universally on sites, especially post *c* 1700. Initially made on the Continent, production started in England in the 1630s. These strongly made bottles gained in popularity and by the middle of the 18th century easily outnumbered all other forms of glass vessel put together. Initially expensive, these bottles often had seals attached to them giving details of ownership, contents etc and frequently carried dates. The dated items have allowed accurate typologies to be generated which follow the shape evolution of these bottles through to the advent of semi-automatic mould-blowing technology in the early 19th century (see eg Hume 1961). Although Hume's typology is derived from material recovered from American colonial sites, virtually everything found there dating to before the middle of the 18th century will have been imported from Britain. The relative purity of the contexts allowed accurate validation of the dating. The small numbers available and their expense led to limited usage in the 17th century. J P Allan comments that the valuation of glass bottles was four times greater than that of earthenware in the Exeter port books of the late 16th and early 17th centuries (Allan 1984, 263). Even in the mid and later 17th century glass bottles were relatively scarce and the presence of several from Holyrood dating to before 1680, and possibly as early as the 1660s, is interesting and an indication of a site of some status. A glasshouse for the manufacture of bottles was set up in the Cromwellian citadel of Leith in 1663 by English settlers (*Kingdom's Intelligencer* 1663) and there is no reason why the Holyrood examples could not have been made there. Other 17th-century glass production sites in Scotland existed at Wemyss in Fife and Morrison's Haven and West Pans, East Lothian. What is surprising in the Holyrood assemblage however, is the relative lack of diagnostic pieces from 18th-century wine bottles. This situation is reflected even more clearly in the vessel glass and also the window, although in the latter case, dating is far less precise. Given the enormous usage of wine bottles in the middle of the 18th century, their low numbers here are an indication of change of site usage from the 17th century. A study of the dates for the clay tobacco pipes also reveals a dearth of 18th-century material.

The five fragments of wine bottle illustrated (fig. 1.9) demonstrate some of the evolutionary characteristics of these containers. The neck and lip (no. 70) are of heavy construction and well made, with a rounded-section string ring mounted some way below the lip, a feature only found on wine bottles pre *c* 1680. No. 71, another neck and lip, is slightly less substantial; the string ring is thinner in section and is mounted closer to the lip. This bottle is slightly later than no. 70 but nevertheless is unlikely to be later than 1680. The base (no. 72) has the typical low kick and small pontil scar which would be found on bottles represented by necks

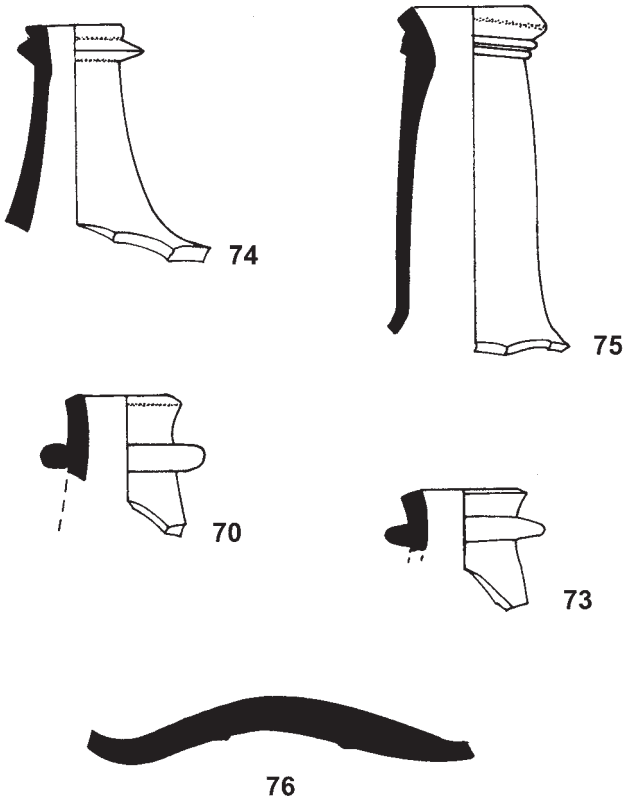


Fig. 1.9 Glass (scale 1:2)

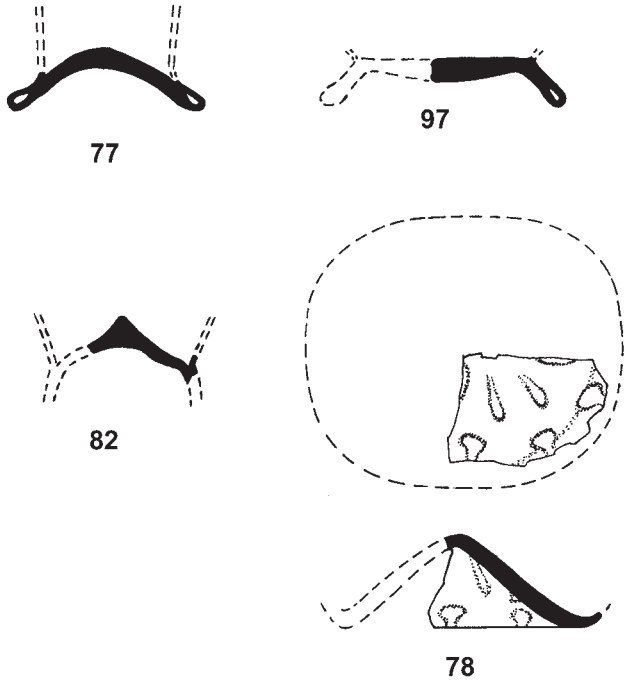


Fig. 1.10 Glass (scale 1:2)

1 and 2. These bottles had a relatively narrow diameter base ring and the sidewalls extended outwards to reach maximum diameter at shoulder level. The neck and lip (no. 73) are of much lighter (weight) construction and have a neatly tooled triangular-section string ring 2–3mm below the lip. The neck is short at 56mm and has a curving outward splay towards the body. All these criteria are characteristic of bottles *c* 1700. Finally, neck and lip (no. 74), in contrast to the others, is poorly finished, with the string ring obviously reworked for half its circumference. The lip has either been enhanced by the addition of more glass or tooled into a broad, downward-sloping profile not seen before *c* 1760.

Bottles other than wine

Several bottles other than wine were recovered and six of those, with reasonable antiquity, are illustrated (fig. 1.10). Nos 84, 85 and 86 are of definite pharmaceutical use and nos 82 and 83 are of probable pharmaceutical use. The bases of nos 84 and 85 are typical small pharmaceutical bottles/phials which would have had everted lips as does no. 86 (Thompson et al 1984, 86; Gooder 1984, 221). No. 84, with its darker colour, is probably late 17th century and no. 85, early 18th. By the middle of the 18th century many of these items were being made in clear glass and have narrower diameters with less chunky necks and lips. The neck (no. 82), with its flared lip, is a profile with a long-term usage but, the style tends to fade out about the middle of the 17th century (Crossley 1987, 358 Figs 6.21 & 22; Vose 1994, 25, Fig. 8.4 and Crossley & Aberg 1972, 132, Fig. 60.3). A similar situation exists with the hexagonal base (no. 83). Polygonal shapes were popular until the middle of the 17th century and, while not disappearing completely, were made in greatly reduced numbers. No. 87 has been a fine quality bottle, oval in plan and blown in a decorative mould. Although nothing remains of the outer wall, it is extremely likely that it would also have been decorated with relief moulding similar to what is visible in the kick. No direct parallels were found but the Venetians frequently made bottles and flasks where the moulding was carried into the kick in such a manner. The light weathering on the shard might also favour Venetian manufacture, possibly a perfume or scented water bottle, or for some high-status culinary item.

Vessel glass

The situation with the vessel glass is similar to that of the wine bottles, with 18th-century types very poorly represented. Fragments were generally very small and many did not retain enough form to allow identification of probable vessel shape. However, several fragments of pushed-in base were present. This feature is found on the majority of fine drinking-glass tableware up to the middle of the 17th century. One reason for this was to increase the mechanical strength of the edge of the most vulnerable part of generally thin-blown vessels. The expense of glass and an attempt to improve clarity and to decolour were the main reasons for the thin blowing in the first place.

The pushed-in base took two basic forms. The first was where the push-in was considerable and formed a pedestal base of double thickness where the base rim itself was left hollow, and the second form was where the base was pushed in only slightly but the hollow base rim was retained. Both forms are present in the Holyrood glass. The pushed-in base is known as far back as the fourth century AD and was particularly common in English forest glasshouse production from the 14th to 16th centuries (Wood 1982, 30). The style continued into the period of rapid expansion of the glass industry, par-

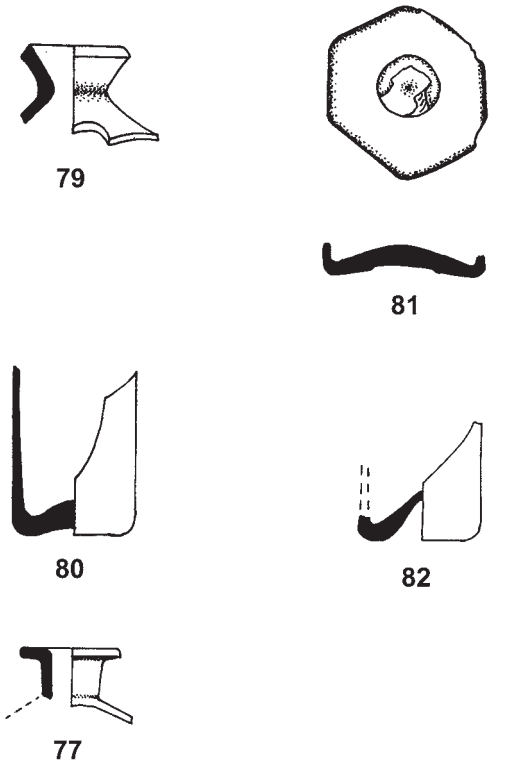


Fig. 1.11 Glass (scale 1:2)

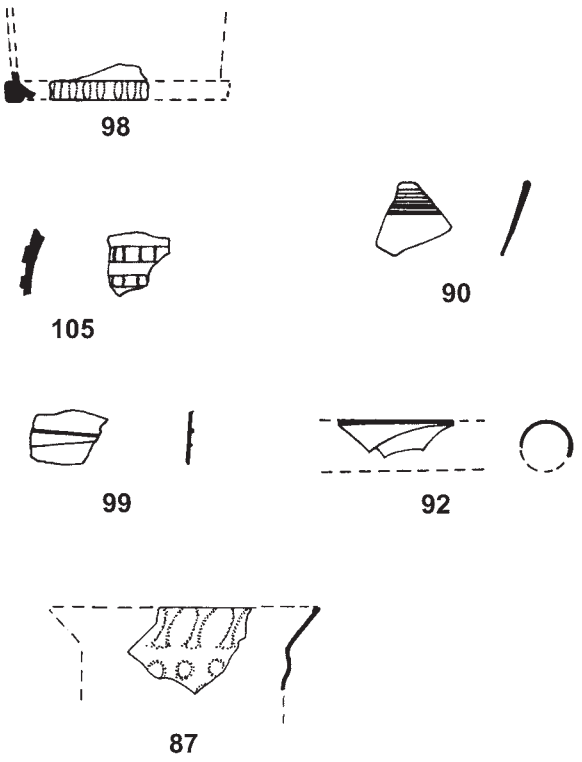


Fig. 1.12 Glass (scale 1:2)

ticularly in England, in the second half of the 16th and first half of the 17th centuries. Examples of pushed-in bases have been recovered from many glasshouse sites of late 16th- to early 17th-century date. They include Hutton and Rosedale in Yorkshire (Crossley & Aberg 1972), Haughton Green, Manchester (Vose 1994), Knightons, Surrey (Wood 1982) and Kimmeridge, Dorset (Crossley 1987). In the latter half of the 17th century, with the preference for thinner stem forms, the doubling over became restricted to the rim itself and is known as the folded foot. This technique in turn phased out of common use about 1760. The Holyrood assemblage only contained one example of the later type of folded foot, but six of the earlier pushed-in base. Vessel glass was made in two different basic codes, green or crystal (clear). The presence of iron in the batch, either in the raw materials or leached from the clay of the manufacturing pots, gave almost all glass a tinge, most commonly green, unless specific attempts were made to clarify it. Generally speaking the green glass vessels were at the lower end of market quality. Green glass was a forest glasshouse tradition, where little or no attempt was made to remove colouration from the glass, in fact some preferred this colour and added more iron to enhance it.

For many centuries glassmakers also strove to make clear, colourless glass and from time to time managed it, sometimes more by luck than judgement. Around 1450 the Venetians developed 'cristallo', simply Italian for clear, a term which became corrupted to crystal and is used to the present day. Although probably clearer and less tinted than what went before, this early Venetian glass still generally had a slight tinge, usually ginger-brown or grey. By the first half of the 16th century a thriving industry had been set up in the Low Countries by emigrants from the Italian glass-making centres of Venice and Altare, near Genoa. The output of these new works was imitative of the original sources and earned the title of *Façon de Venise*; apparently even the experts could not discriminate between the genuine article and the copy (Godfrey 1975, 8). As already mentioned, it was not until about 1720 that a consistent method of decolourising glass was perfected. Only one drinking vessel (not surprisingly the later one with folded foot, no. 81) from the Holyrood assemblage appears to be made from colourless glass.

Among the fragments of vessels with a pushed-in base were those from tall, relatively cylindrical, beakers generally believed to have been for beer or ale. They were common throughout the 16th and the first half of the 17th century. No. 76 is a typical example (fig. 1.9), and parallels are numerous (Crossley & Aberg 1972, Figs 66.93 & 97). This type of glassware was frequently 'decorated', either by mould-blowing to give an overall pattern or by the addition of thin surface trails of glass. However, it would appear that the trailing often only consisted of a couple of turns approximately half way up the vessel and may have been for grip improvement rather than decoration. The small fragments nos 91 and 92 may be examples of such trailing although the former shard seems to have come from just above the foot. No. 91 has been notched by a rigaree (a bit like a pastry wheel). These tall beakers also occur in another form where the base is plain (ie not significantly pushed-in), but where a thin cordon of glass has been wrapped round the circumference of the vessel at the junction of base and sidewall. This, again, is probably part decoration and part mechanical strengthening of a vulnerable area. These applied cordons are frequently notched with the rigaree (see no. 90).

This technique is also found on some of the goblet-type glasses where the rigaree cordon is applied round the base of a bucket bowl. Given the sharp angle between base and

sidewall in these bowls, again strengthening may be a significant factor. Because there is so little left it is not possible to say whether no. 90 came from a beaker or a goblet. No close parallels for the flaring rim (no. 88) were found but the moulding would suggest an ale beaker or tumbler.

Pushed-in bases are also found on goblets, bowls and tazzas, especially those late 15th- to early 17th-century forms which had broad pedestal stems or bases. Although there is only a tiny fragment of side and base wall surviving on no. 75, this could be a goblet with pushed-in base. Interestingly, the good condition of the glass and its bright blue-green colour have reasonable parallels in material recovered from Rosedale, in Yorkshire (Crossley & Aberg 1972). This comment also applies to no. 90.

The pushed-in base (no. 77) is intriguing. It is made from lattimo (opaque white) glass, often used for decoration but less for complete vessels. Unfortunately nothing of the sidewall remains to give an idea of its angle with respect to the base and hence its possible shape and function. Charleston comments that the London glass-seller John Greene imported lattimo vessels from Venice around 1670 (Charleston 1984, 262) but by then taste in drinking-glass shape had moved to types not suited to the pushed-in base method of manufacture. It seems likely that no. 77 predates the English Civil War.

No. 93 is probably a fragment of a 'beker op voet', or footed beaker, made in Holland around 1600. This external ribbing is common on Dutch and North German vessels of that period (Henkes 1994, 187, 44.3).

With only the rim folded and its bright colourless metal, the folded foot (no. 81) can be confidently dated to the 18th century and probably to 1730–60.

The piece of rim, no. 89, is particularly interesting, since this type of decoration, where several horizontal, thin, parallel bands of white lattimo glass have been marvered in just below the rim, has begun to turn up with some regularity on Scottish sites. Find spots include Fast Castle, Berwickshire, which yielded two fragments from 16th-century contexts (Murdoch 2001, Fig. 38.9 & 11). Niddry Castle, West Lothian, yielded another two (Murdoch 1997, Fig. 22.1) and another, possibly from a tazza, was found at Spynie Palace, near Elgin (Murdoch 2002, Fig. 96.16). This type of decoration is paralleled in England, where an example from Exeter is dated to 1500–50 (Charleston 1984, 269 G.52). However, English parallels are infrequent and this style seems to have appealed particularly to Scottish taste. Interestingly, in the relatively brief glass report on finds from the Edinburgh Niddry Street/Blackfriars Street excavations of the early 1970s, comment is made on a pushed-in foot with vertical applied threads of lattimo. While suggesting that the conventional dating for this type of decoration is early 16th century, Charleston does not rule out a late 15th-century date (Schofield 1976, 214). However, another interesting factor is that all of the shards seen with horizontal banded decoration appear to have very similar weathering products, suggesting a similar if not common origin. The weathering seems excessive for Venetian glass and a northern European source is more likely, which would make a 16th-century date more likely.

Three other shards of pushed-in base were recovered but are too small for comment except that they are probably 16th/17th-century.

Several other small fragments of vessel glass, not illustrated, are likely to be from ale beakers since many are lightly moulded and most appear to be made from green rather than crystal glass.

The short length of tube (no. 94) is probably a piece of chemical apparatus, its changing thickness perhaps indicating the spout of an alembic, a piece of distilling equipment (Wood 1982, 32). Alembics were made over a long period of time and the weathering on this piece would suggest 17th century at the latest.

Window glass

Window glass, particularly plain, is much more difficult to assess for date than vessel or bottle glass, because of a lack of shape. Added to this we have the problem of assessing whether the shard came from a completed window or was debris from the common practice of glazing on site. Needless to say, the timespan between the creation of a window and its destruction can be considerable. Decay can sometimes provide the answer to the glazing or waste question since the process can start while the window is in use. Quite often lead came or wooden astragal shadows can be seen at the edge of window shards where there has been differential weathering.

An enforced change in technology at the beginning of the 17th century can also provide a clue as to date. In 1614 a ban was imposed on the use of wood for firing glass furnaces in Britain and coal had to be used instead. The changeover took some time to effect, since the old open pot furnaces allowed contamination of the glass from the coal fumes. Once a suitable closed pot system was perfected, however, the much higher temperatures achievable with coal led to a rapid improvement in the quality of British glass. The higher the temperature, the more liquid the glass becomes and small gas bubbles can be purged more efficiently, giving a much clearer product. There was also a subtle side-effect of this change in technology which particularly affected window glass. During the wood-firing era, almost all of the domestically produced window glass was potash fluxed and the potash was frequently recovered from the ashes of the wood used to fire the furnace (Godfrey 1975, 196). The ashes of coal, however, were of no use as a fluxing alkali, and another convenient and cheap source had to be found to replace costly importation.

Sir Robert Mansell, the major player in the English glass industry in the early 17th century, used native kelp or 'seaoare' for his ordinary glass, which included window-glass, and imported alkali for his crystal glass (ibid). Most of the imported alkali was soda, as was the kelp, since it was a marine plant. Whether or not the glassmakers realised it, they ended up making a more durable product. As already mentioned, potash- and soda-fluxed glasses have denaturing products which are markedly different in appearance. Potash normally results in a very dark brown to black surface and frequently denatures right through the entire thickness of the glass. In the worst cases this can result in total disintegration of the shard into small crystals or powder. Much medieval glass is thought to have disappeared in this manner. Conversely, soda glass decays at a much slower rate and the surface products are generally paler. In very simple terms, what this means is that window shards with a very dark decayed surface are liable to date to before *c* 1650.

However, as already indicated, other constituents in the glass can affect durability, and a lack of weathering cannot be assumed to mean a lack of antiquity. Window glass was made

by two different techniques: crown (disc) or broad (cylinder or muff) and, if the shards are large enough, it is sometimes possible to tell which. This can also give a rough clue as to date. Unfortunately the great majority of the window shards from Holyrood were too small for comment on likely technique. Earlier glass tends to be broad and later glass tends to be crown, although this rule is not hard and fast. Most of the window glass used in Scotland before the early 17th century would have been imported from the Continent. The type of glass would depend on the source of these imports. For instance, the Lorraine glassmakers favoured broad glass, which was normally potash fluxed, and the Normandy glassmakers made soda-fluxed crown. Historical references can also create some confusion since, in the 16th century, most window glass was referred to as broad, simply to differentiate it from vessel, rather than an indication of the technique of manufacture (Godfrey 1975, 5) and there is inherent danger in interpreting the term too literally.

Sir George Hay of Nethercliff obtained a patent for the manufacture of glass in Scotland in 1610 but Godfrey (1975, 97) suggests that it remained dormant until 1618. Certainly, the works at Wemyss, in Fife, were up and running by 1621 according to the records of the Privy Council of Scotland. Apparently the quality of the Wemyss window glass was good but that of the vessel glass was not, and English specimens were to be lodged in Edinburgh Castle to serve as patterns for quality (Chambers 1858, 428).

Shard shape and thickness are also pertinent when considering a rough date for window glass. Examples recovered from Scottish sites so far indicate that window glass made up to the end of the 15th century was generally quite thick, anything from 2.5mm upwards. The 16th- and 17th-century material is generally thin: less than 2mm and sometimes less than 1mm. Early on very thin glass was usually a sign of broad glass, however as the skills and techniques improved it became possible to make crown glass even thinner. This probably reached its extreme during the Napoleonic Wars, when taxation on glass was at its most punitive. However, thicker varieties were produced to accommodate sufficient mechanical strength for the much larger pane size of the case window, which became the preferred option in many larger houses from *c* 1680 onwards. Poorer dwellings, where they had glazing at all, had small windows. Before the middle of the 16th century, windows in Scotland would have been made up from small panes, quite often of irregular shape, in leaded surrounds. In larger windows the lead 'cames' were in turn attached to metal glazing bars and the mechanical strength of the glass was of little importance. After the Reformation the styles became more austere, resulting in the regular patterns of diamond-shaped quarries (lozenges) of the later 16th and 17th centuries, a style which remained popular into the 19th century. The adoption of larger case windows and the desire for larger pane sizes with better optical quality prompted a move from mainly broad to crown production.

The Dumbarton crown works, founded *c* 1777 was, by the early 19th century, producing the equivalent of more than one third of all English production (Logan 1972, 177). However, another technological advancement in the 1830s turned the wheel full circle with the development of sheet glass; this revolutionised the industry and ultimately killed off crown production. Sheet glass was simply polished broad glass. Always easier and cheaper to make than crown glass, broad glass had one major problem: poor optical quality. When the cylinders were reheated and slit, they had to be flattened against a surface. These surfaces were never particularly good or clean, leading to optical aberration. Crown glass, on the other hand, made by the spun disc method, never came into contact with anything but air and the optical quality was excellent. Once a cheap method was found of polishing out the surface defects in broad glass, it soon became the normal method of manufacture, crown production petering out; Pilkingtons stopped producing crown glass in 1872 (Barker 1977, 126). Dumbarton itself had become defunct by *c* 1850 (Logan 1972, 177), a combination of business problems and perhaps an inability or unwillingness to embrace the new technology. The final abolition of all duty on glass in 1845 and the window tax in 1851 also contributed to an expansion in the industry and a move towards the thicker product that we know today.

An attempt has been made to assess the Holyrood window shards in terms of comparison with what has been recovered from other sites but, since the possible variables are considerable, dating suggested should not be regarded as definitive, especially if it is in conflict with other more reliable evidence.

Table 1.11 Glass

Period	No. of contexts with glass
1	0
2.1	2
2.2	3
2.3	9
3	19
4.1	47
4.2	13
5.1	20
5.2	9
–	7
Total	129

Site comments (table 1.11)

A total of 129 contexts yielded glass and their distribution by period, as supplied, is shown in table 1.11.

Based on the diagnostic shards recovered from the glass-bearing contexts, the dating of the periods should be roughly as follows:

Periods 1–2.2	15th century and earlier
Period 2.3	Late 15th to early 16th century
Periods 3–4.1	Early 16th to very early 18th century
Period 4.2	Later 18th to 19th century
Period 5	19th to 20th century

Under normal circumstances, ie continuous and consistent use of the site, the amount of glass recovered from Period 4.2 should have been significantly greater than that from Period 4.1, not less. This clearly indicates a change of site occupation/usage around the beginning of the 18th century.

A total of 30 contexts contained shards that were not

datable or represented a range of dates, which suggested considerable disturbance and contamination. Of the remaining 99 contexts, 83 contained shards of the appropriate period date ranges listed above, or earlier. The latter presumably can be explained by residuality. This leaves 16 contexts apparently containing material later than they should have.

In five contexts, 089, 190, 223, 557 and 837, the apparent discrepancy was due to window glass perhaps appearing more modern than it actually was. As has already been noted, plain glass in particular is very difficult to date and it is quite possible that the shards in question are period-contemporary. Four contexts, 215, 322, 803 and 888, contained other later material in the shape of 18th/19th-century Chinese pottery. Three contexts contained glass which was undoubtedly later than the period date; 002 contained a shard of 20th-century sheet glass; 222 contained a shard of 20th-century beer bottle and 242 contained several fragments of 19th-century beer bottles. Contexts 512 and 627 both yielded wine bottle shards which looked to be later 18th century, but again this conclusion was based on glass colour and condition rather than on diagnostic manufacturing detail, and there is room for doubt.

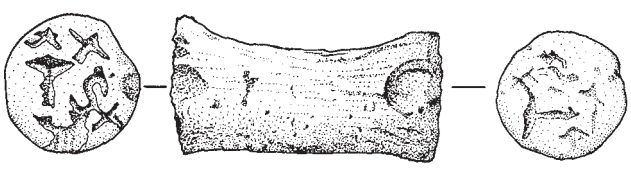
The shard of wine bottle from Context 193 (Period 4.1) has belling, a localised swelling just above the base ring. This feature would indicate that the bottle really cannot date to before about 1720 and is more likely to be a little later. This single item might just push the terminal Period 4.1 date into the second quarter of the 18th century, while the great majority of finds from that period are somewhat earlier. Context 729 contained a shatter fragment with an apparent 19th/20th-century colour.

1.6 CERAMIC OBJECTS

ADRIAN COX

Small ceramic artefacts recovered from the excavation include a number associated with leisure pursuits (for example, a carpet bowl and a counter fragment). This also applies to the small earthenware or stoneware alleys (nos 116 and 117), which would originally have functioned as parts of closure mechanisms in glass bottles during the 19th century. No. 116 is a glazed example, whereas no. 117 is unglazed. Once the bottles were empty, the alleys were often claimed by children for using in games of marbles. No. 118, one of two almost identical stoneware bottle tops from the site, and of very local origin, was recovered from a service trench in Period 5.2.

Found in the fill of a shallow pit in Period 5.1, no. 119 represents two conjoining fragments of a carpet bowl. Glazed, earthenware carpet bowls were used in wealthier households during the 19th and early 20th centuries for playing indoor games of bowls. Such games were part of a Victorian fashion for parlour games. The surface of this example is decorated in green, over a white background, with a repeating pattern of rounded triangles with central dots. A wide range of decorative patterns was used on carpet bowls, executed mainly in red, blue, black and green, above a white background. The bowls also occur in a range of sizes.



121

Fig. 1.13 Ceramic wig curler (scale 1:2)

A fragment representing approximately half of a disc, derived from a sherd of Reduced Greyware (no. 120, fig. 1.17) was found in the rubble backfill overlying stone-capped culvert 757 in Plot 3.3. It is rather abraded, indicating that it might have moved some distance from the site of its original deposition. Probably used as gaming counters, discs cut from sherds of glazed pottery have also been recovered from other excavations in various parts of Scotland. A disc cut from a sherd of post-medieval earthenware with a yellow glaze was found at Linlithgow Palace (Caldwell 1996b, 841, Fig. 15, No. 44). An example of medieval date, in a variant of the East Coast Redware fabric, was found at Elgin (Cox 1998, 796, Fig. 18, No. 101) and others have come from St Andrews and from Urquhart Castle (Cox 1995, 66, Fig. 11, No. 24; Samson 1982, 475, Fig. 6, No. 93). The fabric from which no. 120 is derived indicates a date in the 15th or 16th century. It was associated with window glass of a similar date.

Wigs were fashionable for both men and women from the 16th century until the early 19th century. Their main period of popularity was during the 18th century (Cunnington et al 1960, 236). Wigs and wig curlers were used throughout that century by men, and became popular for women in the late 18th and early 19th centuries (le Cheminant 1982). No. 121, from a garden soil deposit in Period 4.1, exhibits some aspects of the typical 18th-century form, being cylindrical, with expanded, flat-ended terminals (fig. 1.13). Often, one or both ends of a wig curler were stamped; both ends in the case of no. 121. However, this example is untypically short and squat, as most have a more elongated form.

118) Bottle top. Diameter 30mm; length 28mm.
Stoneware bottle top, incorporating a discoid cap and a centrally set screw-threaded shank. The top of the object bears an off-centre stamp bearing the legend 'J.STEWART & SONS, 62 CANONGATE EDINBURGH'.
Context 1042; IADB 2939; Period 5.2.

119) Carpet bowl. Diameter 72mm.
Spherical carpet bowl in two conjoining fragments. The stoneware fabric is fine, buff to grey in colour and has an irregular fracture. A pattern of rounded triangles with central dots, executed in green, decorates the entire external surface.
Context 294; IADB 757; Period 5.1.

120) Disc or counter. Projected diameter 48–50mm; thickness 8mm.
Fragment of a circular disc or counter, derived from a pottery sherd in a dark grey, reduced fabric with an external dark green glaze. Slightly abraded (fig. 1.17).
Context 738; IADB 1995; Period 3.

121) Wig curler. Length 35mm; max. diameter 17mm.
Object made from buff to white clay, in the form of a cylinder with expanded terminals. Each terminal has a flat face, into which the legend 'T S' has been roughly incised, with diagonal crosses above and below.

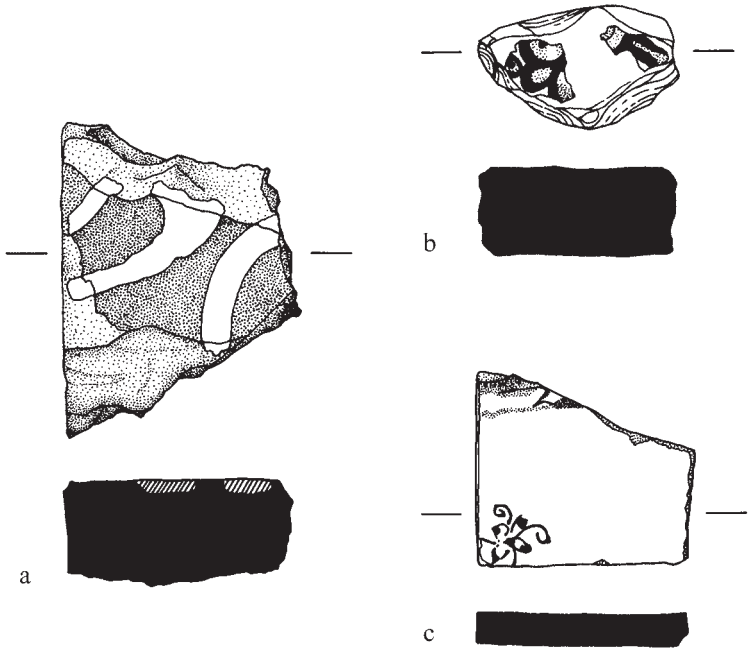


Fig. 1.14 Ceramic tiles (scale 1:1)

The edges of both faces are chipped and abraded (fig. 1.13).
Context 540; IADB 427; Period 4.1.

1.7 CERAMIC AND STONE BUILDING MATERIAL

JULIE FRANKLIN

1.7.1 Introduction

A wide variety of building materials was recovered from Holyrood: roof tiles, roof slates, brick, and various floor and wall tiles. The 533 pieces of ceramic and stone only represent a tiny fraction of what would originally have been used on the site. Building materials were, and are, wherever possible, reused, and what was recovered from the site are the items dumped on site or which found their way into the garden soils. It should also be borne in mind that for most of the site's history, building would have been almost entirely in wood, wattle and thatch, none of which materials have survived.

The assemblage spans nine centuries of building work on site, but problems of dating within this are more acute than with portable finds. Building materials may well be several centuries old by the time of their demolition and deposition in archaeological contexts, or they might represent builders' waste dumped at the time of their original use.

The earliest surviving finds were roof tiles. Early roof tiles were probably used only as edging or ridging on a thatched roof. Later medieval tiles from the site are sometimes found associated with slates. They could therefore have been used in conjunction with stone, either to roof different areas or laid in a decorative pattern. Some of these later medieval tiles were glazed green. One was also incised, possibly to add to the decorative effect.

The earliest slates on site appear in the late medieval period but most are made of sandstone rather than true slate. The nearest sources of slate are Aberdeenshire or the West Highlands. Slate of both these types has been identified on site but the majority are of a grey sandstone available around Edinburgh and also from a quarry at Carmyllie in Angus. It seems that even though sandstone was harder to work, it was more economical to use than to import slate from further afield.

Several different kinds of decorated floor tile were found. The earliest is a piece of medieval tile decorated by inlaying white clay into a red body (no. 122, fig. 1.14a). When glazed this gives a yellow design on a brown ground, probably part of a larger panel design. Such tiles were not common and generally only laid in buildings of high status and wealth.

A collection of seven plain glazed tiles provides the only coherent group of floor tiles, though they probably originate from at least two separate floors. Tiles of this type were produced in the Netherlands from the late 14th to the 16th centuries, with similar but lower quality examples being made in Britain. Glazed yellow, green or black, they were laid in chequer-board or other patterns to emulate black and white marble floors. Two examples of probable local origin were found in a 16th-century rubbish deposit. The five Dutch examples were scattered across the site in contexts dating from the medieval period to the 17th century. Of similar date but less diagnostic was a possible fragment of a relief-decorated tile (no. 123, fig. 1.15), and even its identification as a tile is not certain. Its fabric and glaze are similar to late medieval pottery but it is extremely thick and flat for a vessel and was found in a post-medieval drain.

The two most eye-catching decorated tiles were both of post-medieval date: a fragment of late 16th-century Maiolica floor tile and a corner of a late 17th-century Delft tile, intended for a fireplace or wall (fig. 1.14b and 1.14c). Only a small area of decoration remains on the Maiolica tile, but the rich blue, green, yellow and orange colours of the design are still visible. Maiolica tiles were produced by Italian potters in the Netherlands until pottery from China

Fig. 1.15 Ceramic tiles (scale 1:1)

inspired the beginning of the blue and white decorated Delft industry.

None of these pieces could be associated with a specific building. Despite being spread over the whole breadth of the site, most of the older pieces, especially those of any status, must have originated from buildings on the Canongate, as there was then no building on the Cowgate. The natural topography of the site would have resulted in the movement of debris towards the rear of the plots. Nothing could definitely be associated with Balmakellie or Queensberry House, though the evidence points towards the roof being slated rather than tiled. Of the interior fittings, only the Delft tile is demonstrably of a corresponding date, but was found at the other end of the site.

Despite the lack of a specific association, several observations can be made: there is a high quality of building implied throughout the site's history, as could be expected for the Canongate. Not only is there evidence for the early use of roof tiles and slates, but also a number of decorative tiles and a tradition of using imported material from the Netherlands.

1.7.2 Floor and wall tiles

Only the glazed and decorated floor tiles have been discussed, although a handful of plain unglazed tiles were recovered. The glazed and decorated tiles all dated to the late medieval and early post-medieval periods apart from one earlier medieval fragment with inlaid decoration. Of the five pieces of wall tile recovered, one was modern. The other four were older tin-glazed tiles, one with characteristic Delft blue and white decoration.

Inlaid floor tile

One fragment from the edge of a floor tile came from the Period 1 boundary ditch in a fill containing only medieval finds. It was decorated using a common medieval method of stamping the design into the red clay tile and inlaying the depression with white clay. The design extended over the edge of the tile and it would have formed part of a larger panel. Unfortunately, not enough remained to identify what this design could have been. Floor tiles were not common in the medieval period and it would have been from a building of some wealth and status, possibly religious.

122) Inlaid floor tile. Thickness 26mm.
Fabric sandy and micaceous, orange with a grey core. Decoration stamped and filled with white clay. Clear yellow lead glaze, showing yellow on a brown ground (fig. 1.14a.)
Context 785; IADB 2329; Period 2.2.

Relief floor tile

A large piece of ceramic was found in the fill of a post-medieval drain. It was thick but uneven and sparsely decorated in high relief. It was not a diagnostic fragment and could even have been part of a vessel, though a very unusual one. Its fabric was identical to the local White Gritty pottery, in contrast to the red sandy type of most medieval tiles. The fabric, olive-green glaze and style of decoration imply a date of around the 14th or 15th century.

123) Relief decorated tile? Thickness *c* 21mm.
Pale orange gritty fabric, with a dark grey reduced core for most of its thickness. Underside flat but uneven, with remains of moulded or applied relief decoration on the top, covered in an olive-green glaze (fig. 1.15.)
Context 682; IADB 2256; Period 3.

Plain glazed floor tiles

There were seven plain glazed floor tiles, some of which were imported from the Netherlands and others of probable local manufacture. Netherlandish tiles were generally of higher quality and had small nail holes in the corners, used for keeping the tile in place on a board while it was being shaped (Norton 1994, 151). Three of the tiles (nos 124–6) were identified as from the Netherlands, all had a fine bright orange sandy fabric, were covered in white slip and glazed a bright copper-green. They varied from 25–29mm in thickness, and although no complete lengths could be measured, the largest piece was from a tile at least 11.5cm wide. This type of tile was imported into Britain from the late 14th century and into the 16th century, according to documentary sources (ibid, 152). The Dutch had a virtual monopoly on the business, and tiles were imported in large numbers. They have been found at many sites in Scotland, especially religious ones. In situ tiles were found in Trinity College Kirk, Edinburgh, Linlithgow Palace, Niddry Castle (ibid, 152) and Friarscroft, Dunbar (Eames 1983); stray finds have been recorded from nearby Edinburgh (High Street) and Leith. Two further tiles were possibly imported (nos 127 & 128). Both had an orange fabric, were white slipped and

glazed yellow. Most of the surfaces had flaked away and no corners remained to aid identification. All of the five tiles (nos 124–8) could have come from the same floor but were found scattered across the site. The green tiles came from contexts belonging to slightly later phases than the yellow.

Two tiles (nos 129 & 130), one glazed yellow and the other glazed black, were of poorer craftsmanship. The streaky fabric of the yellow-glazed example was similar to that of tiles found in Aberdeen (Hall 1989), where it was attributed to badly wedged clay. It is possible that the marble effect on the surface was desired but the spalling that had occurred on both top and bottom surfaces make it unlikely that this was intentional. The two tiles were found together in the back fill of a large stone-lined tank (no. 775) associated with 16th-century finds.

Maiolica floor tile

There was one fragment from a Maiolica floor tile (no. 131). Decorative polychrome Maiolica tiles were popular in the late 16th and early 17th centuries, when they were made by Italian potters in the Low Countries and, later, in England. They were not ideal as floor tiles because they wore quickly and by the end of the 16th century began to be used as wall tiles. The thickness of this tile implies that it was a floor tile. It was found in a pit associated with late medieval and early post-medieval pottery.

131) Maiolica floor tile. Thickness 23mm.
Fine cream-coloured fabric. Tin-glazed, though this is mostly missing. The remaining fragments are hand-painted with a floral design in blue, dark blue, green, yellow and orange (fig. 1.14b).
Context 668; IADB 1513; Period 2.3.

Delft tile

Only a corner remained of a decorated Delft tile. It was of a soft sandy fabric with white glaze and corner pin hole typical of Dutch-produced, rather than English, tiles. Production of blue and white ceramics began in Holland around 1620, growing out of the polychrome Maiolica industry and inspired by blue and white pottery being imported from China. It thrived until the introduction of cheaper transfer printing in the late 18th century (Lemmen 1998). The corner motif used is called a 'spider's head' and was common on late 17th-century Dutch tiles (Ray 1973, 97). Its thickness is standard for the late 17th century (Lemmen 1998, 29). It was at the end of the 17th and beginning of the 18th centuries that Dutch tiles became very popular and large commissions came in from abroad, and it could have formed part of the original interior of Queensberry House, though its find location at the south-western end of the site does not particularly suggest this. The three plain tin-glazed tile fragments were identical in terms of fabric and glaze to the decorated Delft tile and all were probably of roughly equivalent date.

132) Delft tile. Thickness 8mm.
Cream fabric with sandy back, glazed white with pin hole in corner. Decoration in blue and dark blue (fig. 1.14c).
Context 222; IADB389; Period 4.2.

1.7.3 Roof slates

(WITH THANKS TO SHELLEY BROWN FOR STONE IDENTIFICATION)

Most of the roof slates were not made of true slate, but of grey sandstone, available around Edinburgh or from a quarry at Carmyllie in Angus. The largest group was also the earliest, from a pit adjacent to a medieval property boundary (Context 808, Period 2.3). None of the 72 pieces in this group had any signs of nail or peg holes, and had the appearance of off-cuts from the slating process, possibly representing the broken surplus from reused slates. A later pit below the terrace (Context 935, Period 4.1) contained nine sandstone slates and two pieces of true slate. Seven of these had nail or peg holes and were the only slates recovered to show this degree of completeness. This, and the variation in stone types in contrast to the earlier pit, implied they came from a demolition deposit. This may have been associated with the clearance of Canongate tenements in advance of the construction of Balmakellie House. Whether these holes were peg or nail holes was unclear. They varied in diameter from 7–15mm and none showed any signs of iron staining from nails. Only four pieces of true slate roof slates could be identified from the assemblage, two of Aberdeen type, one from the West Highlands and one unprovenanced.

133) Roof slate. Length 245; width 152mm; thickness 12mm.
Near complete with two corners broken with peg or nail hole 7mm across cut from both sides. Carmyllie/Edinburgh-type grey sandstone.
Context 129 (Pit 935); IADB139; Period 4.1.

1.7.4 Roof tiles

Of the 239 pieces of roof tile, 18 came from securely medieval contexts. These were mostly either in or associated with the medieval property boundary ditches (Contexts 810 and 780), but three abraded pieces were from a pre-burghal deposit associated with road construction (Context 964). If the early 12th-century context for these three is secure, they are among the oldest medieval roof tiles in the country. Tiles are generally not found before 13th-century levels.

The medieval tiles were coarsely made of a gritty, micaceous orange fabric. No examples of nib tiles could be identified from the fragmentary remains but one tile showed part of a peg hole. In Perth peg tiles appear in the late 13th or early 14th century (MacAskill 1987, 156). In St Andrews, peg tiles replace nib tiles by the early 14th century (Maxwell 1997b, 91). In Perth, MacAskill suggested that the relatively small quantity of roof tiles found was due to roofs being mainly thatched and only partly tiled, possibly at the edges and corners.

Four of the Holyrood tiles have been glazed olive-green, at least in part. One also has a cross incised into it and was possibly covered in cross-hatching. Glazed tiles would have been more effective in keeping out water, but their main function was probably decorative. Glazed tiles were found in Perth, where they appeared to date to the late 14th and 15th centuries. The glazed tiles from Holyrood were spread

between Periods 2 and 4, and most probably date from around the 15th and 16th centuries.

The glazed and incised tile (no. 135) was found in a pit (Context 808, Period 2.3) cut into the medieval garden soil adjacent to a property boundary. This was the same pit that contained the largest collection of sandstone slate pieces. A later demolition pit on the Balmakellie House terrace (Context 935, Period 4.1) also contains a glazed roof tile in association with several slates. Glazed tiles may, therefore, have been used in association with stone for roofing, either for edging or set in decorative patterns.

Later tiles are all pantiles, and much more common. They are found in greatest numbers around Haddington House, and in Trench 21 associated with the modern Canongate frontage.

None of the roof tiles or slates can be tied directly into Balmakellie or Queensberry House but since, as seems likely, the previous buildings on site were roofed at least partly in stone, the expertise and raw materials must have been available as early as the 16th century. The fact that so little of this stone was found on site may mean that it was reused to roof the new house, though equally it could have been reused elsewhere.

134) Peg tile. Thickness 14mm; peg hole approx. 12mm. Gritty, poorly wedged clay, orange with layers of white visible. (Fig. 1.15.)
Context 1684; IADB4636; Period 2.2.

135) Glazed and incised tile. Thickness 12–14mm. Gritty fabric, brownish orange with a reduced mid grey core. Incised and glazed olive-green.
Context 807; IADB2500; Period 2.3.

1.7.5 Brick and daub

Brick is found on site from the earliest deposits, but only in fragments too small for any meaningful analysis up until 17th-century deposits. It is only found in large numbers from the 18th century onwards. Daub also only survives in small fragments. It is most likely to have been associated with industrial processes, with kilns and furnaces; however, no fragments were found in situ.

1.8 STONE OBJECTS

ADRIAN COX

The small stone artefacts from the excavation include four discs. Two of these (nos 136 & 137, fig. 1.12) are associated with medieval activity on the site, while another (no. 139) is associated with a post-medieval phase, and the remaining example (no. 138) is from an unphased context. No. 136, from a garden soil deposit, is much smaller than the others and may represent a gaming counter. A similar disc, 32mm in diameter, was associated with early post-medieval activity at 115 High Street, Elgin (Cox 1998, 794, Fig. 18, No. 81). Part of an incised gaming board found during excavations at Carrick Castle may have been used with small stone discs of approximately this size (Ewart & Baker 1998, 974–5). Alternative interpretations are also possible, however. Two small

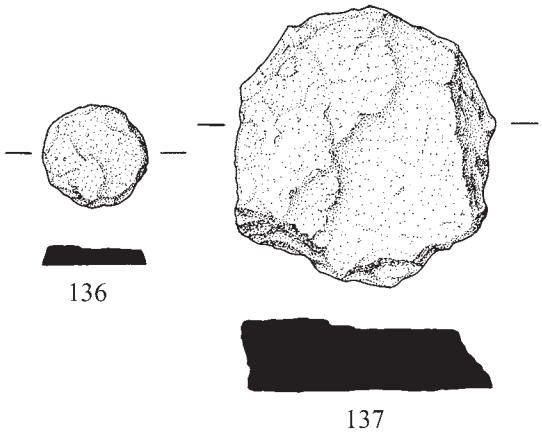


Fig. 1.16 Stone discs (scale 1:2)

stone discs from Caerlaverock Castle, one of which is only 23mm in diameter, are interpreted as probable pot lids (Laing 1999, 227, Fig. 49, Nos 203 & 205), for example.

The three larger discs (nos 137–9) are only roughly finished and have uneven thicknesses, although all have at least one fairly flat face. They are of similar sizes, no. 139 being the broadest and thickest. These may have functioned as counters, as is suggested for no. 136 above, but their rather crude finishing and unevenness may indicate a temporary use such as for pot lids. Crudely-shaped stone discs of similar size have been found at Linlithgow Palace (Caldwell 1996b, 864, Fig. 28, No. 146), Curfew Row, Perth (Cox forthcoming) and Rattray (Murray & Murray 1993, 197, Fig. 45, Nos 297–8).

136) Disc or counter. Diameter 27mm; thickness 4mm. Roughly circular disc or counter, derived from micaceous stone. Undecorated. (Fig. 1.16.)
Context 612 (Sample 1605); IADB 2133; Period 2.2.

137) Disc or counter. Diameter 72mm; max. thickness 18mm.
Object with a roughly circular outline and one roughly flat face. Undecorated. (Fig. 1.16.)
Context 760; IADB 2677; Period 2.1.

139) Disc or pot lid. Diameter 81mm; max. thickness 23mm.
Object with a roughly circular outline and one roughly flat face. The thickness is uneven. Undecorated.
Context 1552; (Sample 3815) IADB 3947; Period 3.

Two spindle whorls (nos 140 and 141) were found. No. 140 came from the secondary fill of a stone-lined feature in Period 2.2, and is decorated on both faces by a series of incised, oblique lines. It bears strong similarities to a whorl recently excavated at Curfew Row, Perth (Cox forthcoming), which is slightly larger (33mm in diameter) but decorated in the same manner. Another close parallel for this type of decoration comes from the excavations at Rattray, where it occurs on a whorl of shallow, conical form, from a 13th- to early 14th-century phase of activity (Murray & Murray 1993, 197, Fig. 45, No. 290). Another spindle whorl exhibiting a similar form and decorative style was found at Canal Street, Perth, in a context dated to the 15th century (Ford 1987b, 149,

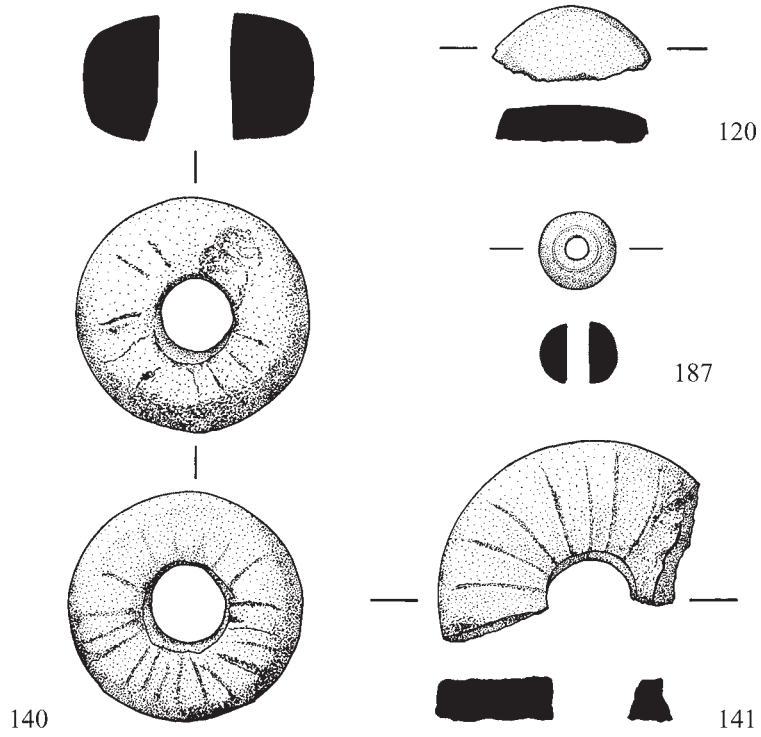


Fig. 1.17 Ceramic disc, stone whorls and bone bead (scale 1:1)

Fig. 80; No. 145). This example was originally of biconical form but had sheared in half across its horizontal axis. No. 141, recovered from a garden soil deposit, has fractured in a similar way. Like no. 140, it is decorated by shallow, incised lines, although in this case they run radially from the centre rather than obliquely.

140) Spindle whorl. Diameter 29mm; thickness 15mm.
Spindle whorl derived from fine-grained, grey stone, with a central, circular hole and slightly convex faces. Both faces are decorated by a series of incised radial grooves, some of which are slightly oblique. On one face these appear to be shallow and/or more greatly worn than on the other. The outer surface is similarly decorated by roughly equidistant incised diagonal grooves. Slightly abraded. (Fig. 1.17.)
Context 1568; IADB 4093; Period 2.2.

141) Spindle whorl. Projected original diameter *c* 39mm; thickness 7mm.
Spindle whorl of discoid or very shallow biconical form, broken across its central, circular hole. A series of shallow, incised radial grooves decorate the upper surface. The object has fractured across its thickness and the lower surface is missing. (Fig. 1.17.)
Context 563; IADB 3161; Period 3.

Recovered from the fill of a rubbish pit in Period 2.3, no. 142 may represent a fragment of a hone or whetstone. No diagnostic tool-sharpening marks are visible on this fragment. Interestingly, one of the broken ends of the object is considerably more abraded than the other, which may indicate continuation of use after the first break occurred. Larger hones, such as that represented by this fragment, would have hung in workshops, whereas smaller ones, often perforated at one end for suspension, could be carried about the person.

142) Hone fragment? Length 60mm; width 31mm; thickness 25mm.
Fragment of roughly sub-rectangular cross-section, broken at both ends, chipped and abraded.
Context 694; IADB 1882; Period 2.3.

1.9 FLAKED STONE

TORBEN BJARKE BALLIN

The excavations at the Parliament site produced a total of 44 pieces of worked stone, none of which came from primary contexts. As a result, little can be said about the assemblage, and the report will be restricted to a presentation of the artefacts followed by a subsequent discussion of their possible dates.

1.9.1 Raw material

The assemblage is dominated by flint (33 pieces), supplemented by some chert (8 pieces) and quartz (3 pieces), as shown in table 1.12.

The flint sub-assemblage varies considerably in colour (grey, black, orange and brown) and quality (Maastrichtian/later Cretaceous), indicating that the raw material came from different sources. This is also suggested by the fact that some pieces have fresh chalky cortex (possibly ballast flint), whereas others have battered and abraded surfaces (from beach or gravel deposits: Saville 1994).

Table 1.12 The flaked stone assemblage

		Flint	Chert	Quartz	Total
Debitage and blanks					
Chips		3	1		4
Flakes		13	2	3	18
Indeterminate pieces		3	2		5
Microblades		2			2
	Sub-total, debitage	21	5	3	29
Cores					
Conical cores			1		1
Irregular cores			1		1
Bipolar cores		3	1		4
Core fragment		1			1
	Sub-total, cores	4	3		7
Tools					
Scrapers		1			1
Borers		1			1
Pieces with an oblique truncation	1	1			
Pieces with edge-retouch		2			2
	Sub-total, tools	5			5
Possible ballast flint		3			3
TOTAL NUMBER		33	8	3	44

The chert artefacts occur as either grey, blue or green, with or without specks or banding. This raw material is probably local, indicated by a number of nodules and gravel-sized pieces of natural chert collected on the site (Saville 1994). The three quartz flakes are all from small nodules of possibly local milky quartz.

1.9.2 Assemblage composition

In the typological presentation of the assemblage the following definitions are applied:

Chips: All flakes and indeterminate pieces the greatest dimension (GD) of which is ≤10mm.

Flakes: All lithics with one identifiable ventral (positive/convex) surface, GD >10mm and L <2W (L=length; W=width).

Indeterminate pieces: Worked lithics which cannot be unequivocally identified as either flakes or cores. Generally the problem of identification is due to irregular breaks, frost-shattering or fire-crazing. Chunks are larger indeterminate pieces, and in, for example, the case of quartz, the problem may originate from a piece breaking along natural lines rather than breaking in the usual conchoidal way.

Blades and microblades: Flakes where L ≥2. In the case of blades W >8mm, in the case of microblades W ≤8mm.

Cores: Artefacts with only dorsal (negative/concave) surfaces – if three or more flakes have been detached, the piece is a core, if fewer than three flakes have been detached, the piece is a worked nodule.

Tools: Artefacts with secondary retouch (modification).

1.9.3 Debitage

Of the 29 pieces of debitage 4 pieces are chips, 18 pieces flakes, 5 pieces indeterminate pieces or chunks, and 2 pieces are microblades. The flakes have all been detached applying either hard platform technique or bipolar technique, and they give a crude appearance. The two microblades have both been manufactured in bipolar technique. The fact that two thirds of the debitage have some degree of cortex-cover adds to the impression of technological simplicity.

1.9.4 Cores

Seven cores were recovered from the site. One is a conical core, one is an irregular core, four are bipolar cores, and one is a core fragment. The conical core (no. 162, fig. 1.18) is a blade core with a faceted platform and minimal preparation of the platform-edge. It seems to have been split diagonally along an internal plane of weakness. The irregular core (no. 159) is very small (greatest dimension 24mm) and completely exhausted. Only one of the four bipolar cores is a certain prehistoric

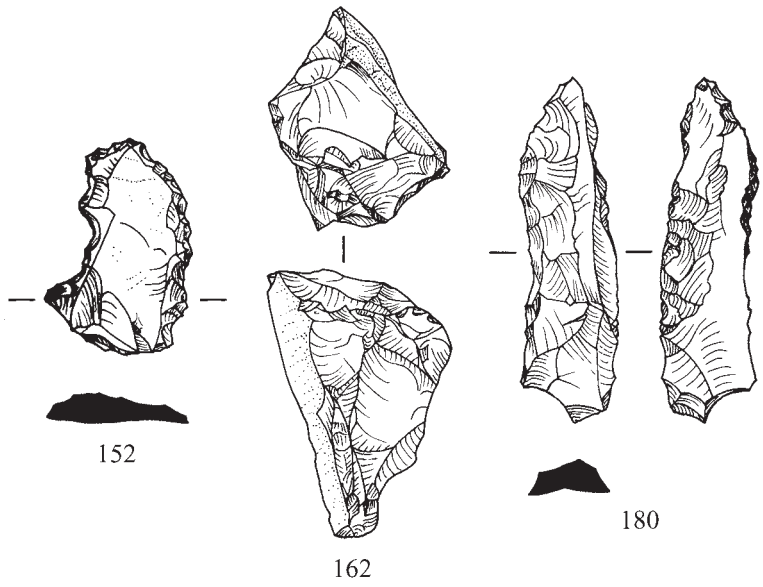


Fig. 1.18 Flaked stone artefacts (scale 1:1)

artefact; this piece (no. 155) is a thin bipolar core in flint displaying two opposed crushed ridges or terminals and a third crushed ridge at one side, proving that the core was re-orientated during the reduction process (cf Ballin 1999). The bipolar core in chert (no. 154) has pointed terminals and may be a moraine-crushed piece or 'starch fracture' (Ballin 1999; Watson 1956, Fig. 5). The remaining two bipolar cores in flint (nos 165 & 166) appear more irregular than classic bipolar cores, and as their cortex is fresh they are more likely to be pieces of ballast flint. The core fragment (no. 151) is from a fluted core, most probably a conical core like no. 162; the platform is faceted and the platform-edge is slightly trimmed.

1.9.5 Tools

The five tools from the Parliament site include one scraper, one borer, one piece with an oblique truncation, and two pieces with edge-retouch, all in flint. The scraper (no. 152, fig. 1.18) is a double-scraper on a flake with a slightly convex working-edge at either end and steep retouch along both lateral sides. The borer (no. 180, fig. 1.18) is an elongated piece on a flake fragment; it has a retouched point at one end, steep normal retouch along one lateral side, and flat inverse retouch along the other lateral side. The truncated piece (no. 145) has a short, oblique blunting retouch at the distal end; very fine retouch, probably use-wear, on the edge opposite the oblique retouch indicates that this piece is a small cutting implement. The two retouched pieces are both non-formal tools; one piece (no. 147) is a small flake with retouch along the entire circumference, whereas the other piece (no. 163) is a proximal flake fragment with sporadic retouch.

1.9.6 Possible ballast flint

Three relatively large pieces of flint (nos 166, 170 & 181) have been classified as ballast flint. They have some similarity to simple irregular cores, but the complete absence of method behind the 'reduction process' combined with fresh chalky cortex and fresh flaking scars suggest that the pieces are not prehistoric (cf Kenworthy 1982, 204, 209).

1.9.7 Dating

There are no diagnostic types in the assemblage, ruling out precise typological dating of the lithics. The general impression is, however, that the assemblage contains material from two different technological traditions; most of the lithic material is crude and characterised by either hard-hammer platform technique or bipolar technique, but two artefacts, the conical core and the possible fragment of a conical core, are from a technological tradition involving soft-hammer technique and careful core preparation. Conical blade cores are either Mesolithic or Neolithic, whereas the coarser flake technology characterising the major part of the assemblage will be later, most probably later Neolithic or Bronze Age. The invasive retouch on the flake borer's ventral face confirms this suggestion.

152) Double end-scraper on flake, flint. 28 × 18 × 3mm.
Both lateral sides completely retouched. Although the proximal end has been removed, the flake was clearly detached from a platform core. (Fig. 1.18.)
Context 332; IADB 1212; Period 2.2.

162) Conical core, chert. 35 × 29 × 19mm.
Split diagonally due to internal planes of weakness. The core has a facetted platform and a minimally prepared platform-edge. (Fig. 1.18.)
Context 330; IADB 1822; Period 3.

180) Borer on platform flake, flint. 45 x 12 × 8mm.
Retouched point at one end, steep normal retouch along one lateral side, and flat inverse retouch along the other lateral side. (Fig. 1.18.)
Context 689; IADB 1824; Unphased.

1.10 BONE AND ANTLER OBJECTS

ADRIAN COX, WITH SPECIES IDENTIFICATIONS BY CATHERINE SMITH

A small group of bone and antler artefacts was recovered from a range of contexts, the earliest from Period 2.2 and the latest from Period 5.1. No. 187, found in a levelling deposit in Period 3, is a lathe-turned object in the form of a flattened sphere, with a central perforation (fig. 1.17). This may have functioned as a bead, but since it is undecorated and has quite a broad perforation, it could, alternatively, have functioned as a toggle on a cord attached to clothing or to a bag or purse. A bone bead excavated in Perth, probably of slightly earlier (15th-century) date, is of very similar dimensions but also incorporates a raised rim around its perforation (Cox 1996c, 785, Fig. 27, No. 572). Part of a bead found in Aberdeen is of a smaller, more elongated form (MacGregor 1982, 182, Fig. 105, No. 28). Glass beads of a similar size to no. 187, groups of which were probably worn together on necklaces, are also known, especially from the later post-medieval period. Bone beads could be made from large ungulate long bone shafts, as this example probably was. Long bone fragments drilled with circular holes, found at Coventry (Gooder et al 1964) and elsewhere, provide possible evidence of bead manufacture.

187) Bead or toggle. Diameter 10mm; thickness 8mm.
Lathe-turned bead or toggle, probably derived from a large ungulate long bone shaft, in the form of a flattened sphere, with a central, circular perforation, 3mm in diameter. Concentric lathe-turning marks are visible particularly bordering the edges of the perforation. (Fig. 1.17.)
Context 660; IADB 3632; Period 3.

Two small bone dice (nos 188 & 189, fig. 1.19), where all six sides are shown together) are among several artefacts from the excavation associated with games and leisure pursuits. Dice games appear to have enjoyed widespread popularity during the medieval period. Dice could be used to determine the moves of pieces on a board, or used by themselves in games of hazard. Gaming boards rarely survive, perhaps because many must have been made from wood, although rudimentary Nine Men's Morris boards have been excavated from several sites, including Castle Acre in Norfolk, where they were incised on blocks of chalk (Coad & Streeten 1982, Fig. 51).

Although the earliest known British dice are from Iron Age contexts, small bone dice with numerical values marked by incised ring-and-dot motifs have a long currency, from the Roman period until late medieval times (MacGregor 1982, 182). Throughout this period and into the post-medieval period, most dice appear to have been fashioned from bone or antler, although wooden examples may also have been used. Metallic dice are also known, such as a copper-alloy example from Balmerino, Fife (Cox & King 1997, 202).

Both nos 188 and 189 are of cuboid form, although asymmetric dice are also known. Cuboid dice give an equal chance of throwing each value represented, while asymmetric examples generally have lower values placed on their narrower faces and higher values on the broader ones, making the throwing of low values more difficult. On no. 189, the surviving motifs represent the numbers 1, 2, 3 and 4. The surviving motifs on the remaining two faces indicate that these are likely to represent the numbers 5 and 6.

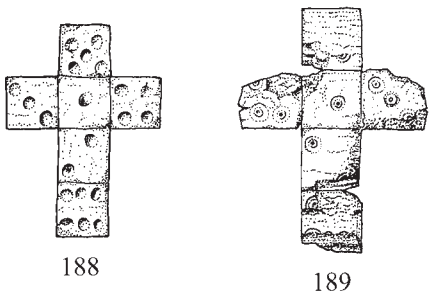


Fig. 1.19 Expanded illustration of bone dice (scale 1:1)

The arrangement of numerical values on the two dice represented here follows a convention that appears to have been the norm in pre-Norman times, as it is with post-medieval and modern dice. On both, the numerical values are positioned so that sets of opposing faces add up to seven (ie '1' faces '6', '2' faces '5' and '3' faces '4'). Medieval dice, however, seem to have followed a different convention, where sequential numbers are positioned on opposing faces (ie '1' faces '2', '3' faces '4' and '5' faces '6'). Dice numbered following the medieval convention have been found, for example, at Southampton (Harvey 1975, 271, Fig. 247, No. 1927) and Streatley, Bedfordshire (Dyer 1974, 19–20), and there are a number of Scandinavian examples, described by Ambrosiani (1981). Other Scottish bone dice include several recovered from the 1975–77 Perth High Street excavations (Bogdan & MacGregor forthcoming), two from Aberdeen (MacGregor 1982, 182, Fig. 104, Nos 18–19), one from Threave Castle, Galloway (Good & Tabraham 1981, 129, Fig. 20, No. 213) and one from Tantallon Castle, East Lothian (Caldwell 1991, 346, Fig. 6, No. 130).

188) Die. Length 7mm; width 7mm; thickness 7mm.
Die of cuboid form, probably derived from a large ungulate long bone shaft. Each face bears small, drilled circular indentations (with diameters ranging from 1.1mm to 1.4mm), arranged to represent the numbers 1 to 6. (Fig. 1.19.)
Context 563; Sample 2957 (retent); Period 3.

189) Die. Length 8mm; max. width 8mm; max. thickness 8mm.
Die, probably derived from a large ungulate long bone shaft. Originally of cuboid form, the object is missing a wedge-shaped piece which has broken away. In addition, other corners and edges are damaged and abraded. Each face bears ring and dot motifs (each *c* 2mm in diameter), although damage to two faces means that a number of the motifs are missing. (Fig. 1.19.)
Context 1505; Sample 3075 (retent); Period 2.2.

A lathe-turned object of biconical form (No. 190) may have served as a handle (for example, on a box or a drawer) or as an end-cap for a metal implement with a circular cross-sectioned handle. It is likely to be of post-medieval date. A handle of tapering, cylindrical form, with a circular end-cap (no. 191,

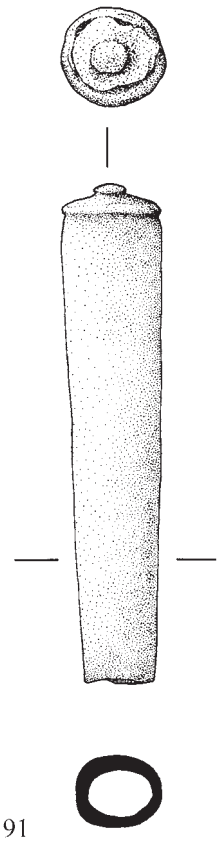


Fig. 1.20 Antler handle (scale 1:2)

fig. 1.16) was found in the fill of a cultivation slot in Period 4.1. It was probably made from an antler tine, and its surface is worn smooth, probably as a result of repeated handling. A fragment of a bone handle of very similar form, with the end covered by a bone disc as in this case, was found at Colchester (Crummy 1988, 75, Fig. 75, No. 3087) in a topsoil deposit. In the Colchester example, the disc of bone is held in place by the burred end of an iron tang, part of which survives within the handle. In the case of no. 191, a small knob forms an integral part of this end-cap. It is difficult to be certain of the type of object this handle formed a component of, but it may have been a toilet implement of some kind, or a button hook.

190) Handle or end cap. Max. diameter 16mm; depth 9mm.
Handle or end cap of shallow biconical form, with a hollow, circular cross-sectioned interior (diameter 8mm). A small hole at the apex (width 2mm) probably represents damage through wear rather than a deliberate perforation. The object is probably derived from a large ungulate long bone shaft.
Context 1212; IADB 3462; Period 5.1.

191) Handle. length 65mm; max. diameter 13mm.
Handle of hollow, tapering, roughly cylindrical form, probably derived from an antler tine. It has a sub-circular cross-section. The terminal incorporates a circular end-cap with a central knop. The surface is smooth. (Fig. 1.20.)
Context 314; IADB 1449; Period 4.1.

A circular object, decorated with incised, concentric circles (no. 192), was found in a garden soil deposit in Period 4.1. This object has a screw thread around its edge, and probably served a purely decorative function as a mount, attached either to bone (for example, as the central component of a larger gaming piece) or wood (as a decorative mount on a box, for instance). It was probably made from either a large ungulate long bone shaft or from a mandible.

192) Mount. Max. diameter 19mm; max. thickness 5mm.
Circular mount, probably derived from a large ungulate long bone shaft or a mandible. It is decorated on its upper surface by two sets of incised concentric circles, with a mandrel point at the centre. The object steps inward, below the upper part, reducing in diameter to 15mm. The lower surface is slightly concave and is undecorated. A screw thread is cut into the outer edge of the object. The edge and face of the object are slightly eroded.
Context 540; IADB 783; Period 4.1.

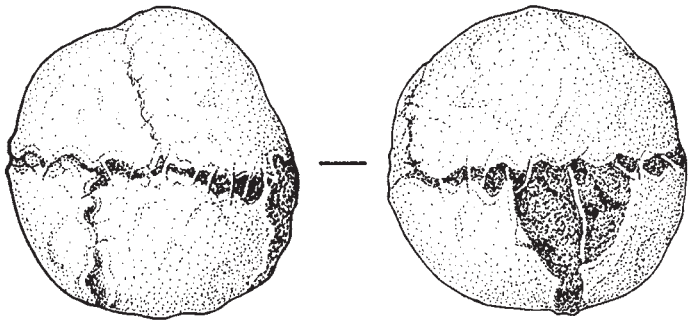
1.11 LEATHER OBJECTS

1.11.1 Leather-covered ball

ADRIAN COX

A leather-covered ball, filled with tightly-packed scraps of leather or textile (no. 193, fig. 1.21), came from a fireplace feature within Queensberry House. The leather cover has a grey to black colouration and is slightly desiccated. One part of it has split, exposing the filling. This represents a ball for playing a game or sport. It has been fabricated by a method very similar to that used in the production of early golf balls. Until the introduction of gutta percha balls in 1848, golf was played using a leather-covered, feather-filled ball. The leather cover was made in three or four pieces, as in this case. After being softened with alum and water, the pieces of leather were sewn together with waxed thread, and then the whole cover was turned inside-out in order that the stitched seams would be on the inside of the ball (Fabian-Baddiel 1994, 28–9). These early golf balls were normally filled with boiled goose or chicken feathers, and, as the wet, newly made ball dried, the feathers expanded and the leather contracted, making the ball tight and hard enough to be hit over considerable distances. St Andrews had an established reputation for golf-ball manufacture, and other well-known makers were based in Leith (eg David Marshall) and Musselburgh (eg John Ramsay and William Robertson) (Henderson & Stirk 1982, 46). No. 193, with a diameter of 41mm, fits comfortably within the size range of early leather-covered golf balls, which were normally between 30mm and 45mm in diameter. Until after 1914, however, there was no limit on the size of a golf ball (ibid, 44).

Although closely resembling a golf ball, there are other possible interpretations of its function. As early as the 17th century, a leather-covered ball filled with wool or flock, known as a *sajet*, was used for golf in the Netherlands, whereas feather-filled balls were used in a game of *Kaatsen* (hand tennis), which remains popular in Friesland today (Henderson & Stirk 1982, 43). Fives balls were also made with leather



193

Fig. 1.21 Leather ball (scale 1:1)

covers and filled with feathers, but were normally stitched with wire rather than thread. There appears to be a degree of overlap between the characteristics of these types, and it can be concluded that no. 193 may have been used either for golf or in games of fives or hand tennis.

193) Ball. Diameter 41mm.
Ball with a cover made from four equal-sized pieces of leather, sewn together along edge-to-edge seams with thread (probably cotton or linen). One of the pieces of leather has torn, approximately into halves, revealing part of the internal filling of the ball. This appears to consist of tightly-packed, small scraps of leather or textile. The ball is slightly distorted. (Fig. 1.21.)
Queensberry House; Fireplace (FF1); IADB 5359.

1.11.2 Shoe and miscellaneous fragments

CLARE THOMAS

The shoe (no. 194) is clearly of riveted construction, which dates it to the 19th or 20th centuries. A sole-riveting machine was patented in 1810 by M I Brunel, in an attempt to use unskilled labour for the manufacture of boots required by the army during the Napoleonic Wars. However, part of his factory burned down after the end of the war in 1815, by which time the demand for such boots had slumped. The use of riveted construction appears to have lapsed until 1853, when Thomas Crick of Leicester patented his method of riveting boots. The outbreak of the Crimean War the following year provided a new demand for cheap, rigid boots; and suitable machines for their manufacture were produced in the 1860s. This form of cheap machine-made working-wear was made in huge quantities until the early 1920s. Accordingly, this shoe most probably dates from the 1850s onwards.

The two pairs of lace-holes and facing are probably from boots or shoes with front-lacing and appear to be machine-sewn. Singer sewing machines, strengthened to cope with leather, were introduced from America in 1856–7. Boots or shoes of riveted construction usually had front-lacing; thus, it is likely that the shoe and the lace-hole fragments represent the same style and construction method, and are of the same date in the second half of the 19th century.

194) Shoe. Length 260mm; width of forepart 78mm; width of waist 50mm; width of seat 63mm. Length of heel-piece 50mm; surviving height 26mm.
Left shoe of riveted construction, comprising composite sole and tiny portion of upper. Sole comprises full-length outer sole, forepart mid-sole, rand or welt with rivet holes, full-length insole and heel-piece. Heel-piece consists of at least seven lifts or layers of leather. Sole is slender and on a very straight alignment, with only a very slight inward inclination of the forepart; it ends in a broad square toe. Sole is worn, especially the outer portion of the top-piece. Outer sole has two holes, towards rear of forepart. Insole is fragmentary, and full-length mid-sole is very thin and incomplete. Tiny portion of front of vamp of upper survives. Margin of upper is sandwiched between forepart mid-sole and rand or welt with rivet holes. Very faint trace of two parallel grain-flesh stitching channels, 2mm apart, and with a stitch length of 1mm, 15mm from front of vamp, suggests that this may be a toe-cap. Shoe is of riveted construction; rivets survive and are clearly visible at waist of outer sole. Holes for rivets are also visible on mid-sole and on insole. Diameter of rivet heads 2mm; rivets are 6–8mm apart.
Context 294; IADB 459; Period 5.1.

1.12 COINS AND JETONS

NICHOLAS HOLMES

Twenty-four apparently numismatic items were recovered, of which 16 coins and two jetons were identifiable. These range in probable date of loss from the late 15th century to some time in the 20th century.

All the coins fall into the category of 'small change'. The earliest could have been minted as early as around 1450, and the latest is a halfpenny dated 1920. The largest concentration is of 17th-century copper coins, comprising five Scottish, one English, two French and one Dutch coin, and representing a fair cross-section of the low-value coins circulating in Scotland at that time. There is only one coin from the 18th century, and this has been identified only on the basis of its size and weight, there being no trace of its designs. There are three bronze issues

of Victoria and George V. All the coins are of types which were frequently lost and swept out with domestic rubbish, and there is no direct evidence from the assemblage of any economic activity in the area from which they came.

The two Nuremberg jetons are of common types. Although these items would undoubtedly have been used over long periods, neither of these specimens shows much evidence of wear. Like the coins, they could well have been dropped inside a nearby building and swept out with refuse.

Select catalogue

Scotland

199) James II–III copper 'Crux Pellit'. 20.0mm; 1.62g; die axis 11.0. Type IIa (*c* 1450–82).
Uneven striking; some accretion; moderate wear. Obverse: double annulet stops; orb upwards and to right. Reverse: double annulet stops; pellets on cusps; nothing in spandrels.
Context 859; IADB 2558; Period 4.1.

200) James III copper farthing. 11.5 × 12.0mm; 0.33g; die axis 7.0. 'Ecclesiastical' type II or III (probably *c* 1475–82).
Heavy and damaged green patina; probably moderate wear.
Context 612; IADB 2531; Period 2.2.

201) Mary billon bawbee. 20.5mm; 0.90g; die axis 5.0. Edinburgh (1543–58).
Much edge damage; some weak striking and flattening; slight wear.
Context 1200; IADB 3296; Unphased.

England

207) Charles I copper farthing token. 13.5 × 13.0mm; 0.93g; die axis 12.0. Rose type 1(d) (*c* 1636–39).
Heavy green patina; accretion on reverse; slight wear.
Context 888; IADB 3159; Period 4.1.

France

212) Louis XIII copper *double tournois*. 20.5 × 20.0mm; 2.24g; die axis 5.5 (1639).
Slightly buckled; uneven striking; obverse very worn, reverse worn.
Context 1000; IADB 61; Unphased.

213) Bouillon and Sedan: Frédéric-Maurice de la Tour copper *double tournois*. 18.5 × 20.0mm; 1.01g; die axis 6.0.
Probably 1640, possibly 1630 or 1650; cf Poey d'Avant type 6358 (Poey d'Avant 1858–62); slightly buckled; heavy and damaged green patina; mostly very worn.
Context 211; IADB 761; Period 4.2.

Netherlands

214) West Friesland: copper *duit*. 22.5 × 23.0mm; 2.34g; die axis 12.0. (1604); type as Purmer and van der Wiel 3001.1 (Purmer and van der Wiel 1996).
Heavy green patina; slight accretion; moderate wear.
Context 1000; IADB 118; Unphased.

Jetons

215) Brass jeton. 26.0 × 25.5mm; 2.40g; die axis 9.5.
Nuremberg anonymous 'ship penny' type (*c* 1490–1550); cf Mitchiner types 1168–76; cracked and chipped at 1.5 obverse); slightly damaged green patina; slight to moderate wear.
Context 89; IADB 274; Unphased.

216) Brass jeton. 22.0 × 21.0mm; 1.33g; die axis 12.0.
Hans Krauwinckel II, Nurembergl rose/orb type (1586–1635); as Mitchiner type 1539; slight wear.
Context 120; IADB 275; Unphased.

1.13 CLAY TOBACCO PIPES

DENNIS GALLAGHER

Nine hundred and eight fragments of clay tobacco pipes were recovered during the excavation of the Parliament site, the majority of which were manufactured in the half century from *c* 1630–80 (figs 1.22–1.41). This was a period in Edinburgh which witnessed the rapid growth of the fashion for pipe-smoking. Smoking was introduced into Scotland in the early years of the 17th century and, despite royal disapproval manifested by James VI's well-known *Counterblaste to Tobacco*, the practice soon increased in popularity. The king, however, was not averse to using tobacco as a source of revenue. A monopoly to manufacture pipes in Scotland, issued in 1619 to Lord Kinclevin, appears in practice to have been the privilege of the pipe-maker William Banks, in Edinburgh. The first known documentary reference to Banks was in 1622, when he was named as a 'tobacco pype maker' in the Canongate. He successfully defended his right to this monopoly in 1642 and continued to be the dominant figure in Scottish pipe production until his death in 1659.

The shape of pipes changed rapidly during the 17th century in response to the dictates of fashion, those of the earlier part of the century resembling heeled London forms. There are no pipes of the very early 17th century in the present assemblage.

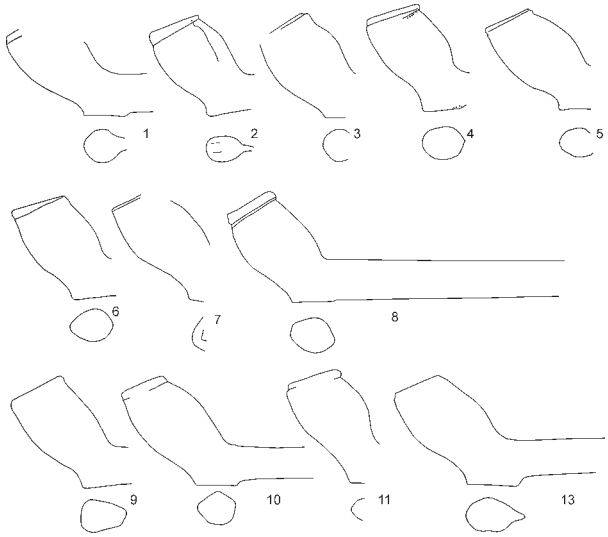


Fig. 1.22 Clay tobacco pipes (scale 1:1)

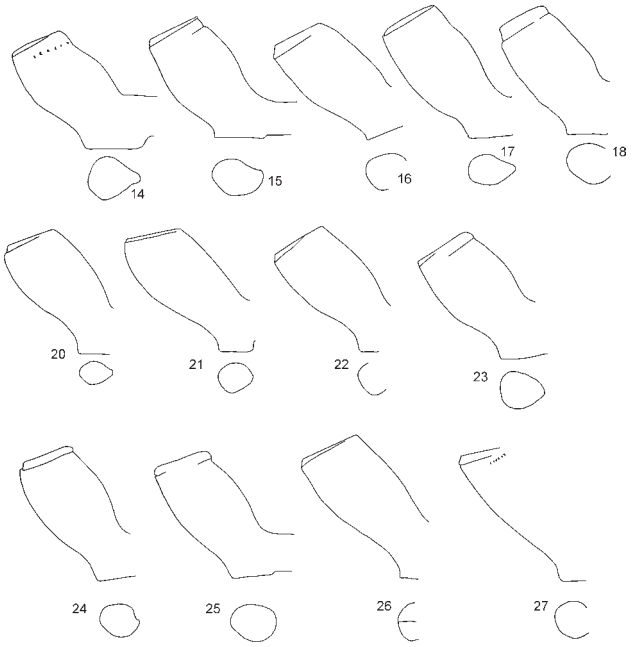


Fig. 1.23

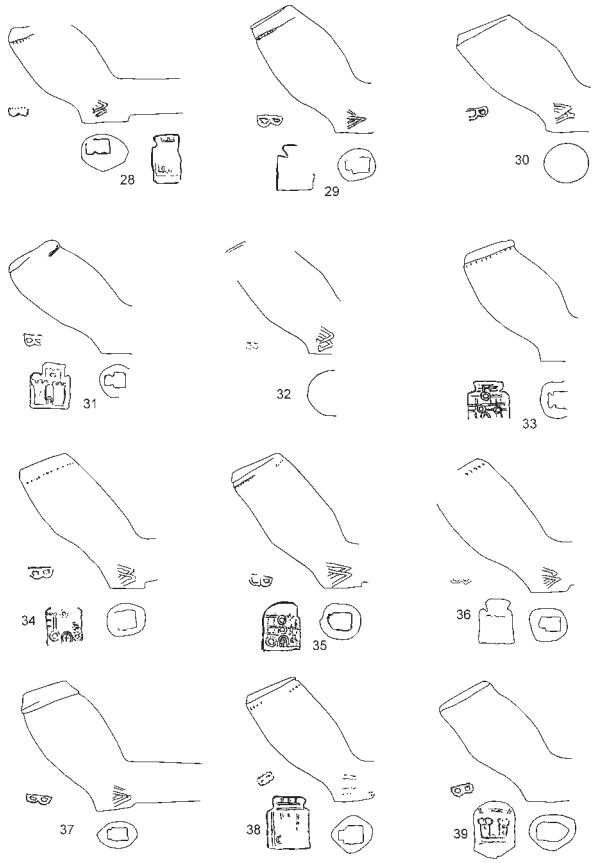


Fig. 1.24

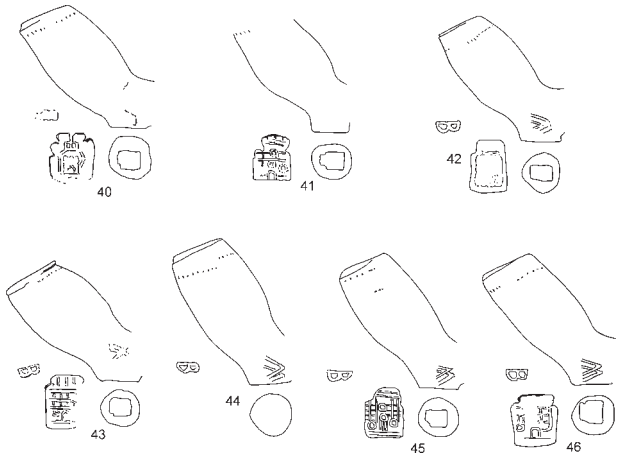


Fig. 1.25

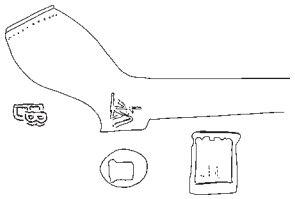


Fig. 1.26

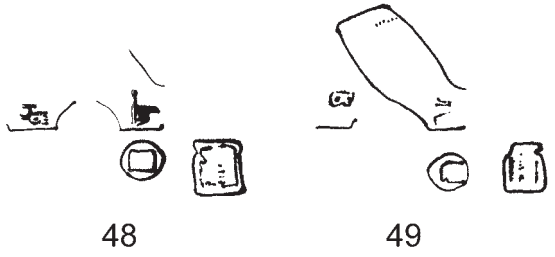


Fig. 1.27

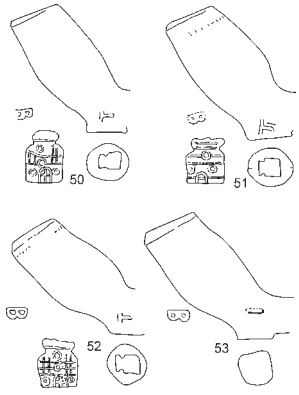


Fig. 1.28

Figs 1.23–1.28 Clay tobacco pipes (scale 1:1)

Although examples are occasionally found in Scotland, their rarity suggests that smoking was not popular until after *c* 1630–40. The earliest pipes from the Parliament site (nos 223–8) date from the period *c* 1620–40, and are comparable in form with some found under the Tron Kirk, Edinburgh in a pre-1637 context (Gallagher 1987a). The bowls have a compact barrel shape and vary from a squat form to a more elegant shape whose fronts have a shallow S-shape. By 1650 bowls become taller, with a straighter back (nos 238–40). Contemporary with a more parallel form (eg nos 238–40) are bowls with a more emphasised S-shaped front, common *c* 1660–80 (nos 242–4), similar to the English West Country form. A taller bowl with a wider mouth became popular towards the end of the century, with nos 248 and 249 having a more forward-leaning style. Contemporary with these bowls is a more upright form, with a heavy splayed base (nos 317 & 318) similar to a Broseley form 3 (Atkinson 1975, 25). Snuff-taking seems to have replaced pipe smoking as the accepted method of tobacco consumption after *c* 1730; pipes became uncommon in most of Scotland during the remainder of the 18th century.

1.13.1 Edinburgh makers

William Banks

Among the marked pipes, the present group includes 25 bowls that can be identified as products of the workshop of William Banks, who is first recorded as a maker in 1622. None of his products from this early period have been recognised, although some of the unmarked pipes of this date may be Banks's products. Banks is likely to have initiated the Edinburgh style of marking pipes, placing the maker's initials on the side of the bowl and stamping the base with a castle, based on the town crest and identifying it as an Edinburgh product.

A number of Banks's bowls have forward-leaning, well-curved forms, varying in size from the small bowl no. 250 to his last pipes, no. 269. The series is likely to range from *c* 1640 to *c* 1660. A prominent example is a bowl with the initials TB superimposed over WB (see below), indicating that it was in use shortly after William Banks's death in 1659 (no. 269). The majority of the WB pipes in the present group have straighter sides (eg nos 264–8), being slimmer versions of London type 18 (Atkinson & Oswald 1969, 178), and must date from the last decade of Banks's life.

John and Thomas Banks

Two of William Banks's children, John and Thomas, became pipe-makers: and both are described as pipe-makers in the documentary evidence shortly after their father's death in 1659. It is not known how they divided the family business, whether they worked as partners or as independent makers. The present group shows that Thomas inherited some of his father's pipe moulds. Bowls no. 269–70 show that the WB of William Banks has been changed on the mould to a TB. Bowl no. 279 has a sub-circular depression in its side, apparently made during manufacture. Despite this defect, the pipe was given a high-quality finish, being stamped, its rim milled and its surface burnished.

The products of John Banks (no. 275) at times can be difficult to distinguish from those of his brother, Thomas, as the initial I on the side of the base can be obscured by wear of the mould and/or by finishing.

William Young

William Young was described, in 1653, as a 'tobacco pipe-maker in Pleasance'. Three years later he acquired land in the Canongate, formerly belonging to William Banks. He appears to have prospered as a pipe-maker, taking on an apprentice in 1667. He died in 1670 and was buried in Greyfriars churchyard. Five bowls in the present group (nos 283–7) have been identified as products of Young, plus one from within Queensberry House (no. 351). The bowls are rather heavy, bulbous forms, often with the base trimmed to slope towards the smoker. No. 284 is unusual in having a bowl with more parallel sides. The later forms are heavy, thick-walled bowls, no. 287 being a taller form.

Robert Smith

The RS pipes (nos 304–9) may be identified as products of Robert Smith. Little is known of this maker; he appeared as a witness at two Edinburgh baptisms, in 1682 and 1683 (Gallagher 1987b, 11). The pipes belong typologically to the later 17th century, with the exception of no. 305, a smaller, straight-sided form which is typologically slightly earlier. All the maker's initials are crudely cut and have a distinctive retrograde letter S. The RS bowls in the present assemblage have only one basal stamp, most examples being from a very worn die.

Unidentified Edinburgh makers

A number of pipes carry initials that, on the basis of current documentary research, cannot be ascribed with any certainty to a particular maker (nos 310–19). Three bowl fragments with constricted bases and flared sides bear the initials AA (no. 310). These may be products of Alexander Aiken, who appears in the Edinburgh and Leith hearth tax records for 1690 (NAS E69/16/3, p3). However, shortly after this date an Alexander Aiken, pipe-maker, was working in Glasgow (Gallagher 1987c, 41–2). It is possible that this maker moved to Glasgow shortly after 1690. The pipes with the initials IA (nos 316–8) are possibly products of another member of the Aiken family.

There are a number of pipes of probable Edinburgh manufacture which bear initials that cannot be assigned to any makers known from the documentary sources. Among these is a single bowl with the initials AM (no. 311), which has a basal stamp in the form of an incuse castle, rather than the motif being in relief. One lower bowl fragment has the initials SB and a castle style of basal stamp.

Patrick Crawford

The workshop of Patrick Crawford was dominant in Edinburgh during the latter decades of the 17th century, and his pipes are among the finest produced in Edinburgh. He is recorded in Edinburgh in 1671 and died *c* 1696. His widow, Jean Wemyss, continued the business and was able to supply 900 gross of pipes to the Company of Scotland for their ill-fated new colony at Darien (Gallagher 1987d, 234).

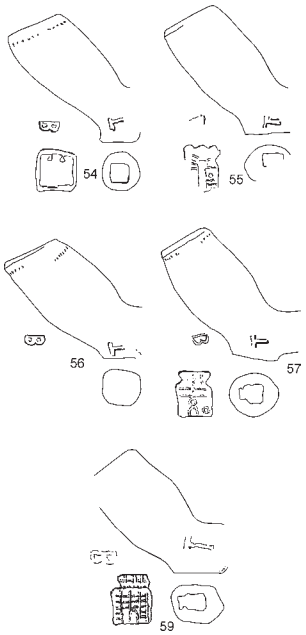


Fig. 1.29

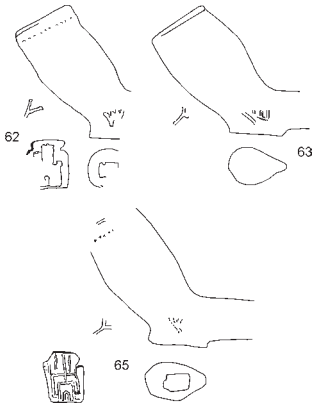


Fig. 1.30

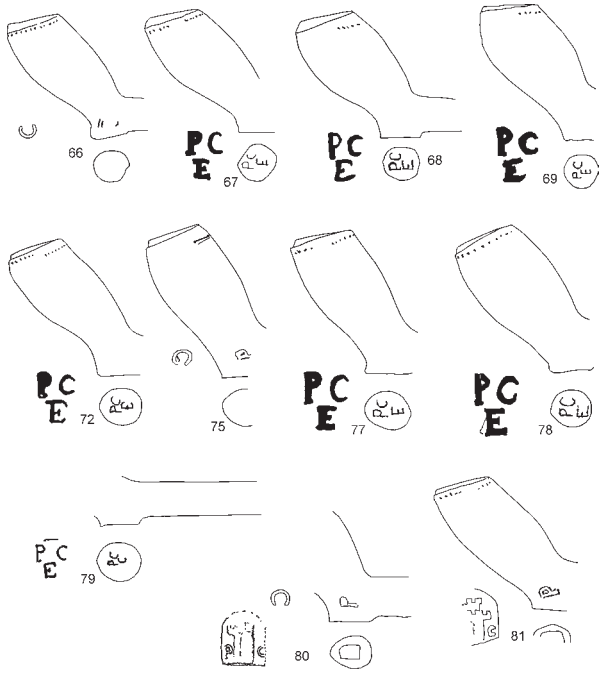


Fig. 1.31

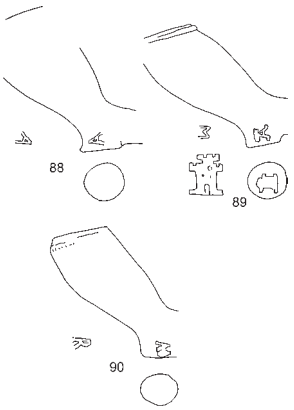


Fig. 1.33

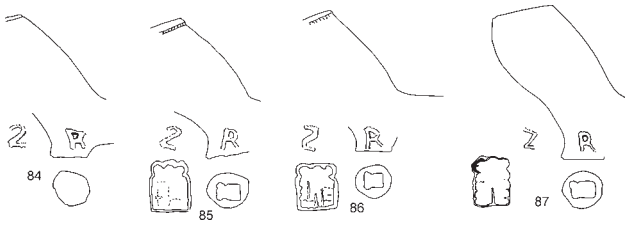


Fig. 1.32

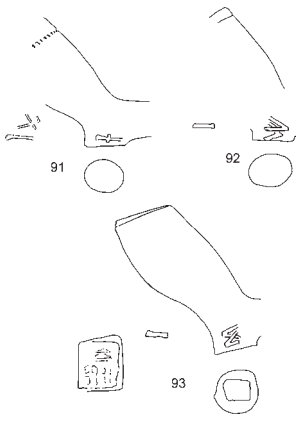


Fig. 1.34

Figs 1.29–1.34 Clay tobacco pipes (scale 1:1)

Most of the Crawford pipes from the Parliament site are marked with a distinctive three-letter basal stamp, incorporating Crawford's initials and the letter E, for Edinburgh. The present group includes marks from at least two different dies of this form of stamp, a smaller and a larger form. A small number of other Scottish makers also made use of this style of stamp, including Thomas Banks and James Colquhoun of Glasgow (Gallagher 1984). At least three different dies of this three-letter stamp can be identified in the present assemblage, although differences are at times obscured by careless application of the die and the use of worn dies. One stamp with small lettering is present only on a basal fragment (no. 301). The three-letter stamp most common in the present group is found on elegant bowls that have fronts with a pronounced S profile (eg nos 291, 294). An example of the third, larger, die is found on bowl no. 299, a form with straighter sides. Crawford also used variants on the castle-style of basal stamp and there are two examples from the Parliament site (nos 302–3). These are normally of a very high quality in their detail, and often incorporate the maker's initials beside the castle, a feature unique among Edinburgh pipe-makers.

Some of the pipes produced by Crawford's workshop in 1696–97 for the Darien venture have been recovered during excavations on the site of the colony in Panama (Horton et al 1987, 243–4). These were much larger bowls than any of the Crawford pipes from the Parliament site and no three-letter stamps were reported in the sample published. This would suggest that the Crawford pipes from the Parliament site were all produced earlier in his career, although this must be accepted with caution as makers could continue to use old moulds, especially for the production of poor-quality pipes.

David Banks

The group contains one pipe (no. 320) produced by David, a son of Thomas Banks, who appears to have continued his father's business. Pipes are known with the initial TB altered to that of DB (Martin 1987, 197, No. 70), although none were found in the present group. David Banks inherited property in Leith in 1698; and the burials of two of his children are recorded in 1705 and 1706. The form of the bowl fits this late 17th-century/early 18th-century date. A similar DB pipe was found in a 1698–1700 context at the Scottish Darien colony (Horton et al 1987, 244–5).

1.13.2 Imported and 19th-century pipes

Whilst the pipes are predominantly Edinburgh products, the group contains a number of Dutch imports. These include a bowl with a moulded rose (no. 329), a cheap export form that is the commonest type of Dutch pipe found in Scotland (Davey 1992, 280). There are also three basal fragments of higher-quality Dutch pipes (nos 332–4). One of these, a heel fragment with an EB basal stamp, is similar to that of Edward Bird, an English pipe-maker active in Amsterdam, *c* 1630–83 (Duco 1981, 399).

There are also some English-style pipes in the present group, all from the period *c* 1640–85 (nos 338–42 and 350). None have maker's marks. They differ from contemporary Scottish pipes in having bowls with spurs rather than heels.

There were extremely few fragments of 19th-century date. Two bowls are from TW pipes, spurred pipes with a TW facing the smoker (no. 345). This mark may have originated with the early 19th-century Edinburgh maker Thomas White, but was soon to be a design produced by almost every Scottish maker. The stem of a fluted pipe by Thomas White & Co of Edinburgh (no. 352) was found within Queensberry House, dating from after the death of Thomas White in 1847, when the business continued as a company. Another two pipes bear a hatched heart design, a reference to the 'heart of Ulster' (nos 343–4). The Irish connection is enforced on one of the pipes with an unusual motif of a cross on a shamrock, in relief on the base of the bowl (no. 343). This may be identified with the 'St Patrick' pipe produced by McDougall of Glasgow; an identical design appears in their illustrated catalogue of *c* 1850–88 (unpublished; copy in possession of P Hammond). This was evidently a favourite pipe, for its rim is heavily worn with use.

One remarkable survival, from a well, is a 19th-century porcelain pipe. Only slightly damaged, it depicts a young lady reading a book whilst resting on a plinth. This plinth, which supports a garlanded urn, is inscribed with the legend 'DenKmal der Jugend' (Monument of Youth). The pipe is German. A precise dating within the 19th century is problematic, as the genre of the picture is of the first half of the century (*c* 1820–40), while the deep blue background colour of the pipe suggests a later date (D Duco pers comm).

1.13.3 The pipes in relation to the site

The majority of the pipes were found in deposits associated either with garden cultivation or with the levelling prior to the construction of Haddington House. In general the date ranges of the pipes from many of the contexts fall within the last three decades of the 17th century. Very few pipes of a post-1700 date were found on the site.

Comparatively large numbers of pipes were recovered from the post-medieval garden soil, Contexts 211, 217 and 540. A number of contexts produced smaller numbers of pipes with a mid 17th-century date range. Context 1789, the fill of the sub-circular stone lining, had pipes dating 1630–50. The midden-like deposit, Context 1600, had fragments dating 1630–50. Those fragments associated with the construction of drain 601 (Context 617) can be dated to 1640–60.

Twenty bowls dating *c* 1640–80 were recovered from Context 211, a make-up layer inside Haddington House. Another four bowls were also recovered from a similar deposit, Context 222. Smaller quantities of pipes were recovered from contexts associated with the make-up of floors: of the canteen phase (Context 532) and the Quartermaster's store (Context 536), with date ranges of 1660–1710 and 1680–1710 respectively. Four bowls from the infill/make-up in Haddington's Entry (Context 222) date from 1640–80. The levelling layer for Hatton House contained 13 bowls with a date range of 1650–85. A pipe from the fill of wall 503 (Context 5940) dates from 1660–80. The packing (636) for terrace wall 629 contained a bowl of 1660–1700.

While most of the fragments of post-1800 date were unstratified or from overburden, a few were from stratified contexts. A single stem of probable 19th-century date was found in the foundation cut, Context 182, of the standing wall

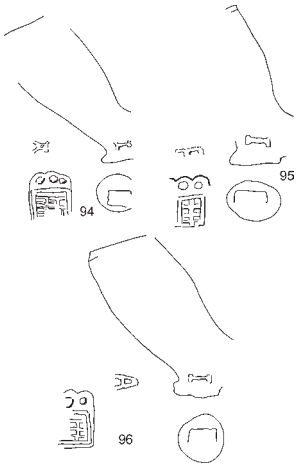


Fig. 1.35

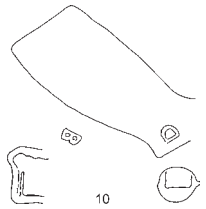


Fig. 1.37

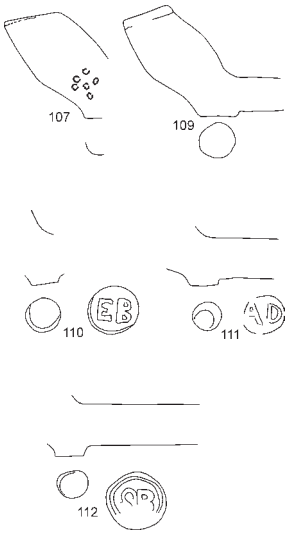


Fig. 1.39

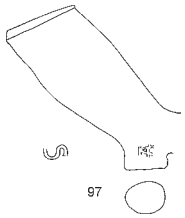


Fig. 1.36

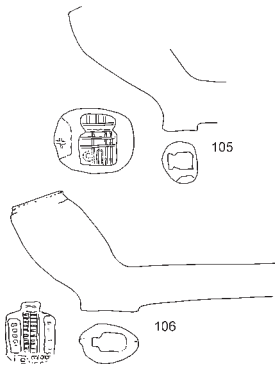


Fig. 1.38

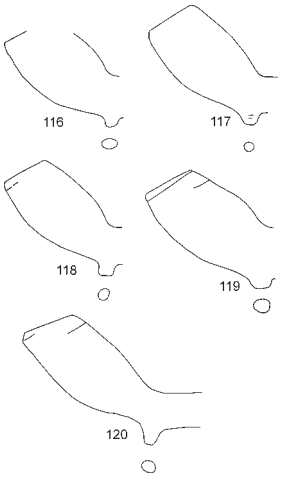


Fig. 1.40

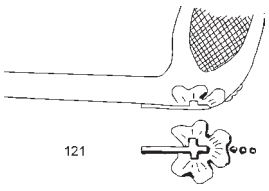


Fig. 1.41

Figs 1.35–1.41 Clay tobacco pipes (scale 1:1)

1111. A single fragment of 19th-century date was retrieved from the fill of a cess tank (1093). A stem by William White of Glasgow was found in the fill of pit 294. The early 19th-century porcelain pipe came from the fill of well 214.

1.14 ARTEFACTS FROM QUEENSBERRY HOUSE

A diverse artefact assemblage recovered during the excavation of three rooms in the basement of Queensberry House is discussed below. A selective catalogue of the most diagnostic artefacts is included, with separate catalogues for the finds and the pottery, as for the main site. All finds numbers are preceded by the abbreviation QH, to distinguish them from the finds excavated from the main site. Much of the material is of 19th-century date, although some earlier material is also present. Measurements are generally expressed to the nearest 1mm; where appropriate, they have been expressed to the nearest 0.1mm.

1.14.1 Pottery (fig. 1.42)

DEREK W HALL

The excavations within the basement of Queensberry House produced 235 sherds of pottery. All these sherds have been examined by eye and where possible assigned a recognised fabric name.

Scottish Post-Medieval Oxidised Redwares

This fabric represents a late medieval version of the earlier medieval redwares discussed below, often referred to as 'Throsk-type' Ware in the literature, this fabric was almost certainly being manufactured at other, as yet unidentified, production centres between the 15th and 18th centuries (Caldwell & Dean 1992). The 72 sherds from Queensberry House are from skillets, jugs, bowls, pirlie pigs and a crucible. The skillets were used as cooking vessels and are distinguished by their very distinctive folded handles, there are a minimum of 21 of these vessels in this assemblage.

Scottish Post-Medieval Reduced Greywares

This fabric can be regarded as a contemporary reduced version of the Redwares described above. It was first described and identified as such in the report on the excavations at Stirling Castle in 1980 (Haggarty 1980). The 17 vessels present in this assemblage are all green-glazed jugs.

Scottish Redwares

This fabric has been long identified as a Scottish medieval east coast tradition that utilises the Carse River clays (Hall 1998). There are only four sherds present in this assemblage, all from glazed jugs.

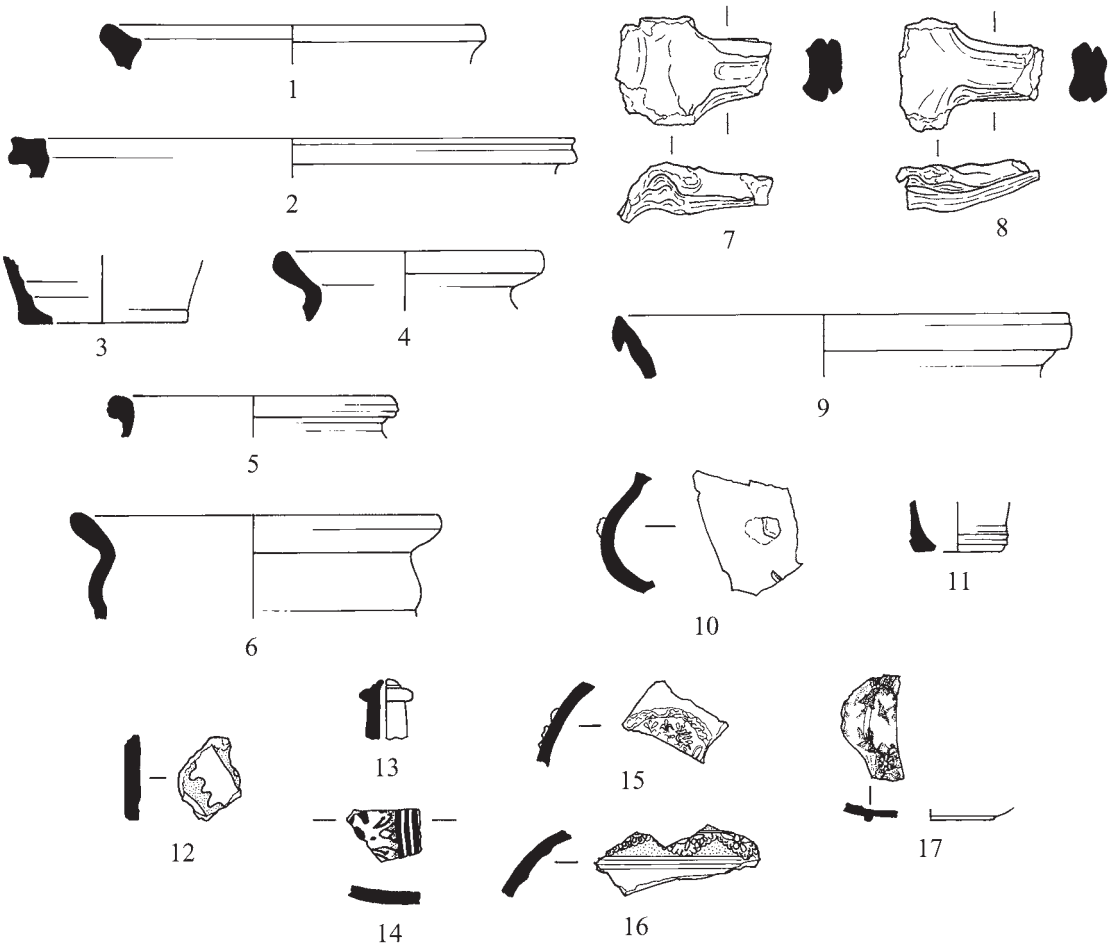


Fig. 1.42 Pottery (QH Pot nos 1–17) from Queensberry House (scale 1:1)

Scottish White Gritty Ware

Recent chemical sourcing and analysis of this fabric suggests that there may have been many kilns producing this pottery type across Scotland (Jones et al 2003). It has been found in Perth in association with 12th-century fabrics and appears to predate the Scottish East Coast Redware industry and may have ceased production by the 15th century (Hall 1996b, 127). It is most commonly highly fired to a white or grey colour and is quartz tempered. There are 51 sherds in the assemblage from Queensberry House, from 38 glazed jugs, ten jars probably used for cooking and two other vessel forms.

Rhenish Stonewares

There are nine sherds from vessels in this highly fired fabric. They are from vessels manufactured in Siegburg, Frechen and Westerwald and date to the 16th or 17th centuries (Hurst et al 1986, 214–21, Gaimster 1997, 251–3).

North European Earthenwares

This fabric type, first named by W J Lindsay in 1983, is thought to originate from as yet unidentified production centres in northern Europe during the 16th and 17th centuries (Lindsay 1983, 567–72). It is most commonly represented by handled tripod pipkins and the single sherd from Queensberry House is part of a tubular spout from such a vessel (QH Pot no. 13).

Tin-glazed Earthenwares

The largest group of this pottery comes from unphased Context 7111/5 and appears to represent vessels of 18th- or 19th-century date. There are three sherds from Period 4.1 that appear to be from vessels in Netherlands Maiolica dating to the 16th and 17th centuries (Hurst et al 1986, 117–26). There is a single sherd that appears to be from an open bowl or dish in this fabric from Context 7064, with an external lead glaze and an internal tin glaze with traces of blue and white floral decoration (QH Pot no. 14). The other two sherds are from Context 7011. These include a slightly everted rim with internal blue line decoration on a white background and a bodysherd with internal blue and brown geometric decoration.

Chinese Porcelain

The four sherds of this fabric are from a saucer and a teacup dating to the 19th century and come from layers associated with the military occupation of Queensberry House.

Brown-glazed Earthenwares

There are six sherds in this fabric, which is of 18th- or 19th-century date.

Slipwares

The three sherds of slipware are very similar to pieces from the main Holyrood excavation that are of uncertain provenance. This fabric is certainly of 17th- or 18th-century date and is either a Low Countries product or a local copy.

Catalogue of pottery from Queensberry House (fig. 1.42)

Scottish White Gritty Ware

QH 1) Rimsherd from unglazed jar. Context 7010; Period 4.1.
QH 2) Rimsherd from unglazed jar. Context 7018; Period 4.1.
QH 3) Basal angle from unglazed vessel. Context 7010; Period 4.1.
QH 4) Rimsherd from vessel with internal green glaze and external smoke-blackening. Context 403; Period 4.1.
QH 5) Rimsherd from jug with small patch of green glaze. Context 463; Period 4.1.

Scottish Post-Medieval Oxidised Redware

QH 6) Rimsherd from skillet, internally glazed green and externally smoke-blackened. Context 1319; Period 5.2.
QH 7) Folded skillet handle junction glazed green externally and internally. Context 435; Period 3.
QH 8) Folded skillet handle junction glazed green externally and internally. Context 7028; Period 4.1.
QH 9) Rimsherd from bowl glazed green-brown internally and externally. Context 7070; Period 4.1.
QH 10) Bodysherd from pirlie pig glazed green with traces of coin slot. Context 402; Period 4.1.
QH 11) Basal angle from drug jar glazed green-brown externally and green internally. Context 7009; Period 4.1.

Slipware

QH 12) Bodysherd from dish glazed brown and decorated with yellow-glazed white-slipped decoration. Context 463; Period 4.1.

North European Earthenware

QH 13) End of tubular spout from pipkin. Context 435; Period 3.

Tin-glazed Earthenware

QH 14) Bodysherd internally glazed with white, blue and brown pattern. Context 7064; Period 4.1.

Rhenish Stoneware

Frechen

QH 15) Bodysherd from jug glazed speckled brown with fragment of medallion. Context 7032; Period 4.1.

Westerwald

QH 16) Two joining bodysherds from vessel decorated with incised lines and triangles containing floral decoration. Vessel glazed with patches of cobalt blue on light grey background. Context 7044; Period 4.1.

Chinese Porcelain

QH 17) Basesherds from plate or saucer with traces of blue glaze landscape on internal surface. Context 1305; Period 5.2.

1.14.2 Iron objects

ADRIAN COX

Demolition and make-up deposits underlying the wooden floor in Room E (the kitchen area) contained several iron objects. In addition to those described below is a group of nail fragments and other miscellaneous fragments of iron. Of particular interest among this assemblage are a group of five brackets (including QH nos 1 and 2), a long-handled shovel (QH no. 3) and fragments of a blade (QH no. 4). The brackets have tapering shafts for driving into walls. There is some variation among the five examples, particularly in the form of the flange at the broader ends of the objects, which in some cases is perpendicular to the shaft (eg QH no. 1) and in other cases of curving, elliptical form (eg QH no. 2). These fittings may have been used to secure internal fixtures such as water pipes. The flat-bottomed shovel (QH no. 3) may have functioned as a dust-pan or hearth-pan, into which ashes or other debris could be swept. QH no. 4 represents fragments of a large, single-edged blade.

QH no. 5, from the fill of a culvert, could be part of a fish hook or a buckle or brooch pin, as it incorporates an acute angle near one end. Unfortunately, both ends are missing, precluding closer identification. Among the nails recovered, QH no. 6 is the most complete example, and has an unusually broad head, possibly indicating that it had a decorative function in addition to its utilitarian one, for example in a door.

Catalogue of iron objects from Queenberry House

QH 1) Bracket. Length 98mm; width 23mm; depth 47mm.
Bracket in the form of a rectangular cross-sectioned bar, tapering steadily towards a point, with a curving, elliptical flange at the broader end.
Context 7069; IADB 5501; Period 5.2.

QH 2) Bracket. Length 129mm; width 17mm; depth 71mm.
Bracket in the form of a rectangular cross-sectioned bar, tapering steady towards a point, with a tapering, perpendicular flange at the broader end.
Context 7069; IADB 5501; Period 5.2.

QH 3) Shovel. Length 298mm; max. width 193mm; max. depth 44mm.
Part of a shovel or scoop consisting of a broad pan with a flat base and approximately perpendicular sides, with a rectangular cross-sectioned handle, secured by two circular cross-sectioned rivets.
Context 7069; IADB 5499; Period 5.2.

QH 4) Blade. Length (total of surviving fragments) 265mm; max. width 49mm; thickness (disregarding corrosion products) 6mm.
Fragments, including two conjoining pieces, of a broad, single-edged blade. The blade back and edge are roughly parallel, both curving gently towards a rounded tip.
Context 7069; IADB 5594; Period 5.2.

1.14.3 The industrial waste from the basement of Queensberry House

EFFIE PHOTOS-JONES

Introduction and Methodology

Materials described as slag/industrial waste originating from contexts 7007, 7105, 7016 and 7099 within Rooms H, I and E, at Queensberry House were examined. Those relevant to the discussion here were from two features within Room E (where a brick floor surface and a culvert represent the post-medieval Queensberry House kitchens): the culvert 7096 and the brick feature 7097 and their associated waste fills 7105 and 7099 respectively. Of the two, 7099 was the richer in terms of quantity and diversity of materials, and therefore, attention was focused on this particular deposit as a means of elucidating the role of feature 7097. The results of the scientific analysis of the above accumulations suggest that debris from both domestic as well as metal-working activity was collected within the drains and culverts.

Archaeological/historic industrial waste, whether of domestic or industrial origin, is difficult to characterise purely on visual grounds. Instead, characterisation relies heavily on a combination of optical microscope examination and chemical analysis with the scanning electron microscope with energy dispersive analyser (SEM-EDAX) and mineralogical analysis with X-Ray Diffraction (XRD). X-Ray Diffraction provides mineralogical identification of major and minor crystalline phases. The samples are ground to a fine powder and are radiated with a CuK source. However, for industrial waste, with its multitude of glassy, semi-crystalline and micro-crystalline phases, X-Ray Diffraction can at times provide only limited information.

Chemical analysis with the SEM-EDAX is based on both area (entire surface of the specimen) and spot (single phase) analysis to determine the composition of matrix and individual phases or inclusions respectively. Of particular relevance to the present discussion is the spot analysis of metallic inclusions within diverse materials like coal and vitrified fuel ash slag (VFA). For SEM-EDAX analysis, samples were mounted on metallographic resin, ground with a series of silicon carbide papers and polished with a 6μm and a 3μm diamond paste. They were subsequently carbon-coated for examination and analysis.

Analytical results

The purpose of the present discussion is not only to identify and characterise the materials within the said waste accumulations, but also to provide information on the contexts from which they derive. Table 1.13 gives a list of the materials examined, their contexts and the results of the analyses either by SEM-EDAX or XRD. In general, the samples divide between those which were natural (fragments of iron pan, basaltic rock, coal, shell) and those which were man-made, either building materials or waste from metal-working oper-

Table 1.13 Queensberry House: list of samples and results of SEM-EDAX and XRD analyses

SASAA no.	SEM-EDAX results	XRD results
PS/QH67 7007/ Room I		Fragments of heated natural ferruginous material consisting of magnetite, hematite and quartz.
PS/QH64 7105/5551 Room E	Small fragments of bone ash with silver and silver sulphide inclusions; most likely fragments of a cupel.	
PS/QH65 7105/5551 Room E	Fragments of basaltic rock including feldspars, olivines and pyroxenes as well as iron-titantium oxides (ulvospinel and ilmenite).	
PS/QH60 7016/5387 Room H	Fragment of VFA heavily coated with coal powder with nickel-iron-copper sulphide inclusions.	
PS/QH62 7099/5550 Room E	PS62A: Fragments of natural ferruginous material, a platy iron-pan type material, recovered in association with fine fragments of basaltic rock.	PS62B: forge hammer scale consisting of hematite, magnetite as major constituents and fayalite, an iron silicate, as a minor constituent.
PS/QH66.S1 7099/5550 Room E		Fragments of shell, consisting of calcite (major peak) and quartz (minor).
PS/QH66.S2 7099/5550 Room E	Fragments of VFA	
PS/QH66.S3 7099/5550 Room E	Fragments of mortar, the binder in the brick feature 7097.	
PS/QH68 7099/5550 Room E	Fragments of coal with small inclusions of a copper-tin alloy reflecting bronze-melting practices	

ations. The results from other rooms within Queensberry House are included.

Naturally occurring magnetic materials, whether basaltic rock (PS/QH65: Room E, 7105/5551) or ferruginous materials (PS/QH67: Room I, 7007) were found in both Rooms E and I. Hammer scale was found in the accumulation of the brick feature 7097 (PS/QH62B, Room E 7099/5550). In the same feature were also found shell, natural ferruginous materials, fragments of VFA, mortar and coal. One of the coal samples analysed contained metallic inclusions of a copper-tin alloy, suggesting that some bronze melting was taking place on site. Within 7099 the predominant concentration of material was coal, with mortar from the construction of the forge (see below) and VFA coming second in approximately similar amounts. The paragraphs below concentrate on the discussion of two specific materials: VFA and fragments of a cupellation crucible.

PS/QH60, Room H, 7016/5387

This was a fragment of vitrified fuel ash slag, a glassy, porous and light density greenish-white material, heavily coated with charcoal powder. Analysis showed its composition to be a calcium-iron alumino-silicate with traces of phosphorus. The presence of small metallic inclusions suggests that this fragment derived from non-ferrous metal-working.

PS/QH64, Room H, 7015/5551

SEM-EDAX examination and analysis revealed a material the matrix of which was found to consist of bone ash with metallic inclusions which were found to be silver/silver sulphide. The matrix, which appears cracked, presumably the result of shrinkage during heating, is bone ash mixed with non-crystalline iron oxides. Small fragments of quartz, feldspar, bone, calcite, basaltic rock and coal were found scattered as inclusions within the matrix, some added intentionally.

It is suggested that PS/QH64 is a fragment from a bone ash crucible/cupel used in refining/assaying or simply melting of silver. Cupelation, or the separation of silver from base metals with the use of lead in highly absorbent bone ash cupels, is a technique which has been used since the medieval period. Since no lead or other base metals were detected within this fragment, it is suggested that pure silver may have simply been melted in this bone ash crucible.

The above analytical results offer limited yet tantalising evidence for non-ferrous/precious metals melting activities in Room E of Queensberry House in the post-medieval period, and even some forging. Indeed, in reference to brick feature 7097, we would suggest that it might have been the foundations of a rectangular all-purpose furnace. A metal grate on which a crucible would have rested would be placed on the base of a brick structure. This structure could have doubled as a forge and would have been operated with bellows. The material accumulating below the grate would consist of the type of waste encountered within accumulation 7099. The same materials may belatedly bear testimony to 'dodgy practices' which led to Lord Hatton's expulsion from the Mint whilst he was the Treasurer Depute of Scotland and owner of the house (HAPT, Chapter 10.4). Alternatively, the 'kitchen' may have been his bona fide workshop.

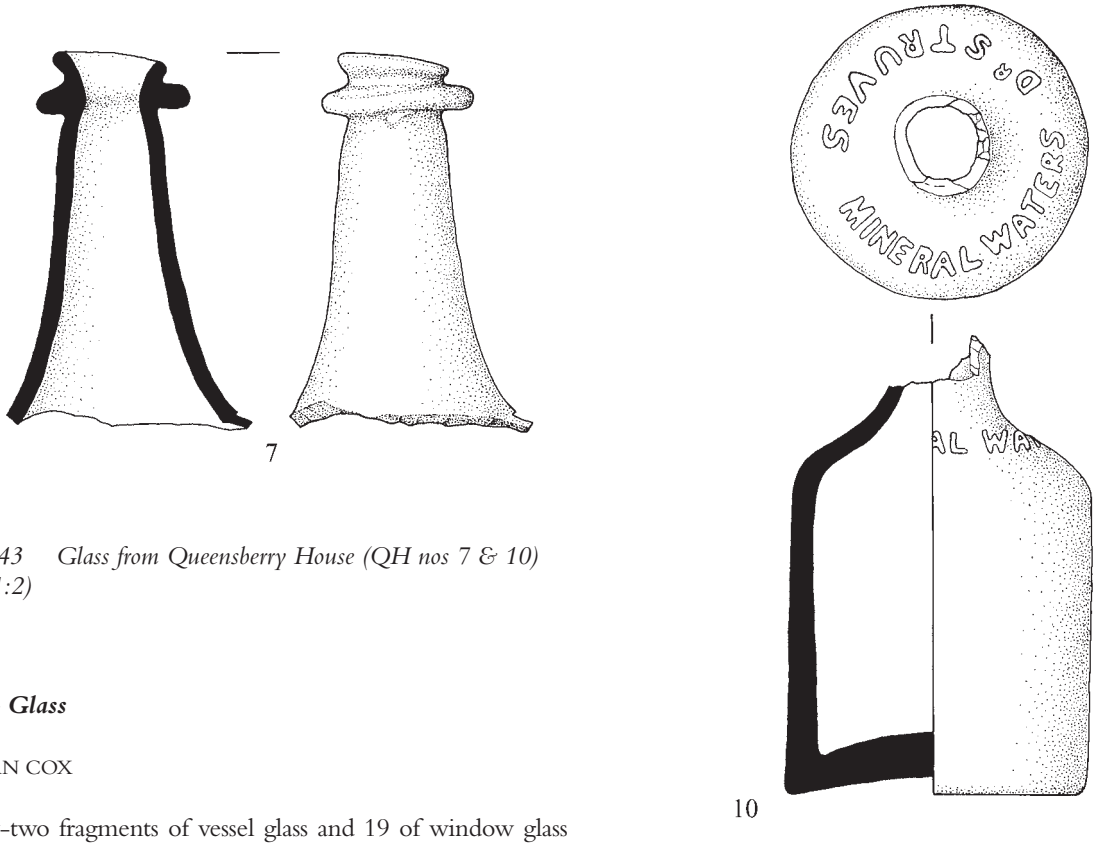


Fig. 1.43 Glass from Queensberry House (QH nos 7 & 10) (scale 1:2)

1.14.4 Glass

ADRIAN COX

Thirty-two fragments of vessel glass and 19 of window glass were recovered, along with a single indeterminate fragment. Among the vessel glass assemblage is a variety of bottles, and a single fragment from a drinking glass. The window glass from Room H includes small fragments of possibly 16th- to 17th-century date. The most diagnostic pieces are described below.

VESSEL GLASS

Probably the earliest of the vessel glass fragments is QH no. 7, a neck fragment from a wine bottle with a broad, disc-like string rim, characteristic of the period *c* 1680–1700 (fig. 1.43). The top of the neck has a distinctive flare, resulting in a waisted appearance just above the string rim. This feature helped to secure the string-rim to the bottle neck and made pouring of the contents easier. This piece was recovered from the demolition deposits in Room E, which contain material of predominantly 19th-century date (including QH nos 9–12, below), although 17th-century clay pipe fragments were also present.

A bottle neck with a rounded lip and a deep string rim (QH no. 8) probably dates from the early years of the 19th century (*c* 1800–15), and includes a form of string rim characteristic of the period just before the widespread adoption of more mechanical, cone-shaped rims. By the 1820s, many glass houses had introduced a three-piece mould system of manufacturing bottles, achieving standardisation of capacity and quality.

QH no. 9 represents a cylindrical neck fragment from a slender bottle with an applied lip. Part of a cork stopper survives in the top of the neck. This bottle was probably used to contain sauce or another food ingredient. Also among the finds from Room E is the body of a mineral water bottle embossed with a legend indicating a connection with Dr Struve's mineral waters business (fig. 1.43). Dr Struve, who applied for a patent for his mineral water products in 1823, developed manufacturing units in Europe for the production of carbonated water and artificial mineral water. Messrs Struve and Co. also manufactured mineral waters in Britain. The 'German spa' and pump room, established in 1825 by R F A Struve, still survives in Brighton, and provided competition for British-owned mineral water manufacturers. Bottles like QH no. 10 are typical of bottles used by companies like Messrs Struve and Co. and Schweppes during the 19th century and into the early 20th for mineral waters, and are sometimes referred to as 'dumpy seltzers'.

QH no. 11 is from a moulded bottle of octagonal cross-section, also of 19th-century date. A great variety of products, including cure-alls, medicines, chemicals, perfumes and products used in cooking, were sold in small, straight-sided bottles such as this. Dating from around the mid 19th century, QH no. 12 represents the lower part of the stem and the foot of a wine glass of a heavy, relatively plain style.

Catalogue of glass from Queensberry House

QH 7) Bottle neck. Surviving depth 97mm; external diameter at rim 30mm; internal diameter at rim 22mm.
Neck of a blown bottle, in green glass, with a broad, discoid string rim set 6–8mm below the neck top. The neck top itself has a distinct flare. The neck is moderately short and tapers smoothly, and is broken where it begins to widen towards the shoulder. Some surface deterioration is evident and deposits of mortar adhere to the object both internally and externally. (Fig. 1.43.)
Context 7069; IADB 5508; Period 5.2.

QH 8) Bottle neck. Surviving depth 108mm; external diameter at rim 33mm; internal diameter at rim 22mm.
Neck and part of the shoulder of a blown bottle, in green glass, with a rounded lip and a deep string rim of equal diameter below it. Some surface deterioration is evident.
Context 10065; IADB 5448; Unstratified.

QH 9) Bottle neck. Surviving depth 66mm; external diameter at rim 23mm; internal diameter at rim 16mm.
Cylindrical neck with an applied lip, in almost clear glass with a green tint. The lowest surviving part of the neck has a ribbed surface. Part of a cork stopper survives in the top of the neck.
Context 7069; IADB 5508; Period 5.2.

QH 10) Bottle base. Surviving depth 106mm; diameter at base 76mm.
Base and a small part of the neck of a moulded bottle with a circular cross-sectioned body and a flat base. The body narrows sharply at the shoulder, which is embossed with the legend 'DR STRUVES MINERAL WATERS'. The bottle is broken at the junction of neck and shoulder. (Fig. 1.43.)
Context 7069; IADB 5507; Period 5.2.

QH 11) Bottle base. Surviving depth 83mm; max. width 59mm.
Base from an eight-sided, moulded bottle, in almost clear glass with a greenish tint. The surviving part of the body is straight-sided.
Context 7069; IADB 5508; Period 5.2.

QH 12) Wine glass stem. Surviving depth 41mm; diameter of base *c* 57mm.
Fragment representing the lower part of the stem, and part of the foot, of a wine glass in clear, transparent glass. The incomplete foot is of shallow conical form, and the surviving part of the stem incorporates a flange.
Context 7069; IADB 5508; Period 5.2.

Window glass

The recovered window glass fragments are mainly very small. A few fragments appear to be from small, diamond-shaped or 'quarry'-shaped pieces, which characterise domestic glazing in the 16th and 17th centuries. Triangular pieces of glass, fragments of which are also represented here, were used at the edges of window frames. A lattice of lead alloy cames was used to join pieces of glass together within a window, and four pieces of glass exhibit the characteristic staining and differential weathering, along their edges, that results from insertion into cames. One of these pieces came from Context 7030, in Room H; the remaining three were unstratified.

A fragment from Context 7010, also in Room H, exhibits grozed edges. Panes were cut to size by scoring the surface and then breaking the glass, the broken edges sometimes being finished by paring with grozing tongs, producing a series of tiny conchoidal fractures. In addition to these possibly 16th- or 17th-century pieces, a number of fragments of more recent window glass were recovered, mainly from unstratified contexts.

1.14.5 Leather

ADRIAN COX

An assemblage of leather from shoes was recovered from the demolition deposits below the wooden floor in Room E (the kitchen). The assemblage includes two near-complete soles, penetrated by small iron tacks, and several fragments of similar soles. There are also several pieces of uppers, some including rows of circular, copper-alloy eyelets for lacing. These are clearly parts of boots, and are very probably associated with activities during the period when Queensberry House functioned as a House of Refuge (1834–1949). Along with numerous small scraps, there are offcuts, and at least some of the assemblage appears to represent the repairing of boots. As suggested by Dawson (Part 1.14.8), this may have been among the tasks performed by inmates of the House.

1.14.6 Stone and ceramic building material

ADRIAN COX

A fragment of sandstone moulding was recovered from an unstratified context. This may have come from decorative edging, for example around a doorway or a window. Part of a large, rectangular slate, presumably a roof slate, was recovered from a rubble spread in Room I (Context 7070).

Ten fragments of pantiles were recovered from a range of contexts in Rooms E and I. No concentrations of this material are evident. These tiles are 15–16mm thick, generally sanded on their convex surfaces, and have a streaky, red to orange fabric with occasional voids. Most contain few inclusions, but a single fragment from Context 7009 in Room I contains numerous inclusions. Pantiles were also excavated from the area around Haddington House and near the modern Canongate frontage.

Two fragments from hand-made floor tiles (QH nos 13 and 14, fig. 1.44) were also recovered. These may be of 17th- or 18th-century date. Both came from Room I, and are of a similar fabric and form, although QH no. 14 is from a thicker and slightly narrower tile than that represented by QH no. 13. The latter fragment bears traces of burning or sooting along one edge.

A single, complete brick (QH no. 15) was retained for examination. This example came from a remnant of a brick floor in Period 4.2, and it appears that the bricks were reused from an earlier surface. This brick was handmade, and probably pallet-moulded. This technique involves the use of a stock board, nailed to the moulder's bench, and onto this is set the mould in which the clay is shaped. The mould itself was generally dusted with sand, and sand was also used when forming a quantity of clay into a clot or warp, which was thrown hard into the mould in order to completely fill it. The use of sand in pallet-moulding produces sand-faced bricks, as in QH no. 15. The unsanded upper surface of this example exhibits smoothing marks. The size of this brick closely matches the dimensions stipulated in a charter of 1571 (9 × 4½ × 2¼in). Given the manufacturing technique, size and context of this brick, it is likely to date from the later part of the 17th century.

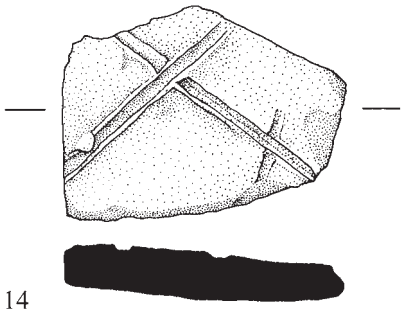


Fig. 1.44 Tile from Queensberry House (scale 1:2)

QH 13) Tile. Max. surviving length 83mm; width 64mm; thickness 28mm.
Part of a square or rectangular tile in a coarse, slightly micaceous, red to orange fabric with frequent rounded and angular inclusions. The lower face of the tile is sanded and uneven. The upper face bears finger impressions. Parts of two edges also survive, and one of these bears traces of burning or sooting. One broken edge has a fragment of corroded iron adhering to it.
Context 7051; IADB 5482; Period 4.1.

QH 14) Tile. Max. surviving length 78mm; width 80mm; thickness 31mm.
Part of a square or rectangular tile in a coarse, slightly micaceous, red to orange fabric (grey internally, where reduced) with frequent rounded and angular inclusions. The lower face of the tile is sanded. The upper face bears finger impressions. Parts of two edges also survive. (Fig. 1.44.)
Context 7028; IADB 5433; Period 4.1.

QH 15) Brick. Length 230mm; width 112mm; thickness 64mm.
Complete brick in a hard, red to orange fabric with a variety of fine inclusions and occasional voids. All but one of the faces are sanded.
Context 7079; IADB 5620; Period 4.2.

1.14.7 Clay tobacco pipes

DENNIS GALLAGHER

This report considers 180 pipe fragments excavated from 24 different contexts.

This assemblage consists predominantly of Edinburgh pipes dating from 1630 to 1660. Within this date bracket there are two distinct groups of Scottish pipes. One consists of those with biconical forms which may be dated to *c* 1630–50. Most are unmarked, but it includes one of the earliest recorded basal stamps from this pipemaking centre, a castle-type stamp. Variations on this design of basal stamp continued to be used by almost all Edinburgh pipe-makers throughout the 17th and early 18th centuries. Another, larger, bowl bears a poor impression of what appears to be the same stamp. Unlike later Edinburgh pipes, the pipes in this group have no initials on the side of the base identifying the maker. It is very possible that the majority are products of William Banks, who held a monopoly on Scottish pipe-making (Gallagher 1987b, 6).

The other group of Scottish pipes has a taller, more barrel-shaped form. It includes late pipes of William Banks, who died in 1659, and one pipe of William Young, who is first recorded as a maker in 1653 and died in 1670.

Two Dutch-style bowls have been identified, both cheap export forms that are variations on Duco type 1 (Duco 1987, 26). One bowl is decorated with a debased form of the moulded rose, a form that has been excavated on a wide-spread number of Scottish sites (Davey 1992, 280). The other is a slightly later form, datable to *c* 1640–60.

A burnished stem fragment from Context 7051 has a secondary mouthpiece formed after a break by whittling the broken end.

The assemblage produced very few pipes of 19th-century date or later. One stem is a product of Thomas White & Co, who was the major manufacturer in Edinburgh, with a factory in the Canongate from 1827 to 1867 (Gallagher 1987d, 26). The spurred TW pipe is an example of a style produced by all the major Scottish pipe-makers. Although the TW on the pipe originally may have identified a maker, it soon became identified with a particular form of spurred pipe that was very popular among Scottish smokers.

1.14.8 House of Refuge finds

JO DAWSON

Introduction

Queensberry House was a House of Refuge from 1834 until 1949 (Hume & Boyd 1984). During excavations carried out in the basement of Queensberry House in April 2001, a quantity of finds relating to the House of Refuge period was recovered. The vast majority of these finds came from the kitchen (Room E) in rubble (7069) between the most recent floor and the flagged floor below it. The kitchen had a sunken floor and the raising of the floor brought it level with the other rooms in the basement of Queensberry House. The assemblage of finds from Context 7069 (Period 5) will be discussed here.

The House of Refuge, which was a charity, operated alongside the Poorhouses of Edinburgh, which were run by the parish councils or parochial boards. It often provided accommodation for the able-bodied poor, who were not entitled to relief under the Poor Law (ibid, 28–9). Police sent people who had been caught begging to the House as a more effective alternative to putting them in the cells.

The House had a small number of staff, and the women inmates did all the housework (ibid, 11). All men who had a trade were provided with materials to enable them to work in the House (ibid). Girls were provided with positions in households and boys were apprenticed where possible (ibid, 19). On entering the House, cheap, clean clothes were given to the new inmates, in exchange for their own, which were mended where possible and returned to them when they left (ibid, 11). There was no uniform, but the routine was strict, with bells dividing the day into different tasks, and religious education featuring prominently (ibid, 18, 26). Food was simple and monoto-

nous – porridge with weak beer morning and evening, with broth or soup for dinner.

Methods and biases

Excavation conditions biased the finds recovery in favour of larger objects, and ones of a contrasting colour to the rubble, which was grey-black. Since larger objects break into larger pieces, utility ware is highly represented in terms of numbers of sherds, in comparison to teacups. There are also biases in the objects which end up being broken and therefore in the assemblage. For example, teacups are more likely to break than saucers, given the greater amount of handling they receive and hot and cold liquids causing thermal shock to the fabric (Miller 1991).

The pottery

Many of the types and numbers of finds are typical of an average domestic assemblage of the time. The patterns present are very common – Willow, Broseley and Fibre were manufactured by most of the major Scottish potteries (Kelly 1999). Verona was the stock pattern for the Links Pottery, Kirkcaldy, similarly Bosphorus was Bo'ness Pottery's stock pattern (ibid, 23, 142). As expected, numbers of teacups are higher than numbers of saucers. Breakfast ware is highest represented, followed by dinnerware, utility ware and finally bedroom ware, in terms of minimum number of individuals. The high number of spongeware porringers indicates the low economic level of the site. The number of teapots represented is unusually high, being more than one for every teacup, and no explanation of this can be offered at present. Plain white earthenware vessels are not as highly represented as might have been expected.

The pottery was glued together where conjoining sherds were identified once it had been washed and dried. It was very noticeable that many half and complete vessels were present, although smaller sherds had often not been recovered due to the factors mentioned above. The dating of the transfer patterns (Willow where marked, Bosphorus and Verona), the clay pipe stems (Thomas White & Co., Edinburgh), the presence of the spongeware and the Struves Mineral Waters bottle provide a date range of between 1847 and 1859. None of the finds fall obviously outwith this date range. This dates the finds to well within the early period of the House of Refuge. Crockery, however, is not mentioned in any of the abstracts of accounts which appear in the surviving annual reports of the House of Refuge (House of Refuge 1835, 10; 1841, I 30–31, II 19–21). It may well be that most or all of the crockery was acquired by donations from members of the public and was second-hand. This would push the dating of the use of crockery in the House of Refuge to a slightly later period, possibly the 1860s.

The context in which the finds were discovered must not be ignored. It is clear that this only accounts for a small amount of refuse produced by the House of Refuge, and there must have been a midden in the grounds where the majority of the rubbish was deposited. An alternative is that it was included in the fulzie (dung and street sweepings) sold by the House (ibid). It is not clear whether residents were collecting the fulzie from the streets of Edinburgh and then selling it, or whether it consisted of refuse from the House itself. In any case, the finds present are not likely to be representative of the full range of refuse produced by the House, and this makes their interpretation less straightforward than if they had come from the place where refuse was normally dumped.

Social context

In comparison to poorhouses and other institutions of the time, this crockery stands out as being very different. Craiglockhart Poorhouse used crockery marked Edinburgh City Poorhouse for a number of years from its establishment in 1870 (Dawson 2000, 71–5). At the Royal Edinburgh Asylum (REA) during the same period as the House of Refuge finds (1840s–60s), rich patients used blue transfer ware such as Willow and Broseley, whereas paupers were given white crockery. Initially this crockery had 'REA 3rd MG' on it and later only 'REA' and a slightly larger selection of vessels which included shallow soup plates (Dawson 1999, 18; Dawson forthcoming). At the House of Refuge there is no sign of purpose-made, institutional crockery. This may be partly due to economy. There was no uniform for the inmates and old clothes were sometimes donated by members of the public (Hume & Boyd 1984, 16), whereas in Craiglockhart Poorhouse there was a strict uniform. However, the lack of institutional crockery surely relates to the attitude of not stigmatising the inmates:

> Whatever may have been the crimes or punishment of the inmates before their admission, no one was allowed to revive these 'either by opprobrious names or remarks'. (Hume & Boyd 1984, 14)

The House of Refuge achieved its aims best if it rehabilitated the inmates and enabled them to find work outside. The use of crockery typical to average domestic dwellings of the time, including a larger range of vessel types than in the poorest dwellings, surely aided this.

Diet

The evidence for the diet at the House of Refuge is scarce. In the abstracts of accounts from the three surviving annual reports, foodstuffs purchased throughout the year are listed: bread, oatmeal, barley, pease (*sic*), butcher meat, milk, small beer (weak beer), potatoes, vegetables and salt (House of Refuge 1835, 10; 1841, I: 30–31, II 19–21). There was no significant change in the foodstuffs being purchased in the three years recorded. As stated above, elsewhere it is claimed that the food was simple and monotonous – porridge with weak beer morning and evening, with broth or soup for dinner. This must have been in strange contrast to the range of crockery in use, which would be expected to reflect a far more varied diet. As noted above, a disproportionately large number of teapots was recovered. Tea is not mentioned in the basic diet or indeed in the foodstuffs purchased, but it is quoted as one of the payments in kind or 'little indulgences' given to the residents in exchange for work done, along with sugar (Hume & Boyd 1984, 11).

Leather-working

The utility wear recovered comes in two body shapes. Shape A is similar to a milk-skimming dish but is deeper and not as

wide – a general, flat-bottomed basin. Shape B is cauldron-shaped with unusually low handles below its mid point. It is possible, given the presence of a significant quantity of shoe-repair debris, that these vessels were used for soaking leather.

The pieces of leather recovered, as noted previously, would seem to be shoe-repair debris. Both sole and upper fragments are represented, but almost exclusively they are single pieces of leather, as though worn parts of shoes have been removed and discarded before being replaced. This would have been carried out by a male inmate of the House of Refuge. Men who had a trade were supplied with materials at the cost of the House of Refuge so that they could work while they stayed there (ibid). A small profit was normally made from the sale of the goods manufactured in the House (House of Refuge 1835, 10; 1841, I 30–31, II 19–21).

Glass bottles

Some glass bottle sherds were recovered, including sherds from at least two wine bottles. The base of a wine glass was also found. There is one bottle neck which probably was part of a sauce bottle, and one almost complete bottle of Dr Struves Mineral Waters. Due to the large number of alcoholics residing in the House of Refuge, 'spirituous liquors, porter, ale or strong drinks' were not allowed (Hume & Boyd 1984, 19). Whether wine was permitted is not clear, but the presence of the bottles and glass merely adds to the somewhat conflicting evidence of the documentary sources and the archaeological evidence.