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around the town**

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The excavation of a medieval burgh ditch at East Market Street, Edinburgh: around the town

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with contributions by
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1. ABSTRACT

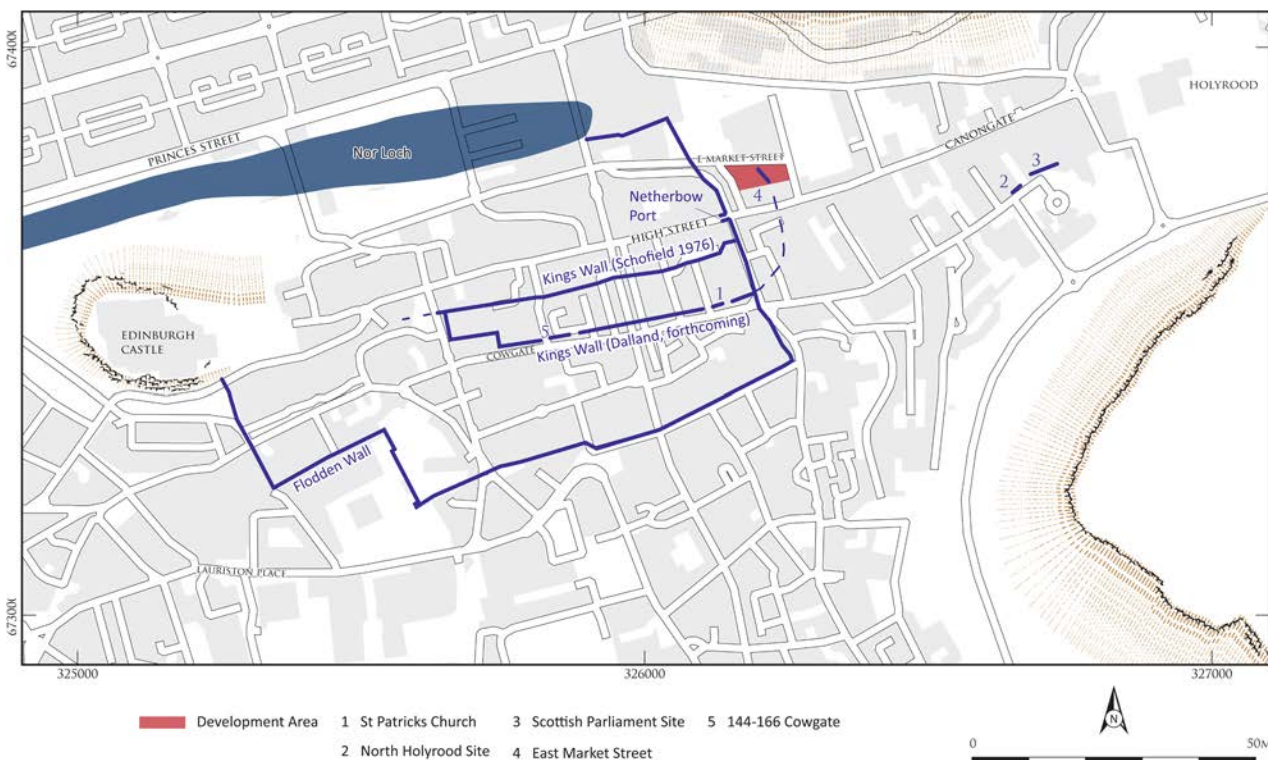
In 2015 excavation works undertaken in preparation for a new hotel development at East Market Street, Edinburgh, encountered the remains of a substantial ditch feature likely relating to previously excavated ditches in the medieval burghs of Edinburgh and Canongate. A substantial stratified artefact assemblage including both animal bone and ceramics was recovered and the waterlogged deposits in the base of the ditch also offered the opportunity for macroplant analysis. These waterlogged deposits afforded the preservation of artefacts including a textile garment, the first of its kind in the British Isles, and leather shoe soles boasting slender waists and turned out, pointed toes. These finds were both attributed to the 14th to 15th centuries, contributing to a vivid picture of the inhabitants of Edinburgh and Canongate in the medieval period. Analysis of both the artefact and ecofact assemblage revealed two phases of use, from the construction of the ditch in the late 12th–13th century to its eventual disuse in the latter half of the 15th century.

2. INTRODUCTION

This report presents the results of archaeological works commissioned by Gleeds Management Services in preparation for a new hotel development at East Market Street, Edinburgh, centred on the Canongate Venture building (Illus 1). The site is bordered to the north by East Market Street, to the west by Cranston Street, to the south by the rear gardens of properties along the High Street, and

to the east by a former school (NGR NT 26242 73758). The development area contained a vehicle maintenance depot built in the 20th century, incorporating elements of the earlier 19th-century buildings preceding it, and included a small area located directly to the east, which was occupied by a carpark.

The area covered by the watching brief measured only 30m × 14m but a substantial rock-cut feature was encountered in the west of the development



Illus 1 Map of Edinburgh showing the various defensive boundaries and excavation sites mentioned in the text

area adjacent to the Canongate Venture building, running in a generally north–south direction. Although only just over half of its profile was accessible, the rest having been truncated by the construction of a modern retaining wall along its western edge, it is interpreted here as a ditch rather than a quarry. Sharp tip lines were visible in the sections, as was a recut (Illus 3 and 4), and the feature does not cut into bedrock until around 3m in depth, all indicative of a ditch rather than a quarry.

The ditch was at least 5m deep and possibly up to 13m wide at the modern surface. The ditch was investigated via two slots cut across it. The first was hand dug so as to recover the maximum amount of ecofactual and artefactual evidence but, because of the large scale of the ditch, the second slot was excavated in spits using a mini digger and then hand finished and cleaned.

The development site lies in an area widely accepted to have been part of the former burgh of Canongate which, separate from Edinburgh, grew along the ridge between Holyrood and the Netherbow Port at the easternmost end of Edinburgh High Street (Simpson et al 1981: 48). Previous excavations in the areas of Edinburgh and Canongate have produced evidence of large ditches around the perimeters of both burghs (Illus 1), contributing to the idea that both burghs were defended at some point by one or more burgh ditches (Schofield 1976; HAPT 2008; Jones 2011; Gooder 2013). However, the scale of the ditch presented here is so far unparalleled in the archaeological record of the area and thus raises questions about its function, antiquity and relation, if any, to the other excavated ditches in historic burghs of Edinburgh and Canongate.

3. ARCHAEOLOGICAL BACKGROUND

3.1 Medieval burghs: features

The creation of a number of burghs in Scotland by David I was a political and financial policy aimed at furthering the development of the economy by encouraging craftsmen and merchants into towns, thus creating centres for trade (MacQueen & Windram 1988: 208; Ewan 1990: 1; Coleman 2004: 283, 284; Dennison & Lynch 2005: 24; Tait 2010: 130). As many Scottish burghs were set up

under this policy, they inherently have similarities that we now view as characteristic of the medieval burgh. Arguably the most notable characteristic of the burgh is its layout, involving the main street and backland ‘burgage plots’: long, thin strips of land stretching back from a small frontage on the main street (Tait 2010: 130). However, there are also other notable features of medieval burghs, including the ports, kirk, tron, tollbooth and market cross (Coleman 2004: 281). These features are discussed frequently in studies of burghs (Simpson et al 1981; Coleman 2004; Tait 2010), and in many cases at least one or more of these features are still visible in the fabric of the surviving towns and cities today (Edinburgh, Linlithgow, Canongate, Glasgow, etc). Burgh boundaries are also discussed in reasonable depth, with many sources agreeing that they were an important feature in the medieval burgh, defining the limit of burgh privileges and jurisdiction, and providing the first line of defence for the spread of disease and against hostile attacks (Coleman 2004: 292). In stark contrast to the documented similarities, relatively few Scottish burghs are recorded as having defences until the 14th–15th centuries, although it seems logical to conclude that earlier defences may have preceded these. Many agree that it would have been the extent of the burgage plots, or backlands that would have acted as the outer boundaries in the form of ‘head dykes’, which would have likely consisted of either a fence, bank or ditch (ibid: 292; Hall & Kenward 1998; Jones 2011: 4).

3.2 The medieval boundaries and defences of Edinburgh and Canongate

Edinburgh was already an established centre prior to the medieval period (Dennison & Lynch 2005: 22–3; HAPT 2008: 13), with the earliest documented defences widely accepted to have formed the extent of the burgh, and therefore its boundaries. Edinburgh was established as a royal burgh around 1125 and there must have been some kind of defensive perimeter around the burgh, although there are no documentary references, nor any physical evidence for this perimeter. It is assumed that this early boundary may have been marked out by a ditch or palisade (Schofield 1976: 164), as at Perth (Yeoman 1995: 64), Roxburgh

(Wessex Archaeology 2004: 12) and Aberdeen (Murray 1982: 247). Documentary references to gates in both the east and west also suggest that Edinburgh may have had a defensible enclosure by the 12th century (Jones 2011: 4). Indeed, one early model of the development of Edinburgh presented by Duncan (1975) postulates that the eastern boundary for the burgh of Edinburgh, the Netherbow Port, was already in existence by the mid-12th century, albeit positioned further west (Duncan 1975: 466); however, little evidence has been found to support this. The Netherbow Port's location is an important issue, as it has been widely accepted as medieval Edinburgh's boundary with the newly developed burgh of Canongate.

The earliest reference to a defensive boundary around Edinburgh is to the King's Wall in 1427 (Illus 1) (Miller 1887: 252–3; Simpson et al 1981: 39). The King's Wall was formed by joining the existing property boundary walls to create a more formal defensive perimeter (Schofield 1976: 181). This effort may have been perceived as inefficient by James II, who issued a charter in 1450 granting the inhabitants of Edinburgh 'full licence and leave to fosse, bulwark, wall, tower, turret, and other ways to strengthen our said Burgh in what manner of ways or degree that be seen most speedful to them' (Marwick 1871: 70–1). In 1472 a further charter was issued which ordered the demolition of houses built outside or on the King's Wall as they were hampering efforts to strengthen the town's defences (ibid). This may have been the last move to strengthen this particular defensive boundary, as there are no later charters referring to it. It was superseded by Edinburgh's most notable boundary, the Flodden Wall, built following the Scottish defeat at Flodden in 1513 (Illus 1) (Lawson & Reed 2003: 13).

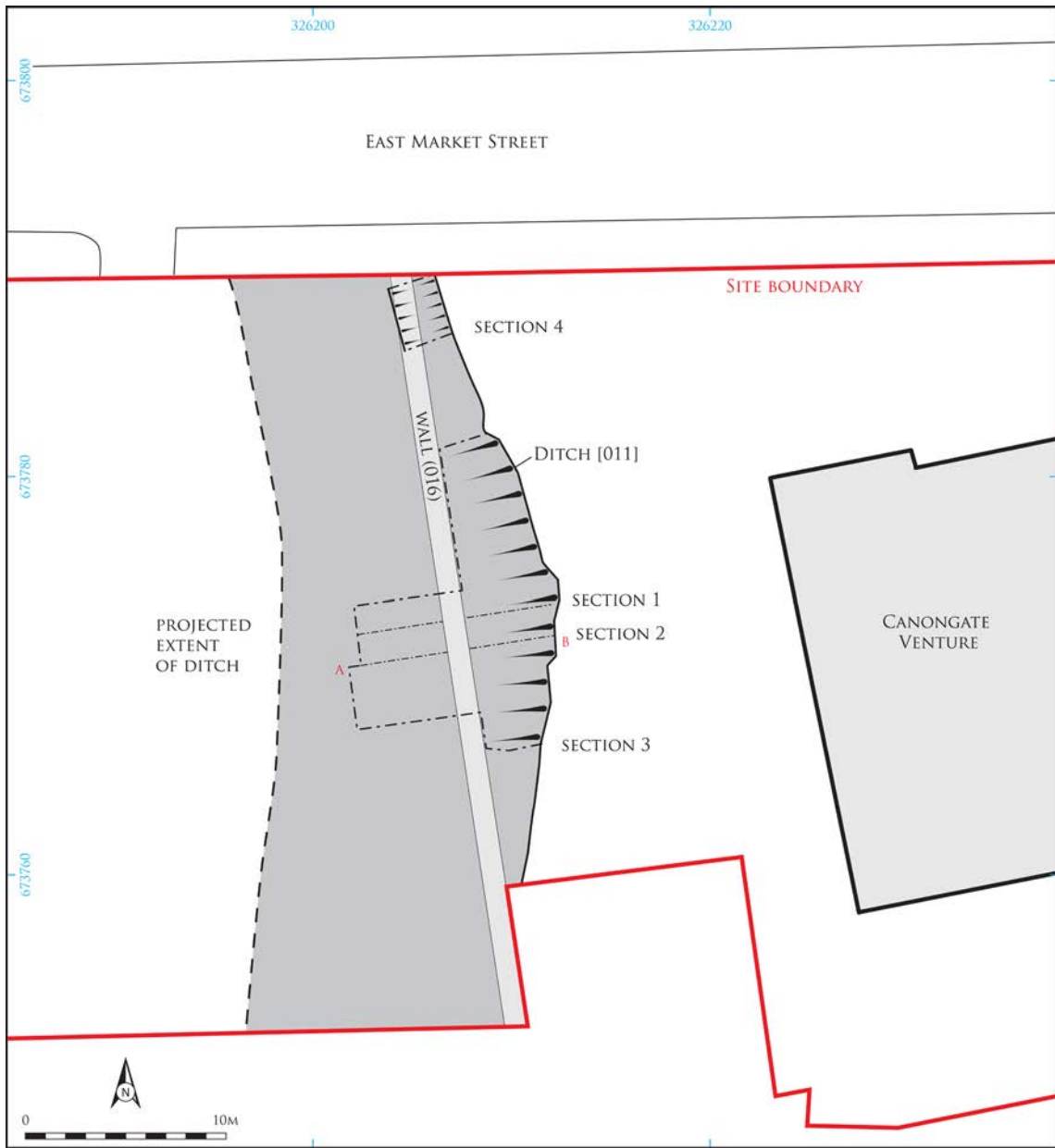
The historic burgh of Canongate has its roots in the 12th century, during the reign of David I (1124–53). It was during this time that the Augustinian abbey of Holyrood was granted permission to establish and enclose Canongate as a burgh, stretching from the abbey to the Netherbow Port at the southern end of Edinburgh's High Street (Gooder 2013: 3). Although it has been stated (Simpson et al 1981: 59; Gooder 2013: 3) that the boundary between Canongate and Edinburgh remained the same, from the formation of the

burgh to its later incorporation with Edinburgh, documentary evidence scarcely survives prior to the 15th century (Coleman 2004: 314). It is therefore up to the archaeological evidence to provide a clearer picture of the burgh boundaries of Edinburgh and Canongate.

3.3 Archaeological evidence for boundaries and defences in Edinburgh and Canongate

Only a handful of archaeological investigations in the heart of modern Edinburgh have provided evidence for its early burgh boundaries and defences. Excavations off Edinburgh High Street approximately 100m west of the Netherbow Port, and inside the medieval burgh, exposed the remains of a ditch ending 4m east of the line of Dickinson's Close and running in an east–west direction (Schofield 1976: 177). The ditch had a rounded end, and became thinner and less deep as it moved east, with the fill being indistinguishable from the midden deposit above. The construction of the ditch is undatable, and Schofield (ibid: 182) suggests that it is likely to have formed the early military defences of the burgh, rather than the civic. However, subsequent excavations in the area of the Cowgate provide a more likely suggestion for Edinburgh's possible early boundary.

Excavations undertaken in the grounds of St Patrick's Church revealed that the area was incorporated into the burgh in the 14th century, when a large ditch was cut running east to west approximately 13m from the street frontage (Jones 2011: 9; Illus 1). The ditch was approximately 5.5m wide and 1.3m deep, with varying deposits building up the stratigraphy, from the primary waterlogged organic silty deposits, to redeposited subsoil and industrial dumping layers (ibid: 9). Its dimensions and location, together with the datable stratigraphy, make this ditch a much better candidate for the 14th–15th century Edinburgh town boundary before the construction of the King's Wall. Another stretch of ditch along the line of the Cowgate was encountered during works at 144–66 Cowgate (Illus 1). This ditch was only visible in section and also appeared to have predated a substantial wall (ie the King's Wall) built along its north side (Dalland 2004: 52; Jones 2011: 23; Dalland 2017: 23). It is described as being 4m wide and forming the same



Illus 2 Plan of the ditch found at East Market Street

burgh boundary as the ditch encountered at St Patrick’s Church.

Prior to the excavations at the Scottish Parliament site at Holyrood, there was no evidence that Canongate boasted any kind of defensive enclosure (Simpson et al 1981: 59). However, these excavations (Illus 1) revealed a substantial ditch running parallel to Holyrood Road and measuring over 3m wide and 2m deep (HAPT 2008; Gooder 2013: 4). Subsequently, at the North Holyrood development site (Illus 1), two ditches were encountered, possibly providing evidence of the shifting and redefining

of Canongate’s boundaries. The early ditch was ascribed a 12th-century date and was 1.25m deep on average and 2.6m wide (Gooder 2013: 5). The later ditch was much smaller, measuring just 0.7m in depth on average, with an average width of 1.3m, and probably 13th–14th century in date (ibid: 6).

4. EXCAVATED EVIDENCE

The works at East Market Street, Edinburgh, have revealed the remains of a large ditch, running on a roughly north to south alignment, containing various



Illus 3 Top: Section 1, northernmost north-facing section; Bottom: Section 2, southernmost south-facing section



Illus 4 Top: Section 3, southernmost north-facing section; Bottom: Section 4, northernmost south-facing section

stratigraphic fills and producing a large artefact and ecofact assemblage (Illus 2). The ditch was largely truncated on its western side by the construction of a 19th-century wall, and on its south-western edge by possible quarrying. At the northern end of the site, the lower section of the western edge of the ditch was also visible, surviving to a depth of 2.5m (Illus 4). At this point the ditch narrows significantly and begins to turn to the north-west.

On its eastern side the ditch survived to a height of 4m, and below the level of truncation survived to a maximum width of 8m, although the far western edge was not accessible. It is possible that the ditch at this point was around 13m in width. Two slots were excavated through the ditch to reveal the stratigraphy and recover sufficient evidence to date the deposits. Section 1 (Illus 3) shows an uninterrupted stratigraphy from the lower deposits through to the disuse of the ditch, whilst Section 2 (Illus 3 and 5) shows a possible recut to the ditch which does not continue through to Section 1, which lies only 3m to the north. The deposits in the recut extended through the entire excavated southern area to Section 3 (Illus 4).

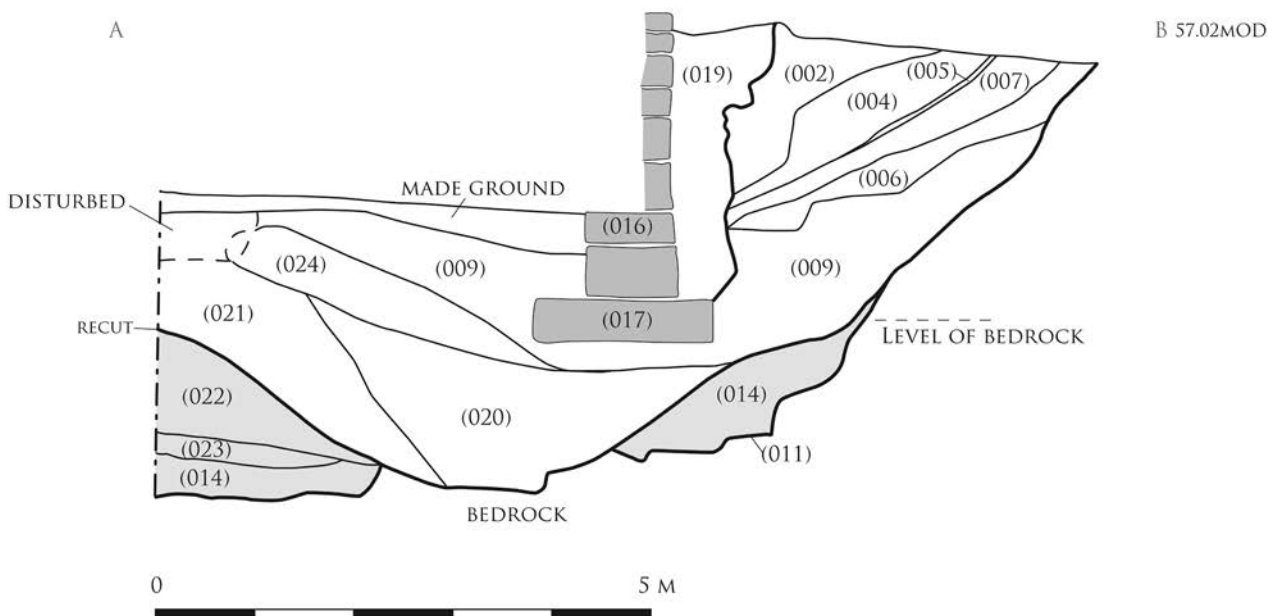
There is a marked difference in the taphonomy of the upper deposits in contrast to the lower fills as demonstrated by the artefact and ecofact

assemblage. It is therefore pertinent to discuss them separately.

4.1 Phase 1: the primary ditch fills

The lowest primary fills in the ditch were all waterlogged; they include Contexts 014, 022, 023 and 024 in Section 1 (Illus 3) and 013 in Section 2 (Illus 4). Animal bone from C023 consisted of sheep and rodent, likely accumulating from the short-term disposal of food waste, whilst C014 contained cattle representative of dumped butchery waste (Appendix 7). Ceramic finds from C014 and C023 included three sherds of Scottish White Gritty Ware, dated to the 13th century, and one Developed Stamford Ware strap handle from the late 12th century (Appendix 1). These provide a *terminus post quem* for the construction of the ditch, with the contents of subsequent fills indicating deposition in the later 13th to 14th centuries (see below).

Animal bone fragments recovered from C022 were unidentifiable to species and offered little interpretive value. It is clear from the minimal animal bone assemblage that the lower deposits in the ditch were not regularly used for the deposition of animal bone (Appendix 7). However, this does not generally mean that the lower fills were not utilised to dispose



Illus 5 Section drawing of Section 2, southernmost south-facing section

of domestic wastes, as the macroplant assemblage demonstrates the disposal of cess and food refuse. The poisonous plant hemlock was found in large quantities in C022 and C023; it was used as a medicine during the 14th century and may have been deposited in the ditch as cess (Appendix 6). A particularly large quantity of chickweed recovered from C022 could also be indicative of the climate change and social and political upheaval in the 14th century, with people using this weed as a food supplement (Appendix 6).

The presence of waste ground weed taxa in the lower deposits suggest that the immediate environment around the ditch was damp and relatively overgrown, while the variety of the remains indicates that the lower ditch fills were left open for extended periods of time (Appendix 6). Similarly, a large amount of surface staining and weathering was recorded on the animal bones, suggesting long exposure to the elements (Appendix 7).

4.2 Phase 2a; the lower fills of the recut ditch

Deposit (C020), the basal deposit in the recut, is a dark-brown waterlogged clay and as such yielded finds of wood and leather in addition to the ceramic and animal bone. A fragment of a sheep/goat tibia from this recut was radiocarbon-dated to 1318–1445 cal AD at 2-sigma (523 ± 35 BP; SUERC-65027).

The leather finds in this context are divided into three categories: shoes, straps and fastenings, and waste material. The shoe finds consist of soles, uppers, a heel stiffener and a fragment of rand, and are indicative of turnshoe construction, in which the flesh side is upwards (Appendix 5). Parallels for this style of shoe indicate a 14th- to 15th-century date. A more narrow-waisted, turned-out, pointed-toed sole (Illus 15) was found in C009.

C009 is visible in both Sections 1 and 2 (Illus 3 and 5). It is the richest of the lower fills in terms of the ceramic and animal bone assemblage and, as it was partly waterlogged, it also yielded finds of leather (Appendix 5), wood (Appendix 3) and textile (Appendix 4).

The textile assemblage consists of six fragments of a single garment made up of a single wool 2/1 twill (Illus 13). In English urban contexts this type of textile is usually dated to the 11th to mid-14th centuries (Crowfoot et al 1992: 26–30; Walton

1981: 194–5), but in Scottish and Norwegian contexts the use of this twill seems to continue for possibly another century (Gabra-Sanders 2001: 227–32; Walton Rogers 1999: 197). The fragments of textile come from an item of clothing the most closely related examples of which come from Greenland, and can be attributed to the 14th to 15th centuries, when garments of this type were in fashion throughout northern Europe (Appendix 4).

Weathering and surface staining on the animal bone assemblage from C009 indicates that this deposit was formed by the deposition of both domestic and butchery waste over a long period of time. It is likely that deposition of this waste, combined with the waterlogged nature of the ditch, would have created noxious, smelly conditions, which may have been the reason for the quick backfilling of the ditch as demonstrated by the Phase 2b deposits (see below).

Scottish White Gritty Wares of the 13th–14th centuries are present in C009 but these are also coupled with later examples of late medieval whitewares and Scottish late medieval reduced wares, which date to the late 15th century. This could indicate that, as with the animal bone assemblage, this deposit was in use for a long period of time. However, the ceramic assemblage also suggests that due to the heterogeneous nature and the lack of joins in the assemblage from C009 and its upper counterpart, C004, it is likely that these deposits represent backfilling from an existing short-lived midden, possibly associated with a nearby monastic site (Appendix 1). An unlikely find from C009 is in the form of a worked piece of prehistoric flint (SF39), which further supports this activity (Appendix 2). It is therefore reasonable to surmise that C009 represents a shifting in use of the ditch from casual and opportunistic deposition in an open and functioning ditch, to the rapid deposition of materials at hand to seal and backfill the ditch.

4.3 Phase 2b: the upper fills of the recut ditch

The upper fills represent a rapid backfilling process from C009 through to the uppermost deposit (C002). This is clear in the tip lines visible in both Sections 1 and 2 (Illus 3 and 4).

The ceramic assemblage is concentrated in C004, which yielded 327 sherds, in comparison to 32

sherds in total from the other Phase 2b contexts. From this context are sherds of a conjoining rim and a sherd from a urinal, finds possibly associated with monastic sites (Illus 6G) (Appendix 1). As with C009, this context contains a large mixture of dated ceramics, which provide a date for the cessation of deposition in the late 15th century (Appendix 1).

The animal bone assemblage is also concentrated in C004, which produced 1037 fragments from domestic sources, butchery and possible tanning waste (Appendix 7). As with the rest of the animal bone assemblage from the upper layers, these were deposited rapidly and represent a deliberate dump of waste from mixed sources.

Further dating evidence for the upper fills of the ditch include a complex copper alloy chain from C004, which appears to have a decorative function, whose closest comparison is from Amsterdam in a late 15th-century context (Illus 11) and a single coin, retrieved from C006, which is likely a billon penny of 15th-century date (Appendix 2).

5. DISCUSSION

It is clear from the excavated evidence that the East Market Street ditch is a substantial feature in the landscape of medieval Edinburgh and Canongate. The earliest dating evidence from the lower deposits suggests that the ditch was cut in the early 13th century, possibly even the late 12th century (admittedly based on the presence of a single sherd). While this could be considered contemporary with both the establishment of Canongate as a burgh and the date for the ditch encountered at the Holyrood North development site (Gooder 2013: 6), there are problems with attempting to connect the East Market Street ditch with the burgh boundary of Canongate.

Recent studies in burgh plots have surmised that the abbey at Holyrood would have created the first plots to its immediate west. This is supported by the studies of burgh plot sizes, which suggest that the east and west areas of Canongate were laid at different times, with the western expansion of Canongate being complete some time around the 14th century (HAPT 2008: 54). This later date for the completed expansion of Canongate towards Edinburgh would suggest that the establishment of

a boundary encircling Canongate around the 12th to 13th centuries would have likely been positioned further west, with possibly only a later ditch occupying the area around the East Market Street site. Furthermore, the only documented sources that mention boundary ditches of Canongate refer only to the northern and southern ditches (HAPT 2008: 60). It is likely that Canongate had no western boundary ditch in the vicinity of the East Market Street ditch, as any attacking force from this direction would have had to come through Edinburgh.

The scale of the East Market Street ditch is larger than any other previously excavated in the medieval burghs of Edinburgh and Canongate. So far, only two other Scottish burgh boundary ditches of this scale have been encountered, at Perth and Roxburgh. A V-shaped ditch encountered during excavations in Perth, and dating to the 12th century, may have been up to 10m in width (Yeoman 1995: 64; Bowler & Perry 2004: 25). The ditch surrounding the abandoned burgh of Roxburgh was recorded as being up to 9.5m in width (Wessex Archaeology 2004: 23). Subsequent Scottish burgh ditch defences have generally been on a smaller scale, as at Annan, where the 16th-century ditch was only up to 5m wide (Toolis & Cavanagh 2002: 150). Similarly, although the dimensions of the earliest ditch and palisade defending Aberdeen in the 12th century are unknown, two ditches of not more than 6m in width have been recorded, the latest perhaps dating to the 17th century (Perry 1998: 848–9).

As presented earlier in this report, candidates for a boundary ditch surrounding Canongate have been encountered at two sites associated with the Holyrood Parliament Development, although both of these examples are on a much smaller scale than the East Market Street ditch.

The alignment and location of the East Market Street ditch makes it more likely that this was a boundary ditch around Edinburgh rather than Canongate. The ditch ran on a roughly north to south alignment but begins to turn north-west at its northern end (Illus 2), as though heading downwards toward the marshy area later occupied by the Nor' Loch (Illus 1). The purpose of this course may have been to drain the ditch of any water whilst also creating a continual boundary from the ditch to the impassable marsh below Edinburgh.

The dimensions of the East Market Street ditch suggest that, above all, its purpose was defensive. It has already been mentioned that to its northern perimeter Edinburgh was protected by the large area of marshy ground which was later dammed to become the Nor' Loch, forming a natural defensive boundary (Illus 2). To the west, Edinburgh Castle is situated on a large rocky outcrop, clearly defensible from attack from all but the east by its steep, stony banks. To the south-east and north-east the volcanic landforms of Calton Hill and Arthur's Seat both provided obstacles to attackers from these directions. It is documented that prior to the construction of the Cowgate, the southern area of Edinburgh needed to be drained, or at least that the area was regularly inundated with water (Tait 2010: 133; Jones 2011: 9), possibly further demonstrating that this too was an implausible direction for an attacking force. This leaves only the eastern edge of the town entirely vulnerable to a marauding force.

It has been stated that the boundary between Canongate and Edinburgh remained the same from the burgh foundations until Canongate's incorporation with Edinburgh in the 18th century, from which it is widely accepted that the eastern extent of Edinburgh was marked by the Netherbow Port (Simpson et al 1981: 59; Gooder 2013: 3). However, the East Market Street ditch, which provides the only archaeological evidence so far for an early burgh boundary of Edinburgh, lies well to the east of the Netherbow Port.

We know from recent studies regarding burgh plots (Tait 2008a; 2008b) that a plot of land south-east of the Netherbow Port and south of the Canongate was part of the burgh of Edinburgh (Tait 2008a; 2008b) (Illus 2). The boundary ditch encountered in the St Patrick's Church excavations and the 144–166 Cowgate excavations, which runs east to west, could feasibly have continued east and curved northwards, to encompass these plots and join with the East Market Street ditch (Illus 2).

The St Patrick's Church ditch is similar to the East Market Street ditch in terms of its stratigraphy; the lower deposits of both ditches were waterlogged and both ditches were subject to deliberate backfilling, represented by their upper deposits (see above; Jones 2011: 9). Furthermore, the St Patrick's Church ditch was on a larger scale than the other ditches excavated in Edinburgh, measuring 5.5m in width

(Jones 2011: 9). However, their defining difference comes in the form of their construction dates. The East Market Street ditch was likely cut in the late 12th or early 13th century, while the St Patrick's Church ditch appears to have been constructed in the mid-14th century (ibid: 22). However, the St Patrick's Church ditch was cut into an area of midden soils which had slowly built up since the 11th–12th centuries (ibid: 9) which suggests that the town had slowly expanded in this direction. Although the construction dates for both ditches are different, the Phase 2 recut ditch at East Market Street also appears to date from around the mid-14th century. Therefore, the cutting of the St Patrick's Church ditch and the recut in the East Market Street ditch could represent a redefining of the eastern boundary, and the shifting of the southern boundary of Edinburgh.

Both ditches also fell out of use at relatively the same time. The St Patrick's Church ditch was backfilled some time between the late 14th and mid-15th century, most probably in the early 15th century (Jones 2011: 11). However, there was also evidence for a recut of the ditch which was rapidly backfilled, likely dating to the late 15th century (Jones 2011: 24). The East Market Street ditch probably went out of use towards the end of the 15th century.

The first reference to the King's Wall is in 1427 but a royal charter of 1472 makes it clear that it was still being developed (Marwick 1871: 134–5). Once the wall was completed the old burgh boundary, ie the East Market Street ditch, was no longer needed and was consequently backfilled.

During the excavation of the East Market Street ditch a number of artefacts were unearthed, giving us insight into life in Edinburgh in the 14th–15th centuries. By far the most exciting of these finds is the East Market Street garment dated to the 14th–15th centuries (Illus 13 and 14). This garment is the first of its kind found in the British Isles, with its closest parallels found in Greenland (Appendix 4). This garment may have been high status, with its full body and skirt and close-fitting chest and shoulders being a popular fashion at the time throughout northern Europe. In addition, four leather shoe soles were also recovered, all extremely narrow-waisted with pointed, out-turned toes, which may have been stuffed with moss to keep

their shape (Appendix 5). The preservation of these items in waterlogged deposits offers us a unique look into the early fashion in medieval Edinburgh not often afforded by archaeological investigations, and we might speculate that these items came from the wardrobe of a fashionable man.

6. CONCLUSION

The excavation at East Market Street has provided the first substantive evidence for an early defensive boundary between Edinburgh and Canongate which predates the later, and better known, defensive walls around the burgh. The analysis and interpretation of this feature alongside evidence of other possible burgh boundaries from recent excavations (Schofield 1976; Lawson & Reed 2003; Dalland 2004; HAPT 2008; Jones 2011; Gooder 2013); historical

documentation; and studies of the formation and layout of Scotland's burghs (Simpson et al 1981; Tait 2008a; Tait 2008b; Tait 2010, etc) provide an insight into possible layouts of the former burghs of Edinburgh and Canongate.

Only one model has been presented here; however, it is hoped that further excavations and studies will be able to shed more light on the layout and development of Edinburgh and Canongate, providing a more complete picture of life in the early burghs. A substantial artefact and ecofact assemblage was also recovered, which includes items of clothing rarely found in the British Isles and provides us with glimpses of life in medieval Edinburgh and Canongate.

Full catalogues for all the specialist reports that follow in the appendices are available in the site archive.

APPENDIX 1 THE CERAMIC ASSEMBLAGE

*George Haggarty***A.1.1 Summary**

The East Market Street ceramic assemblage was recovered from a ditch into which there seem to have been two phases of deposition. From its base there is evidence of a primary fill, possibly dating from no later than the 13th century. A subsequent recut has been backfilled with deposits, which have a later 15th-century end date, but with some earlier material mixed in. Its homogeneous nature and lack of joins etc suggests that this material may have come from an existing short-lived midden. There are no examples of the 16th- or 17th-century imported ceramics commonly recovered from other excavated post-medieval sites in the Canongate, Edinburgh and Leith.

A.1.2 The assemblage

From Contexts 014 and 023 were recovered three small Scottish White Gritty Ware sherds of 13th-century date (Haggarty 1984) and a late 12th-century Developed Stamford Ware strap handle sherd covered in a bright green suspension glaze. Also from C014 and almost certainly intrusive is a Scottish post-medieval reduced ware jug body sherd in a fine smooth paste which dates from the 17th century. Also possibly of medieval date, C027 was devoid of ceramic and small finds. The largest secondary ceramic deposits consisting respectively of 327 and 57 sherds were recovered from C004 and C009, and they, along with the rest of the later medieval assemblage, were almost certainly dumped over a relatively short period of time. Dating for this period of dumping comes from the small imported German stoneware assemblage from C004, C005 and C009, consisting of seven Siegburg and seven Langerwehe sherds. From C004, the two most distinctive light grey Siegburg stoneware sherds (Illus 6C) are from bowls/drinking cups, which date from the period 1450–1550 (Hurst et al 1986: 178).

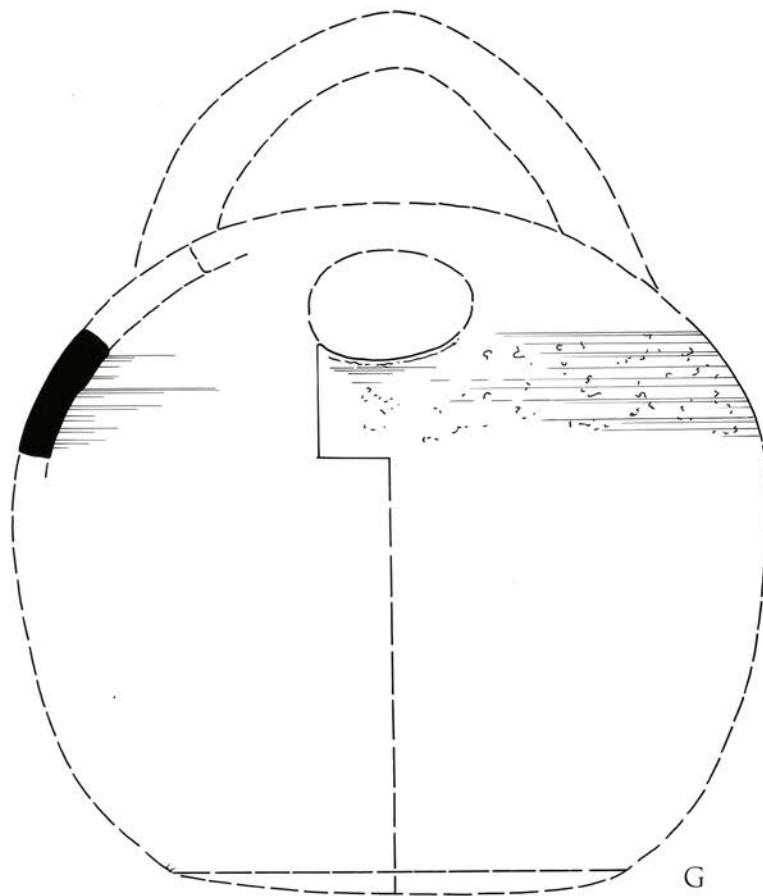
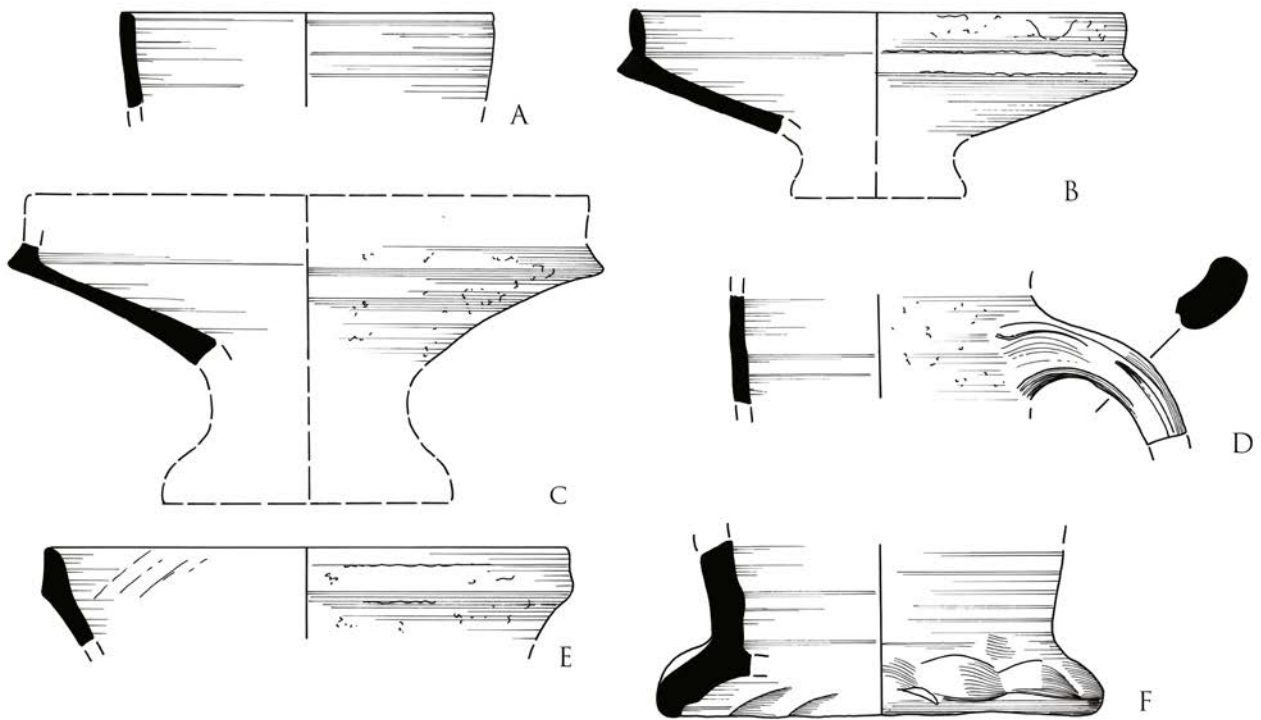
In Britain Langerwehe stoneware is relatively more common than Siegburg during the second half of the 14th century and first half of the 15th century. By far the best example of this is from the Edinburgh High Street excavation, which is still the largest group of German stoneware recovered

in Britain to date, with 313 Langerwehe sherds from 131 vessels, in contrast to 41 Siegburg sherds from 24 vessels (Clark 1976). By the later 15th century, Siegburg stoneware sherds are relatively uncommon; however, there is hardly a site in Britain which does not have sherds of Langerwehe, which had become a monopoly product (Hurst et al 1986: 186).

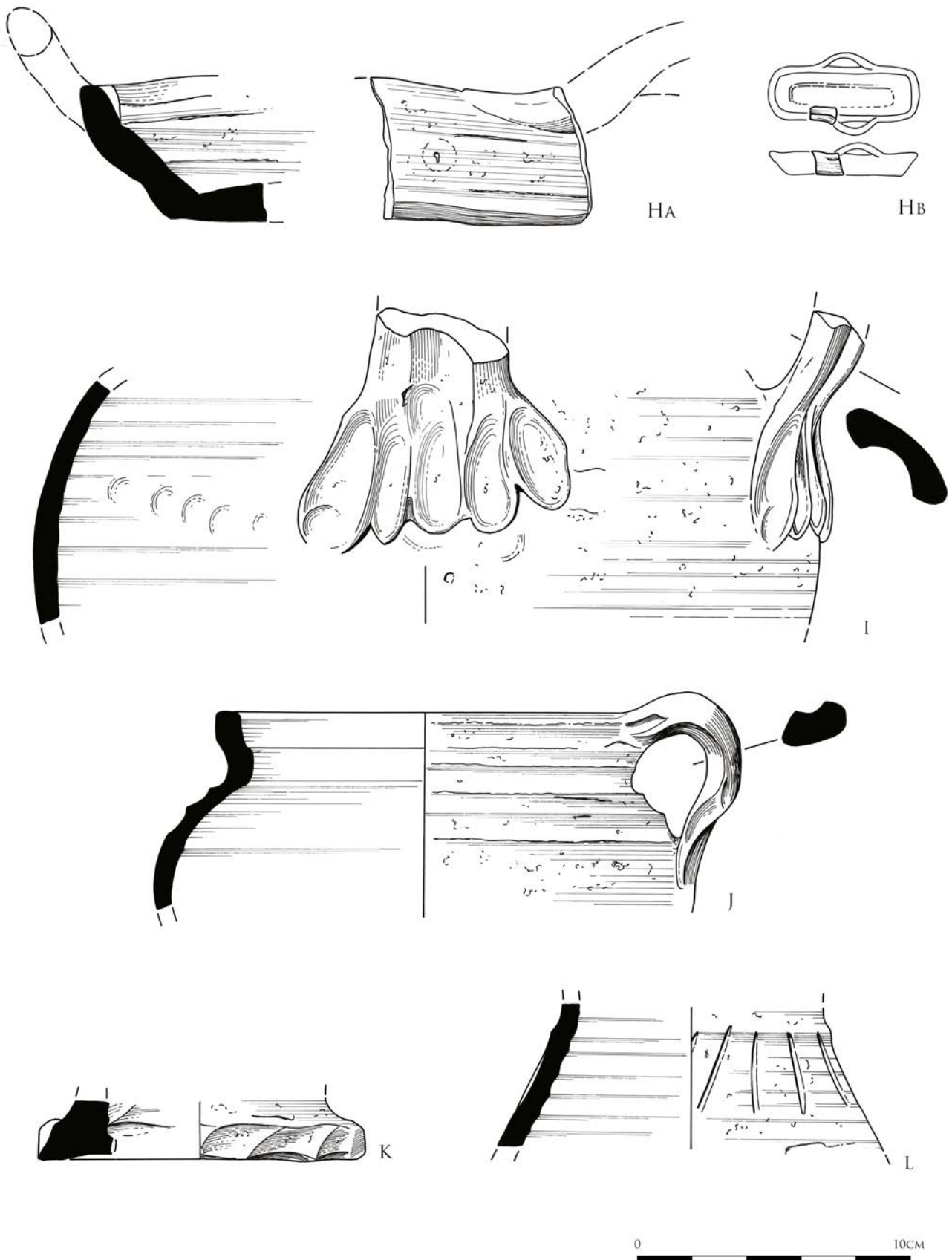
The only other continental imports are four sherds of Low Countries redware from C004, C009 and C020, and these are hard to date. The sooted sherd from C020 has internal white slip decoration, while the basal angle from C004 is lead-glazed on its interior and sooted on its exterior. It also shows evidence of a pinched base, which suggests it is not a cooking pot. The internally glazed rim and externally glazed handle sherd from C009 (Illus 8P) are heavily sooted on their exteriors, while the lack of an angle on what remains of the handle might suggest a 15th-century date (Hurst et al 1986: 130).

Most of the late medieval whiteware, reduced ware and oxidised ware sherds seem to be from jugs, although, despite much time and effort, very few joins were found. From C004 a green-glazed late whiteware body and strap handle sherd has an unusual five-fingered join (Illus 7I), while another body sherd from C009 has part of a thumbled circle (Illus 9S), sometimes seen surrounding a stamp or incised design. A good example from Jedburgh Abbey was published by Stewart Cruden (1956: 70 and 75, illus 1 and plate V figs 1 and 3). From C004 are the only conjoining jug rim sherds (Illus 8O), which look earlier than the rest of the assemblage, and a sherd from what may be a urinal (Illus 6G). If this identification is correct it is a type generally recovered from monastic sites, for example Melrose Abbey (Cruden 1953: 168–9, figs 24–26), and it is probably unique in this fabric. However, a few have been recovered from secular sites, such as Bothwell Castle (Cruden 1952: 15, figs 33 a & b).

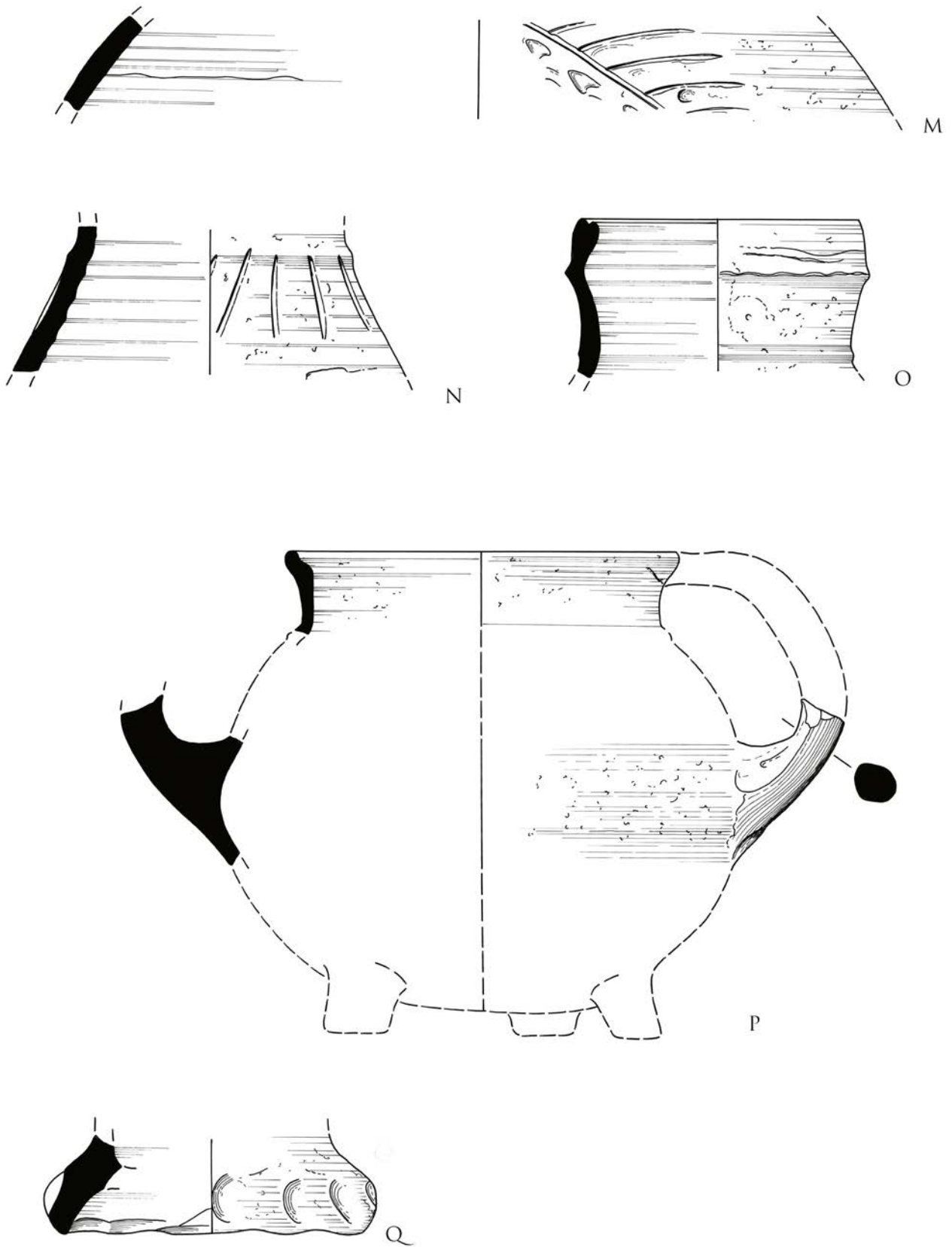
Also from C009 there is a thick rim and shoulder sherd from a dish, or more likely a unique deep bowl, *c* 440mm in diameter. It is decorated below its interior rim with a pad of clay which has been impressed with a roundish lattice stamp (Illus 9R). This is not a local fabric and its interior is covered in a thick green glaze. It also has a pink oxidised surface and a white core. Among the oxidised ware from C004 there is a sherd, with a complete profile and evidence



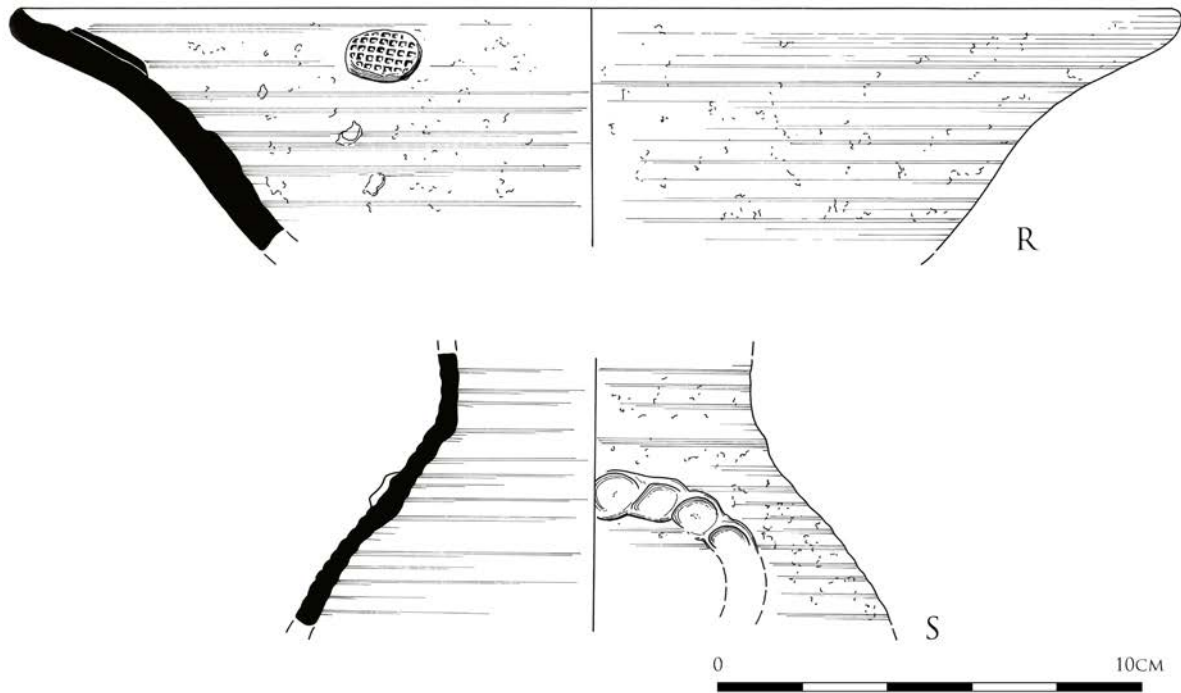
Illus 6 The ceramic assemblage 1



Illus 7 The ceramic assemblage 2



Illus 8 The ceramic assemblage 3



Illus 9 The ceramic assemblage 4

of a handle, from an externally sooted dripping pan (Illus 7H).

Although it is generally stated in the literature that the Langerwehe stoneware fabric is a dark grey colour covered with a brown iron wash, many of the examples recovered from Scottish excavations are in an underfired, almost buff to reddish, paste. Even more common when glazed, it is a patchy light mottled grey, making it hard to distinguish from the later Raeren stonewares, and this is the case for most of the sherds in this assemblage. Interestingly, sherds of Langerwehe iron-washed stoneware in the National Museum of Scotland's fabric reference collection, which came from a Langerwehe kiln excavation, are what can best be described as being in a pale grey paste.

A.1.3 Catalogue of illustrated objects

A.1.3.1 C004 (× 327 sherds)

► **Sherd from a Langerwehe salt-glazed stoneware vessel (Illus 6A)**

A small rim sherd from a Langerwehe salt-glazed stoneware vessel in a dark grey fabric with traces of a tan ash glaze on both surfaces.

► **Sherd from a Siegburg stoneware drinking bowl (Illus 6B)**

A sherd from a Siegburg stoneware drinking bowl with traces of a tan ash glaze and a diameter of 144mm. These are thought to date from 1450–1550 (Hurst et al 1986: 178).

► **Sherd from a Siegburg stoneware drinking bowl (Illus 6C)**

A sherd from a Siegburg stoneware drinking bowl, with traces of a dark tan ash glaze and a diameter of 140mm. These are thought to date from 1450–1550 (Hurst et al 1986: 178).

► **Sherd from a small Langerwehe stoneware Type IV jug (Illus 6D)**

Neck and handle sherd from a small Langerwehe stoneware Type IV jug. Mottled brown and dark brown iron wash on both surfaces over a grey fabric. 15th century.

► **Langerwehe stoneware jug rim sherd (Illus 6E)**

Small stoneware jug rim sherd in an underfired salt-glazed buff fabric. Although abraded, it has traces of rouletting. Underfired Langerwehe.

► **Langerwehe stoneware base (Illus 6F)**

Flaring thumbled Langerwehe stoneware base, from a large jug with a brown iron wash covering much of it under a salt glaze. The fabric slightly underfired. 1475–1525.

► **Late medieval rim sherd (Illus 6G)**

Rim sherd in a late medieval sandy fabric with thick external olive-green glaze; possibly from a urinal with top-glazed aperture *c* 60mm in diameter.

► **Green-glazed, late medieval whiteware sherd (Illus 7H)**

Very thick green-glazed, late medieval whiteware sherd; the profile of a dripping pan with a sooted exterior and trace of where a handle sprang from.

► **Late medieval whiteware body and strap handle sherd (Illus 7I)**

Late medieval whiteware body and strap handle sherd which has been luted to the body with unusual five fingering.

► **Green-glazed sherd from a late medieval whiteware cooking pot (Illus 7J)**

Rim, neck shoulder and strap handle from a late medieval whiteware green-glazed, sooted cooking pot.

► **Late medieval whiteware basal angle sherd (Illus 7K)**

Small late medieval whiteware basal angle sherd with an expanded frilled base copying stoneware.

► **Green-glazed sherd from late medieval/early post-medieval jug (Illus 7L)**

Green-glazed body sherd from the shoulder of a late medieval/early post-medieval green-glazed jug decorated with *c* 30mm-spaced slashes below a cordon.

► **Late medieval whiteware jug body sherd (Illus 8M)**

Late medieval whiteware body sherd from a green-glazed jug decorated with horizontal slashes and incised notches.

► **Neck and strap handle stoneware sherd (Illus 8N)**

Neck and strap handle sherd in a heavy high-fired off-white clay with a pink oxidised inner surface. The exterior covered in a mottled iron-rich glaze. Underfired stoneware.

► **Two conjoining green-glazed 14th-century rim sherds (Illus 8O)**

Medieval (14th-century) conjoining rim sherds from a jug, green-glazed on its exterior (Illus 8O).

A.1.3.2 C009 (× 57 sherds)

► **Two lead-glazed, Low Countries redware cooking pot sherds (Illus 8P)**

Lead-glazed, Low Countries redware cooking pot sherds; one rim, and one handle heavily sooted on its exterior. 15th century.

► **Siegburg stoneware basal angle thumbled sherd (Illus 8Q)**

Siegburg stoneware basal angle thumbled sherd in a light-grey fabric; its exterior has a patch of brown ash glaze.

► **Late medieval oxidised rim and shoulder sherd (Illus 9R)**

Thick rim and shoulder sherd from a late medieval oxidised dish, or more likely a deep bowl, decorated below its interior rim with a pad of clay which has been impressed with a roundish lattice stamp. It is in a lighter than normal fabric and its interior is also covered in a thick green glaze. It is *c* 440mm in diameter.

► **Late medieval whiteware sherd from a large jug (Illus 9S)**

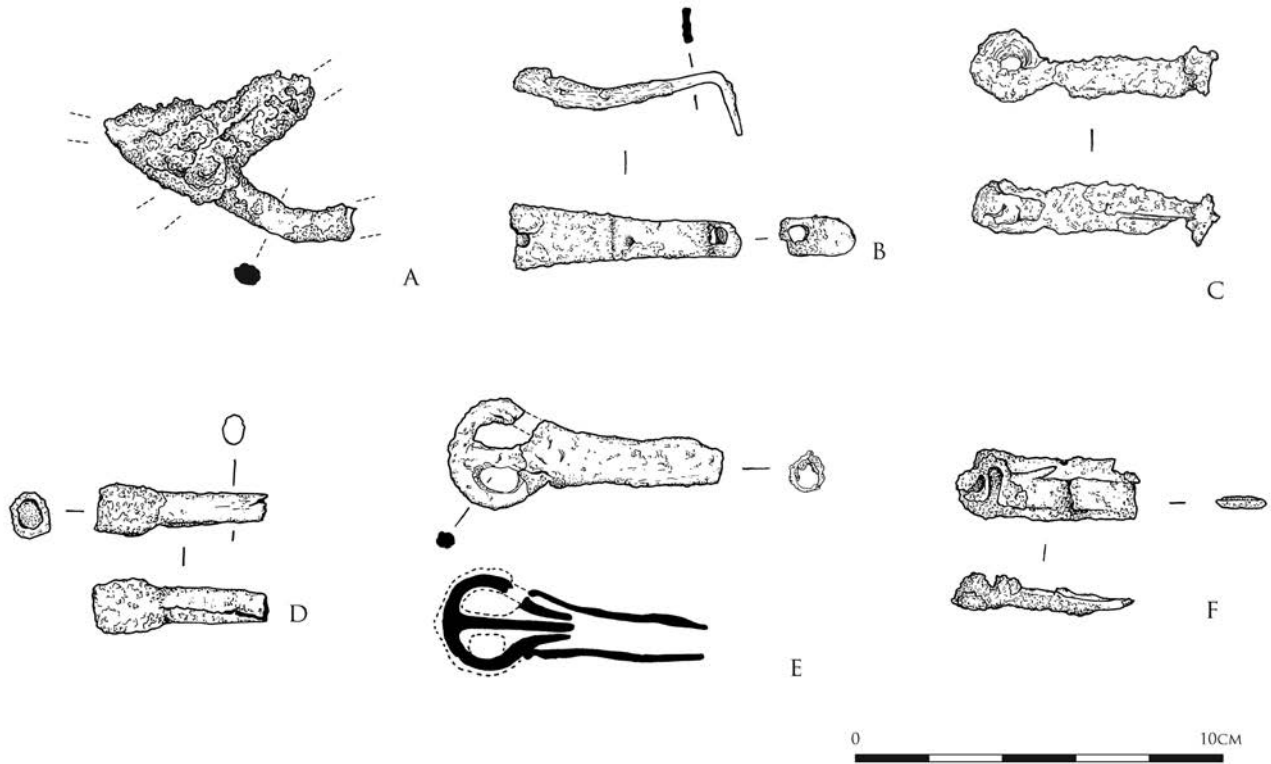
Green-glazed late medieval whiteware sherd from the neck and shoulder of a large jug, decorated with what may be part of an applied circle of thumbled clay.

APPENDIX 2 THE INORGANIC ARTEFACTS

Dawn McLaren

A.2.1 Metal

A total of 22 metal objects, consisting of 13 iron objects, eight copper alloy objects and a single composite iron/copper alloy artefact, were recovered during excavation of the ditch. It is notable that metal artefacts derive only from the upper fills of this feature (C002, C004, C005, C006, C009) and were entirely absent from the earliest deposits. The surviving metal objects comprise a small number of tool fragments, fittings, household equipment and decorative items. Dress accessories, typical components of medieval-period metal assemblages from urban contexts, are notably absent. The majority of the metal objects are fragmentary or damaged as the result of use or removal from



Illus 10 The metalwork: A = SF17c; B = SF20b; C = SF20a; D = SF39a; E = SF146; F = SF12c



Illus 11 The metalwork: SF04a

their point of fixture, which makes identification problematic, and only a few objects can be dated closely. Despite these limitations, the assemblage as a whole is broadly consistent with a medieval date.

The assemblage of metal objects will be discussed together under functional groupings. Catalogue descriptions are provided for illustrated items only; a full catalogue of the metal assemblage is presented in the archive.

A.2.1.1 Tools

Broken arms from a pair of fine hinged tongs or pincers (SF17c, Illus 10) came from C004. Although the jaws of the tool have been lost, the small size of the arms and their short length suggest that this was a tool for fine, cold, metalworking, probably in conjunction with non-ferrous rather than ferrous metals. Found alongside this tool was a blade fragment from a small straight-backed single-edged knife, missing its tip and tang (SF17b).

A.2.1.2 Fittings

A fine, tapering, L-shaped perforated iron strip (SF20b, Illus 10) is probably a corner binding strip from a casket or item of household furniture. The squared perforation at the right-angled corner of the strip has splayed edges on one face resulting from the shank of iron nail or peg being hammered through to hold the strip in place. The break across a circular perforation at the opposite surviving end and the gentle curvature of the strip is likely to be damage caused by deliberate removal of the fitting prior to discard.

A small iron joiner's dog or timber dog (SF11a, not illustrated) was recognised from C009. These are long rectangular staples with straight backs and down-turned ends that were used in woodworking to secure timbers in position and could also be used to hold internal structural fittings in place (Goodall 2011: 161). This example has a single damaged arm surviving; the other has broken off and been lost. This type of damage would be consistent with it being removed deliberately from its timber fixture and discarded.

In addition to these fittings just described, three substantially complete iron nails (SF406) were recovered from C004. These have damaged flat

sub-square/circular heads and fine square shanks and are consistent in size and shape with Ford & Walsh's (1987) type A and B nails, the most common nail type for general woodworking purposes in use during the medieval period. Two further possible nail shank fragments (SF11b and 11c) came from C009.

A.2.1.3 Household equipment

Although difficult to identify with any certainty due to its incomplete and corroded condition, a fine iron bar with looped terminal for suspension (SF20a, Illus 10) is likely to be a plain stem and handle from a padlock slide key. A range of forms of slide key handles are known to have been in use throughout the medieval period (Goodall 2011: 237–9). This is a particularly plain example but a similar, complete slide key comes from a mid-14th-century context in Perth (Franklin & Goodall 2012: 160, illus 142, no. 293). The barrel- and box-shaped padlocks that slide keys were used in conjunction with were elaborate composite mechanisms and could have been used to secure doors and chests as well as animals and people (Goodall 2011: 233).

A flattened copper alloy thimble (SF32a) used to help push a needle through cloth is unstratified and likely to be post-medieval in date. The surfaces of the thimble are heavily corroded, removing any trace of the texture and detail of the artefact's original surface. A small fragment of organic material, possibly horn (SF32b) was removed from the surface of the flattened thimble during conservation work. The piece was too small for precise identification.

A.2.1.4 Commerce

A single coin (SF16) came from C006. It is of a debased alloy with a heavy green surface patina caused by corrosion of the copper and is almost certainly a billon penny of 15th-century date (identification by Nicholas Holmes, pers comm). A crowned facing bust is present on the obverse of the coin, and the reverse has a standard single cross with pellets in all four angles. Although this design is consistent with billon pennies minted during the reign of James I to IV, it is not possible to identify the coin more closely due to the heavy corrosion of the surfaces (Holmes 1998: 16–21).

A.2.1.5 Decorative items

Several articulated pieces of a complex copper alloy chain (SF04a, Illus 11) came from C004. Each link, made from drawn wire and shaped individually, interlinks with the other on two planes, giving the chain a thick, closely interconnected, triangular profile. The complexity of the chain and the highly decorative style of linking suggest that this was for display but it cannot be unequivocally identified as a dress accessory and could have been from an ornate lamp fixture or censer (Egan & Pritchard 1991: 318). A similar elaborate chain fragment is known from a late 15th-century context in Amsterdam but the chain itself could well be earlier in date (Baart et al 1977: 201, fig 372).

A second decorative item (SF12c, Illus 10) amongst the assemblage is a fragment of a copper alloy mount in the form of a flat rectangular strip with a band of damaged ornamental motifs along the centre of one face. At least one ripped rivet hole is visible on the edge of the strip, which was damaged on removal from its original fitting. The design of the decoration is not clear due to a combination of pre-deposition damage and post-depositional corrosion of the surfaces. Despite this, a splayed omega shape in relief is visible towards one broken end and further raised areas indicate the presence of a chip-cut or repoussé decorative scheme. This decorative strip or mount came from C009.

A.2.1.6 Miscellaneous items

The other metal objects from the ditch cannot be so readily assigned to functional groups as those already discussed. These include several copper alloy strip and sheet fragments which may be pieces of sheet metal vessels, mounts and binding strips but cannot be more closely identified due to their incomplete state and corroded condition. The most intriguing and enigmatic of these items is a damaged composite iron object (SF146) that superficially bears a resemblance in shape and size to a small iron strap-end buckle or forked spacer from a three-piece strap end (eg Egan & Pritchard 1991: 78, fig 48 and 140, figs 82, 92) but whose function remains elusive. The object (Illus 10E) comprises a fine wrought-iron bar with tapering tips that has

been bent around to form a small round loop, the tapering ends of which project from the base of the loop, parallel to one another and very closely spaced. These tips or prongs have been inserted into one end of a short cylindrical hollow iron tube with squared ends. At mid-point in the interior of the loop, opposite to where the prongs have been inserted into the tube, is a short fixed 'pin', tapering in length at one end. The function of this item is elusive and no ready parallels are known. The hollow tube in which the pronged loop has been inserted may originally have been fixed upon a cylindrical wooden rod as a terminal or short handle, similar in shape at least to a more ornate, copper-plated handle of 15th/16th-century date from Fishergate, York (Ottaway & Rogers 2002: 2845, fig 1423, no. 15045).

A.2.2 Catalogue of illustrated objects

D = diameter; H = height; L = length; T = thickness; W = width.

► SF17c Arms from small tongs or pinchers

Two conjoined, pivoting, circular-sectioned rods (D 8.5mm), curving in opposing directions towards each end forming the arms of an iron tool. The terminals of each arm are broken and the jaws of the tool, perhaps small tongs or pincers, are lost. Surviving L 67mm. C004.

► SF20a Looped terminal from an iron key or tool

Fine, plain, rectangular stem, tapering at one end to a flat narrow blunt point (D 6.5mm) which has been bent around on itself to form a circular loop (W 19.5mm; H 17mm); the opposite end is badly broken and torn as the result of damage during use. On the basis of form and size, this looped terminal is consistent with the handle of a small padlock key. Surviving L 62.5mm; W 11.5mm; T 5.5mm. C006.

► SF20b Perforated iron fitting

Flat iron strip, broken at widest end (W 17.5mm) across a circular perforation (D 4.5mm) tapering along length to a narrow, blunt, squared tip (W 10mm; T 2.5mm), bent across a squared perforation (D 3.5mm × 4.5mm) at right angles (H 17.5mm); fitting appears to have broken during removal. The strip is gently bowed along its length. Surviving L 60mm; W 10–17.5mm; T 2.5mm. C006.

► **SF39a Unidentified composite iron and copper alloy object**

Square-socketed head of iron (L 12mm; D 12mm; T 0.5mm), inset with a circular tube of copper alloy (D 8.5mm × 10mm; T 0.5mm) which contains traces of wood. Extending from the squared head is a hollow, narrow, long sheet-metal iron tube (D 6.5mm × 8.5mm), broken at the opposing end. The tube has a distinct longitudinal seam from where the sheet metal has been drawn around on itself to overlap. The surfaces are flecked with green copper alloy corrosion, suggesting the item had originally been brazed. Surviving L 46.5mm. C004.

► **SF146 Composite iron object of unknown function**

Fine square-sectioned iron bar with tapering tips that has been bent around to form a small round loop, the tapering ends of which project from the base of the loop, parallel to one another and very closely spaced. These tips or prongs have been inserted into one end of a short cylindrical hollow iron tube with squared ends. At mid-point along the interior of the loop, opposite to where the prongs have been inserted into the tube, is a short fixed 'pin', rectangular in section and tapering in length at one end, which also appears to be inserted into the end of the tube, resting between the two prongs of the loop. L 71.5mm. C004.

► **SF04a Four short articulated lengths of a fine copper alloy chain**

S-like loops at right angles, and at each end meeting the next loop beyond the central point, resulting in a chain roughly triangular in section and tightly interconnected. A closely comparable length of chain is known from excavations in London (Egan & Pritchard 1991: 320, fig 210; no. 1599) and from a late 15th-century context in Amsterdam (Baart et al 1977: 201 fig 372). L 62mm. C004.

► **SF12c Decorative copper alloy mount**

Flat rectangular strip, slightly expanding in width but broken at both ends; original length unknown. A raised or applied narrow rectangular band (W 7.5mm) runs along the centre of the strip at an equal distance from both damaged but presumably originally straight edges. This central band has a series of damaged and now distorted decorative

motifs in relief, the clearest of which is a possible omega shape immediately adjacent to one broken edge. This appears to be chip-cut but the extent of surface corrosion, despite careful conservation, is too severe to confirm details of the manufacturing process or design more clearly. A small ripped rivet hole (D 2mm) is present towards one edge, 15mm from the narrowest broken end, suggesting that this strip was originally part of a composite object, perhaps applied as a decorative mount or fitting. Surviving L 49mm; W 15–18.5mm; T (max) 10mm. C009.

A.2.3 Metalworking waste

Debris produced during metalworking is present in the form of six fragments of amorphous iron slag (549g) and a single molten-looking lump of copper alloy casting debris (8.3g). These came from C004 and C009, associated with large quantities of medieval ceramics.

The iron slag is glassy and vesicular in places, with heavily corroded surfaces; none of the fragments are highly magnetic. Although this material undoubtedly derives from ironworking, the individual pieces lack any diagnostic morphological characteristics to allow the stage in the ironworking process (eg smelting or smithing) to be identified with any confidence and are best described as rake-out material from a bloomery furnace or blacksmithing hearth.

Broadly contemporary with this activity in the Canongate is the well-preserved and seemingly prolific forge at Mills Mount, Edinburgh Castle. This smithy, dating to AD 1325–1400, was associated with large quantities of ironworking waste and scrap metal. Analysis of the associated slags found them to be dominated by blacksmithing debris, which led Spearman (1997: 167–8) to suggest that the smiths at Edinburgh Castle were principally involved in the repair, maintenance and production of wrought-iron objects rather than the production of the iron itself. This implies that the smiths at Edinburgh Castle were either using iron blooms smelted elsewhere or recycling scrap metal, and it is assumed from the position of the forge within the castle that the smithy served the needs of the castle complex rather than producing items for wider distribution.

A more comprehensive assemblage of medieval ironworking waste, consisting of numerous

smithing hearth bottoms, smithing slags and micro-debris indicative of blacksmithing activities, have previously been recovered from the backlands area of the Canongate burgh but no in situ area of metalworking has yet been identified (Heald & Campbell 2013: 31). As noted elsewhere, it was often in the burgh backlands that craft workers had their workshops, whilst the finished products were sold and traded in shops on the frontage (ibid 31). It is unsurprising, in this light, that small quantities of residual iron- and copper alloy-working slag became incorporated in the fill of the Canongate burgh ditch.

A.2.4 Glass

A single fragment of window glass (SF64) was recovered from C004. Window glass, particularly plain glass, is problematic to assess for date (Murdoch 2010: 40). Often the colour and morphology of surface denaturing products and texture of the glass can be useful in terms of suggesting a broad date, as changes in glass production methods that took place in the mid-17th century effectively altered the quality of the glass being made (ibid: 40). The original colour of the translucent glass sherd from the Canongate is obscured throughout by a pale iridescent patina that coats the surfaces, suggesting, in the absence of chemical analysis to confirm, a soda-based glass of probable post-1650 date.

A.2.5 Stone

An unexpected discovery from the ditch was a single fragment of flint (SF36) recovered from C009. It is a tertiary rejuvenation flake of honey-coloured East Coast flint with a pronounced bulb of percussion and hinge fracture, with edge damage along the right-hand lateral edge (Rob Engl, pers comm). Simple flakes of this form are not closely datable but it is undoubtedly prehistoric in date.

A.2.6 Conclusions

The assemblage of metals and metalworking waste form a small but interesting group of artefacts that relate to life in the Canongate during the medieval period. The mixture of tool fragments, fittings and household items is entirely consistent with urban assemblages of 14th- to 15th-century date such

as those from Perth, Aberdeen and from previous excavations in the Canongate and Edinburgh burghs, yet the number of metal objects as a whole is fairly low. With the exception of a single c 14th-century coin, all of the metal objects appear to have been in a broken or damaged condition when they were deposited. The presence of a much earlier item, the prehistoric flint flake, is intriguing in this context and may suggest that some of the infill deposits, particularly the upper layers, represent the sweeping up and disposal of residual waste rather than distinct and deliberate dumping episodes from a single source.

APPENDIX 3 THE WATERLOGGED WOOD

Anne Crone

Only three small finds of wood were retrieved from the ditch, SF06 and SF34 from C009, and SF50 from C020. These are described below.

► SF06

A very small offcut of pine (*Pinus* sp.), 30mm × 12mm × 4mm.

► SF34

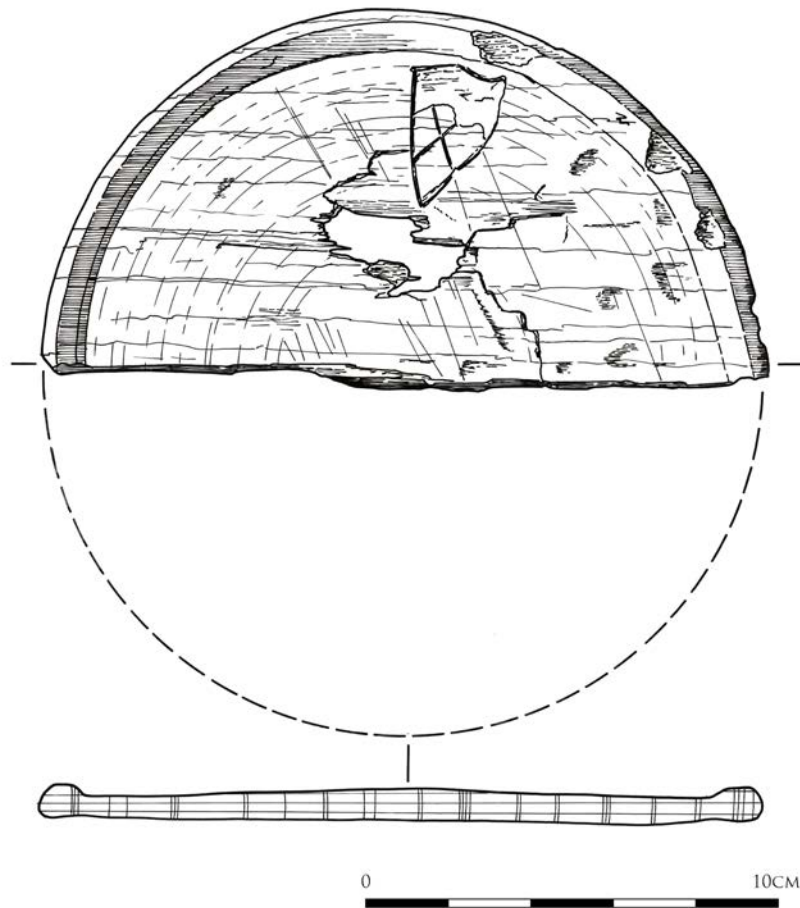
A turned artefact consisting of a thin half-disc, 175mm in diameter and 6–7mm thick (Illus 12). It has been face-turned from a half-log of alder (*Alnus glutinosa*).

The surfaces are damaged and there is a ragged hole to one side of the original centre. Concentric turning marks are visible on both sides of the disc. The 'upper' surface has a raised rim around the edge which is 10mm wide and 7mm thick. On the underside there is a slight indentation some 10mm in from the edge which matches the point at which the rim starts on the upper surface.

Although damaged, it is possible to discern on the upper surface the remains of an engraved mark, or symbol. This consists of two lines forming an open V-shape, within which are two crossed lines. There are also fine knifemarks across this surface.

► SF50

This contains four pieces of radially cleft oak (*Quercus* sp.). The two larger pieces join together to form a board 315mm long, 120mm wide and 16mm thick. A small hole, 6mm across with rust



Illus 12 The wood assemblage: SF34

stains around its perimeter, is probably a nail hole. None of the edges are original and there are no other features to determine its original function. The two smaller pieces are splinters which may have come from the same board. It is possible that it is a barrel stave fragment.

A.3.1 Discussion

The only piece which is clearly artefactual is SF34. The most likely function of this disc-shaped object is as a container lid; a wooden disc could have been used to cover any type of container, stave-built or carved wood, as well as ceramic or stone. The raised rim around the edge and the matching indentation on the undersurface suggests that it may have overlapped the rim of the container rather than sitting within the rim. The centre of the disc is much decayed so it is not possible to be absolutely certain, but the position of the hole suggests that it could have been where one end of a

handle had been inserted or attached, the removal of the handle causing the damage around which the decay concentrated.

Wooden lids from other medieval excavations are, on the whole, very different in style and manufacture from SF34. There is a group of small, finely made, face-turned lids with integral knob handles (ie York – Morris 2000: 2186–88; Perth – Curteis et al 2012: 258; Gallowgate, Aberdeen – Crone et al 2001: 215 and illus 170; Bon Accord, Aberdeen – Crone forthcoming) but most examples are more basic, flat discs usually with a single central hole, into which a leather or rope knot and looped handle would have been fitted (ie York – Morris 2000: 2262–5). These types of lids are mostly carved and not turned and they are generally smaller, between 100mm and 130mm in diameter, although there are some examples up to 165mm (Morris 2000: 2262). They are also thicker than SF34, mostly between 10mm and 20mm in thickness. Morris (ibid: 2265) points out that these lids would have fitted neatly

into ceramic storage jars and cooking pots, and generally, wooden lids appear to have been preferred over other materials. SF34 is quite finely made in comparison and might have been a cover for another type of container.

SF34 bears an engraved symbol but decay around the cutmarks has obscured the design. The open V-shape may be the remains of a heart-shaped symbol, such as that burnt into the bases of several wooden bowls at Threave Castle, Dumfries & Galloway, although in that case it is known to be a heraldic device of the Douglas family that owned the castle (Barber 1981: 117 and fig 14). Within the V-shape two crossed lines can be distinguished. Morris (2000: 2265) lists other examples from medieval contexts of wooden potlids with incised crosses and suggests that they may have been protective symbols designed to ward off evil.

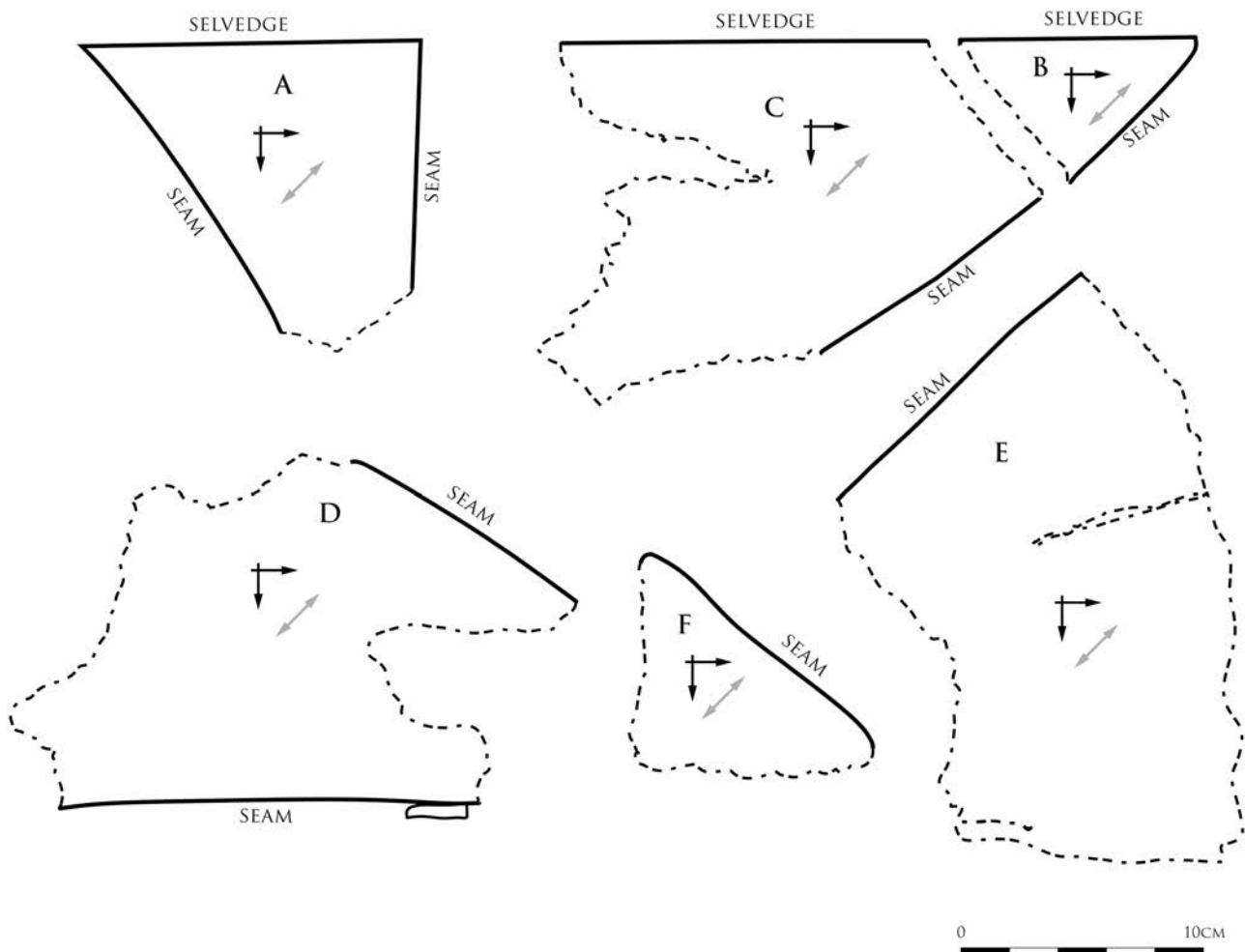
The fact that very little wood was found in the

ditch, despite the anaerobic conditions which protected the more extensive leather and bone assemblages, is intriguing. It could be that little or no woodworking took place in the vicinity of this stretch of the ditch, or that the ditch was not used for waste disposal?

APPENDIX 4 THE TEXTILE FRAGMENTS

Penelope Walton-Rogers

Textile fragments, SF33, recovered from the lower levels of the ditch context (C009), represent the torn and crumpled remains of a single wool twill garment. The surviving six fragments, A–F, correspond to five panels of the garment (Illus 13). Folds and stitch-holes indicate where seams were present, although the sewing thread – most probably linen – has not been preserved. None of the panels has survived



Illus 13 Outline drawing of the six fragments, A–F, of wool textile, SF33. Crossing arrows mark the direction of warp and weft; the double-ended grey arrow indicates the line of the twill diagonal

intact, but their shapes suggest late medieval garment construction. It would be impossible to date the garment confidently from such fragmentary remains, but they have their closest correspondence with fashions of the late 13th to early 15th century. The wool twill from which the garment was made would also fit this date-range.

In the British Isles, only post-medieval clothing suites have been published in detail (Orr 1922; Henshall & Maxwell 1952; Henshall & Seaby 1962; Bennett 1975; 1980; Arnold 1985). The Canongate remains do not accord with the construction of any of these, nor do they bear any resemblance to the undated garment known as the ‘Rogart shirt’ (Henshall 1952: 18–21). Whole garments of the medieval period, however, have been recovered from a number of sites in the Nordic countries and they have been published with their cutting patterns (Nørlund 1924; Gjessing 1938; Hald 1980; Nockert 1997; Nockert & Possnert 2002; Østergård 2004; Fransen et al 2011). The Canongate pieces have their best fit with adult garments from the Herjolfsnæs

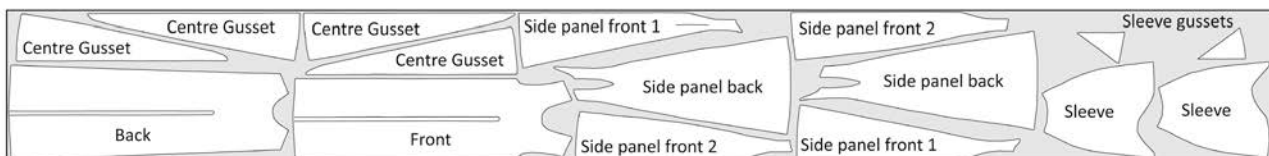
cemetery in Greenland, although they are larger and need to be scaled down by about 20 per cent to fit the relevant pattern layout (Illus 14). Herjolfsnæs garment types Ib-Ic (Nørlund 1924: 100–23; Fransen et al 2011: 41–94) were constructed from several vertical panels and Fragment A has shaping similar to that seen in the under-arm area at the top of the side panels. The side panels were mostly cut as long flaring pieces, but in at least one example (fig 2, garment D10581, Fransen et al 2011: 58–65), their upper parts were separate pieces, similar in shape to Fragment A. Since the under-arm area receives most wear, it is possible that these represent repairs. The sinuous shape of the seam on Fragment F resembles the under-arm area of the sleeve itself, where it will have been stitched to the arm-hole.

Adjoining Fragments B–C and Fragment D have one straight and one sloping side, which can be compared with the two-part gores inserted into the same styles of garment. If this interpretation is correct, then the garment will have been closely fitted on the shoulders and upper chest, but fuller

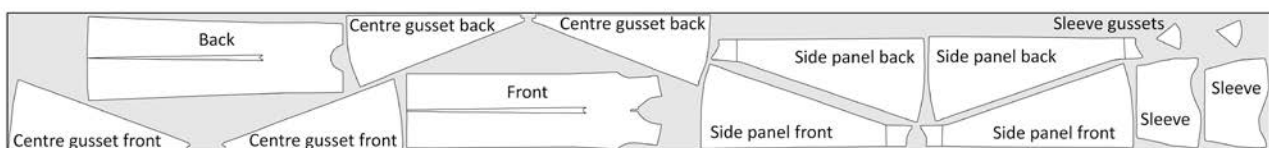
Herjolfsnaes garment styles Ib-Ic



Pattern layout for garment D10580 on 80cm wide cloth



Pattern layout for garment D10581 on 80cm wide cloth



Illus 14 Garment types Ib–Ic from the Herjolfsnæs cemetery, Greenland, and the cutting pattern for garments D10580 and D10581 (both type Ib). Adapted from Fransen et al 2011: 41, 51, 59, 63

in the body and skirt. This fashion was widespread in northern Europe, where it was largely dated to the 14th century as worn by men and women, although there was some continuation into the 15th century among women (Fransen et al 2011: 128). The Herjolfsnæs burials were mostly 14th-century, with a few earlier and later graves.

The fabric is the same in all fragments, a wool 2/1 twill, made with S-spun yarn in warp and weft and a medium-coarse thread-count of 8 × 6 per cm. The selvages, present in Fragments A and B–C, were matted and could only be viewed in patches, but appeared to be of simple construction. The 2/1 twill weave has a warp face and a weft face, which means that front and back can be determined. As is common with late medieval wool twills, the warp side faced outwards, while the weft side, slightly matted in places, faced inwards. The wool proved to be derived from two different fleece-types, Generalised Medium in the warp and Hairy Medium in the weft – both of which were widespread and common in the late medieval period (Ryder 1983: 472–7). All fragments were heavily stained, or dyed, to a dark brown or black, but a certain number of densely pigmented (naturally black) fibres could be observed amongst the non-pigmented ones in warp and weft. This, then, was made of grey wool, possibly over-dyed for a more even black.

Wool 2/1 twills, when they occur in English urban centres, are usually dated to the 11th to mid-14th centuries (Walton 1981: 194–5; Crowfoot et al 1992: 26–30), but in Scotland and Norway they seem to continue, in diminishing numbers, for at least another century (Walton Rogers 1999: 197; Gabra-Sanders 2001: 227–32). A similar textile, for example, a 2/1 twill with 6 × 6 threads per cm and S-spun yarn in warp and weft, was recorded at Edinburgh Old Parliament Building in a 15th- to 16th-century deposit (Walton Rogers forthcoming).

These remains therefore accord with the evidence of the pottery for a 14th- to 16th-century date for the fill of the ditch, though they would possibly fit most naturally in the earlier half of this time-frame.

A.4.1 Offcuts from garment-making

Three further fragments were found, separate from the garment parts, in association with leather. SF37 and SF43 came from C009 and are so alike

in technical details that they can be interpreted as coming from the same cloth. SF45, from C020, is similar, but not identical. All three have been woven in tabby from S-spun yarn and have been heavily soft-finished (probably teaselled and sheared in the case of SF37 and SF43), so that the cloth is very thick, with a felt-like appearance. The wool from which they have been made was originally white, but has been dyed (or stained) a very dark brown or black.

These are typical of wool clothing fabrics of the late 14th century onwards, when tabby weaves with S-spun yarn in warp and weft became increasingly common (Walton 1981; 1983; Crowfoot et al 1992: 45). The three pieces are clearly offcuts, left over from cutting out pattern pieces, and the weight of the cloth suggests an outer garment such as a coat or jacket. When recovered in their hundreds, offcuts are usually interpreted as waste from tailors' workshops (Walton 1981; 1983), but a small collection such as this is more likely to represent scraps left over from domestic garment-making.

APPENDIX 5 THE LEATHER ASSEMBLAGE

Clare Thomas

This small assemblage of leather consists of 13 items, comprising eight shoe parts, one fastening, one strap and three offcuts.

A.5.1 Shoes

Shoes are represented by four fragments of soles, two uppers, a heel stiffener and a fragment of rand.

The shoes bear all the characteristics of turnshoe construction, with the soles having the flesh side upwards, and edge-flesh stitching channels. The uppers have lasting margins with grain-flesh stitching channels. Both soles and uppers have stitch lengths of 5–6mm. The larger upper fragment (no. 5) is almost certainly of one-piece design, with an edge-flesh stitching channel on the vamp wing, with a stitch length of 3mm. Neither upper fragment has any surviving fastening. Heel stiffeners were attached to the interior of quarters. Rands were used to improve the sole-upper seam and make it more waterproof.

All the soles are very slender; the three surviving toes are pointed, and turned outwards; no. 1 (SF43



Illus 15 The leather shoe; SF43

– Illus 15) has an extended toe and an exceptionally narrow waist. The extended toe might have been stuffed with moss.

Slender soles with pointed toes generally date from the 14th to 15th centuries, as, for example, from Threave Castle, Galloway (Thomas 1981: 123–4). Similar soles from Perth, mainly of 14th-century date, were broader and without turned-out toes. (Type 4, Thomas & Bogdan 2012: 170, 176, illus 121) An example from Perth with a turned-out pointed toe, dating to the 12th century, has a much wider waist and forepart (Thomas & Bogdan 2012: 172, 178).

Other parallels found at York dated from the early 13th century onwards, but especially from the 14th and 15th centuries (Mould et al 2003: 3273). Examples from elsewhere, for example London and Exeter, of 14th- to 15th-century date, mostly have broader foreparts and toes which are not turned outwards (Friendship-Taylor 1984: 324–30; Grew & de Neergaard 1988: 66).

One upper (no. 5, SF52) is from a low shoe, with a rounded toe and an oversewn top edge. The area of

the vamp throat is very worn, obscuring any potential evidence for fastenings. The other upper is a small vamp fragment with pointed toe, possibly matching the forepart of sole no. 2 (SF52). Both uppers are too fragmentary to enable comparison for dating purposes.

A.5.2 Straps and fastenings

A strip with a pointed slit is probably a fastening (no. 9), while a narrow fragment with traces of stitching is possibly a strap (no. 10).

A.5.3 Waste material

Three small offcuts (nos 11, 12 and 13) are possibly left-overs from reuse of leather. They do not appear to be waste from primary working of leather.

A.5.4 Conclusion

The most interesting characteristic of this small assemblage is the uniformity of the soles, all very slender, and, where they survive, with pointed toes, turned outwards. The parallels quoted above suggest

a 14th- or 15th-century date. The small amount of waste material is possibly indicative of reuse of leather, but not of primary working of the material.

A.5.5 Catalogue of illustrated objects

► **SF43, C009 (Illus 15)**

Slender right sole, complete apart from rear of seat, with exceptionally narrow waist, and a pointed toe, which points outwards. Edge-flesh stitching channel, stitch length 5mm.

Worn, with hole in centre forepart, and torn across seat.

Surviving measurements: L 210mm; T 2.5mm; W of seat 38mm, waist 12mm, forepart 55mm.

APPENDIX 6 THE MACROPLANT REMAINS

Jackaline Robertson

A.6.1 Introduction

A total of 13 bulk samples were submitted for environmental analysis. The macroplant assemblage was preserved through both anaerobic and charring conditions. Although generally small the plant assemblage was composed of food remains, weed species, woodland and heathland material. Very little charcoal was present; only a few fragments of charcoal larger than 4mm were present in C006, C010 and C014. Coal fragments were recovered from nine contexts, and this suggests that in medieval Edinburgh coal was preferred as a fuel source over charcoal.

The results are presented in Tables 1 and 2.

A.6.2 The carbonised macroplant assemblage

A total of 131 carbonised plant remains were recovered from eight contexts and the assemblage was dominated by poorly preserved cereal caryopses. The species identified were barley (*Hordeum* sp.) (× 20), bread/club wheat (*Triticum aestivum* type) (× 30), wheat/rye (*Triticum/Secale* sp.) (× 5), wheat (*Triticum* sp.) (× 1), oat (*Avena* sp.) (× 33) and cereal (× 36). The other finds were two hazelnut shell fragments (*Corylus avellana* L.), two hemp nettle (*Galeopsis* sp.), one dock (*Rumex* sp.) and two indeterminate weed seeds which could not be identified further due to poor preservation. The

Table 1 The carbonised macroplant assemblage

Context	004	005	006	008	010	013
Feature	Upper ditch	Upper ditch	Upper ditch	Upper ditch	Upper ditch	Lower ditch
% Sorted	100	100	100	100	100	100
Vernacular name	Common name	Plant part				
<i>Triticum aestivum</i> -type	Bread/club wheat	Caryopsis/es	2	1	4	23
<i>Triticum/Secale</i> sp.	Wheat/rye	Caryopsis/es	1	2	2	
<i>Triticum</i> sp.	Wheat	Caryopsis/es	1			
<i>Hordeum</i> sp.	Barley	Caryopsis/es	2	2	3	12
<i>Avena</i> sp.	Oat	Caryopsis/es	6	2	1	24
	Cereal	Caryopsis/es	1	2	3	27
<i>Galeopsis</i> subgenus	Hemp nettle	Nutlet(s)			1	1
<i>Galeopsis</i>						
	Indet.					2

Table 2 The waterlogged macroplant assemblage

Feature	Ditch	Ditch	Ditch	Plant part
Context	009	022	023	
Sample vol. (kg)	2.5	2.5	2.5	
% Processed	25	25	25	
Vernacular name	Common name	Plant part		
<i>Pteridium aquilinum</i> (L.)	Bracken	Pinnule frg(s)	*	
<i>Corylus avellana</i> L.	Hazel	Nur(s) and/or nutshell frg(s)	*	*
		Charred nut(s) and/or nutshell frg(s)	*	*
<i>Urtica dioica</i> L.	Stinging nettle	Achene(s)		**
<i>U. urens</i> L.	Annual nettle	Achene(s)	*	**
<i>Polygonum aviculare</i> agg.	Knotgrass	Fruit(s)	*	*
<i>Persicaria lapathifolia</i> L.	Pale persicaria	Fruit(s)	*	
<i>Bilderdykia convolvulus</i> L.	Black bindweed	Fruit(s)	*	
<i>Rumex acetosella</i> L.	Sheep's sorrel	Fruit(s)	**	
	Sheep's sorrel	Charred fruit(s)		*
<i>Rumex</i> sp(p).	Docks	Fruit(s)	****	***
		Perienth	****	*
<i>Chenopodium album</i> L.	Fat hen	Seed(s)	*	
<i>Atriplex</i> sp(p).	Oraches	Seed(s)		*
<i>Atriplex hortensis</i> L.	Red orach	Seed(s)	**	*
<i>Stellaria media</i> L.	Common chickweed	Seed(s)	****	*
<i>Stellaria</i> sp(p).	Chickweed	Seed(s)	*	*
<i>Cerastium</i> sp(p).	Mouse-ear chickweeds	Seed(s)	*	***
<i>Spergula arvensis</i> L.	Corn spurrey	Seed(s)	*	
<i>Agrostemma githago</i> L.	Corncockle	Seed frg(s)	**	

Table 2 cont

Vernacular name	Common name	Plant part
<i>Ranunculus</i> sp.	Meadow/creeping/bulbous buttercup	Achene(s) *
<i>Brassica rapa</i> L.	Turnip	Seed(s) ****
<i>Brassica</i> sp./ <i>Sinapis arvensis</i>	Turnip/cabbage	Seed(s) **
<i>Raphanus raphanistrum</i> L.	Wild radish	Charred pod segments and/or frg(s) * *
<i>R. fruticosus</i> agg.	Blackberry/bramble	Seed(s) *
<i>Linum usitatissimum</i> L.	Cultivated flax	Seed(s) **
<i>Calluna vulgaris</i> L.	Heather	Leaf/leaves ***
<i>Myosotis</i> sp(p).	Forget-me-nots	Nutlet(s) *
<i>Sambucus nigra</i> L.	Elderberry	Seed(s) *
<i>Carduus/Cirsium</i> sp(p).	Thistles	Achene(s) * *
<i>Sonchus asper</i> L.	Prickly sow-thistle	Achene(s) *
<i>S. arvensis</i> L.	Corn sow-thistle	Achene(s) *
<i>Conium maculatum</i> L.	Hemlock	Fruits **** **
<i>Allium</i> sp(p).	Onions/leeks etc	Leaf epidermis frg(s) *
<i>Juncus inflexus/effusus/conglomeratus</i>	Hard/soft/compact rush	Seed(s) * **
<i>Bran</i>	Hard/soft/compact rush	Capsule *
<i>Avena sativa</i> L.	Bran	Periderm frg(s) (bran) *
<i>Carex</i> sp(p).	Cultivated oat	Waterlogged floret bases *
Twigs/rw	Sedges	Nutlet(s) * *
Wood chip		*** *
Wood frags		* ****
Indet. seed		* *

Table 2 *cont*

Vernacular name	Common name	Plant part
Moss		
Sphagnum		*
Moss stem		***
Insects		
Worm capsule		* *
Fly puparia		**
Beetle		**
Other		*
IN	*****	***** **
Midden-type peat material		*****
Burnt peat		*
Shell	*	* *** *
Fish bone		* *
Leather		* *
Burnt bone	*	* *
Snail shell		* *
Spores	*****	***** *

Key: *=<10, **=10-29, ***=30-100, ****=>100

charred cereal caryopses were concentrated in C010, with the rest scattered throughout the remaining deposits with no evidence of selective or deliberate disposal.

A.6.3 The waterlogged macroplant assemblage

C009 and C023 were only partially waterlogged and appeared to have undergone periods of aeration, which has led to the irretrievable loss of organic remains. C009 was particularly affected by this issue and this was reflected in the poor condition and small number of plant remains recovered from this deposit. The preservation in C023 was marginally better and more food and weed species were recovered. C022 was the richest sample and produced the greatest number of waterlogged finds in both quantity and species diversity. The waterlogged assemblage was composed of a small number of food remains alongside a much larger variety of weed taxa. The food remains included bran, cultivated oat floret, flax (*Linum usitatissimum* L.), epidermis fragments of onion/leek (*Allium* sp.) and a large number of turnip seeds (*Brassica rapa* L.).

A.6.4 Discussion

A.6.4.1 Cultivated foods

The carbonised cereal caryopses from the ditch are all common finds from the Scottish medieval period. Bread club wheat, barley and oat were used to produce bread, porridge, gruel and alcoholic beverages. The small quantities recovered make it difficult to establish which cereal species, if any, was the most economically important. None of the grains were germinated so it is unlikely this was waste produce from brewing. The presence of only a single waterlogged cultivated oat floret (*Avena sativa* L.) indicates that the grain had already been processed elsewhere.

The cereal caryopses had been burnt at an extremely high temperature and as a result were excreting a tar-like substance. This could have been accidental and have occurred during food preparation, but distinctive surface abrasions typical of a weevil infestation were visible on most of the caryopses, especially those from C010. The weevil infestation appeared particularly advanced and it is likely these were deliberately burnt at a high

temperature in an effort to stop it spreading to other foodstuffs. The destroyed grain was subsequently disposed of in this ditch, again in an effort to prevent cross-contamination.

Bran is normally a good indicator of the presence of cess and it is likely that human faecal matter was disposed of in small quantities in the ditch, particularly within C022. The absence of any hay or stabling waste rules out the likelihood that animal dung was also disposed of within this ditch.

A.6.4.2 Wild food remains

The wild food remains were hazelnut shell and blackberry/bramble (*R. fruticosus* agg.). The hazelnut shell was recovered in both a waterlogged and charred condition. Blackberry/bramble, which usually grows on waste ground, could have been an accidental inclusion within this ditch but it is more likely to have been collected for food as it is a typical inclusion within cess. The presence of these species is evidence of exploitation of wild resources.

A.6.4.3 Heathland material

The heathland material included burnt peat, heather (*Calluna vulgaris* L.) and buttercups (*Ranunculus* sp.) and this could have been collected for use as fuel or building material. The heather and buttercup were probably accidental inclusions within the peat which was deliberately collected.

A.6.4.4 Woodland material

Woodland material was recovered in the form of twigs, roundwood fragments and a small number of worked wood chips in C022. There was also a small quantity of bracken and moss identified as *Sphagnum* sp. The wood was probably collected for building and fuel and was disposed of as waste. Moss has multiple uses as toilet paper, packing, rope-making and insulation, but given the small quantities present it is more likely it was growing on the wood and imported as an accidental inclusion. The bracken could have been collected deliberately for use as a building or fuel material, but the small quantities present are more suggestive of accidental inclusions.

A.6.4.5 Weed taxa

The carbonised weed taxa are of little interpretive value and were probably intrusive seeds which were accidentally charred rather than representing foodstuffs or other economically useful plants.

The waterlogged weed seeds were a mix of waste ground and agricultural contaminants. Several of the weed species such as the chickweed (*Stellaria* sp.), and wild radish (*Raphanus raphanistrum* L.) have all been used as a food source, especially in times of famine. The particularly large concentration of chickweed within C022 from the lower fill could reflect use of this plant as an extra food supplement during the 12th and 13th centuries.

The rest of the weed assemblage was made of taxa typically found in waste grounds and damp habitats, such as rush (*Juncus* sp.), sedge (*Carex* sp.), nettles (*Urtica* sp.), docks and thistles (*Carduus/Cirsium* sp.). Given the relatively large number in which they were recovered, it is likely they grew on nearby waste ground close to the ditch or on its silty margins before becoming accidentally trapped within its confines. It is also possible that the rush and sedge were used as floor coverings or thatching, but it was not possible to determine their actual role.

A.6.4.6 Poisonous plants

Corncockle (*Agrostemma githago* L.) was recovered in a fragmentary form, suggesting it had been consumed. This species is a common agricultural contaminant of cereal crops which is poisonous if eaten. This species was probably introduced to the site as a by-product of the bran, and this was a serious problem in medieval Scotland. Another poisonous plant was hemlock (*Conium maculatum* L.) recovered in large numbers from C022 and C023. This plant could have been growing nearby and been deposited accidentally in the ditch, but alternatively it could have been used as a medicine. It is possible that hemlock was used as a treatment for outbreaks of disease from the 14th century onwards, and was subsequently deposited into the fill as a component of cess material.

A.6.5 Conclusion

The small size and poor preservation of the cereal caryopses from East Market Street is similar to that reported at other sites in medieval Edinburgh. The carbonised macroplant assemblages from Caltongate (Robertson forthcoming a), Advocate's Close (Robertson 2017c) and Jeffrey Street (Haston 2014: 46) were all equally small and generally poorly preserved. What all four assemblages do demonstrate is that grain was not processed in any significant scale within the urban domestic areas of Edinburgh during the later medieval period. Instead it appears that the city residents preferred to buy flour or bread rather than grain.

Where East Market Street differs from the other Edinburgh sites is in the recovery of a waterlogged plant assemblage. The waterlogged assemblage is similar to the finds recovered from medieval Bon Accord in Aberdeen, where there was evidence for the disposal of cess, food, heathland and woodland material but on a much larger scale (Robertson forthcoming b).

The cereal species are all common finds throughout the 14th to 16th centuries. The cereal appears to have been deliberately burnt and then disposed of in the ditch in an effort to curtail an infestation of weevils in other foodstuffs.

The waterlogged plant remains give an insight into the local diet and the immediate environment of the site. It is clear that the people using this ditch disposed of small quantities of cess and food refuse such as bran, onion/leek and turnip. There is also some evidence of exploitation of heathland materials in the form of peat turves. The recovery of waste ground weed taxa suggests that the landscape surrounding this ditch was made up of damp, acidic, nitrogen-rich soils and was relatively overgrown.

The variety of the waterlogged plant remains within the lower ditch deposits suggests that this feature was left open for extended periods of time. The smaller number of charred macroplants from the upper fills indicates that the ditch was sealed more often. This could have been as a result of hygiene legislation which controlled how waste was deposited in the later periods. Throughout the duration of the existence of the ditch it appears to have been used partly for the disposal of domestic waste.

APPENDIX 7 THE ANIMAL BONE

*Jackaline Robertson***A.7.1 Introduction**

A total of 2910 (31.6kg) of animal bone fragments were recovered from the ditch. The faunal assemblage derived from three sources: primarily butchery waste and domestic food refuse, as well as bone-working in the form of horn cores and possible tanning waste in the form of cattle phalanges.

The stratified nature of the ditch deposits at East Market Street has provided an excellent opportunity to examine animal exploitation and waste disposal practices in medieval Edinburgh. This has made it possible to establish whether exploitation of species changed over an archaeologically secure time period. By analysing the skeletal elements it has been possible to determine the nature of this debris and whether it accumulated from primarily domestic, butchery or industrial sources. The nature of the ditch at East Market Street is unusual because, unlike other midden deposits in Edinburgh which represent the disposal of local waste, it appears that the debris within the ditch was collected from a larger area and was deliberately deposited to backfill this feature in the later phases.

The assemblage was quantified using both number of identifiable specimens (NISP) and minimum number of individuals (MNI) (Tables 3 and 4). It is noted that both methods do have recognised drawbacks but it is hoped that by using them in conjunction with each other a more accurate interpretation of the assemblage and how species were utilised may emerge.

A.7.2 Results

A total of 2113 fragments were recovered by hand and a further 797 collected from the bulk samples. Identifiable fragments consisted of sheep/goat (60%), sheep (3%), cattle (27%), horse (2%), red deer (0.5%), pig (1%), dog (1%), cat (1%), rabbit (0.5%), rodent (3%). The rest of the assemblage was described as large mammal (45%), medium mammal (24%), small mammal (1%) or indeterminate (30%) where appropriate (Table 3).

The remains were dominated by domestic species, in particular sheep/goat. While all skeletal elements were represented the most common finds were skull fragments, ribs, vertebrae and foot bones alongside smaller quantities of long bones, scapula and pelvises. The bulk of the assemblage was concentrated within upper ditch fill C004 and lower ditch fill C009, with much smaller numbers in the remaining deposits. Preservation of the fragments varied from poor to excellent, but the majority were described as good. Those fragments designated as poor were mostly smaller than 50mm and many had suffered from external surface staining and/or weathering due to burning and prolonged exposure to the soil conditions and elements. Those fragments which were poorly preserved were mostly recovered from the bulk samples.

The results for the ditch are briefly summarised below by context. The fragments recovered from both the unstratified and mixed deposits are not discussed further.

A.7.2.1 Ditch fill C002

Ditch fill C002 contained 178 animal bone fragments. The species were sheep/goat, cattle and rabbit. The sheep/goat and cattle remains derived from an accumulation of food debris alongside some butchery waste. The butchered bones were long bones and vertebra which appear to have been dismembered and defleshed by a mix of both professionals and amateurs. A small number of the long bones had also been marrow-cracked, and these marks appeared clumsy and were probably undertaken within a domestic setting. A cattle phalanx bore striation marks which could be evidence of continual stress being placed on this joint. This could have occurred if this individual was used as a long-term draught animal. This was the only deposit in which rabbit was present and the remains were composed of an articulated first, second and third phalange. The rabbit could represent food debris but it is more plausible that this individual is an intrusive animal that burrowed into the deposit. This fill was in use for only a short period of time and represents a deliberate dumping of debris to backfill the lower deposits within the ditch.

Table 3 (NISP) total fragment count by deposit

NISP	Upper 2	Upper 4	Upper 5	Upper 6	Upper 7	Upper 8	Upper 10	Lower 9	Lower 13	Lower 14	Lower 20	Lower 22	Lower 23	Lower 20/21	U/S	Total
Cattle	10	93	3	10	6	6	73	73	4	4	8	8	2	2	17	226
Horse		3		2			3	3			7				1	16
Sheep		14					6	6					1			21
Sheep/ goat	12	178	11	11	1	18	215	215			11				17	474
Pig		4			1		7	7								12
Red deer							1	1								1
Dog		2					3	3			3				1	9
Cat		1			1		5	5								7
Rabbit		3														3
Rodent		3			1	2	1	6		1			5			19
L/M	69	409	21	23	7	20	1	320	4	12	17		2		50	955
M/M	18	202	5	2	1	14		237	1	6	2		3	2	13	506
S/M	2	6					2	2			3					13
I/M	64	122	104	11	43	123	13	94	7	28	6	6	33			648
Total	178	1037	144	59	53	185	15	972	12	51	51	6	44	4	99	2910

Table 4 Minimum number of individuals for both the domestic and wild species

Species	MNI
Cattle	9
Horse	3
Sheep	15
Sheep/goat	53
Pig	3
Red deer	1
Dog	4
Cat	4

A.7.2.2 Ditch fill C004

The animal bone remains were concentrated in ditch fill C004, which had 1037 fragments. The species identified were cattle, sheep, sheep/goat, pig, horse, dog, cat and rodent. The cattle remains were dominated by foot bones, in particular the first phalanx. There were also a small number of metapodials which bore evidence of marrow-cracking. There was no evidence that the phalanges had been butchered or were intended for human consumption. Instead, these remains appear to have derived from butchery waste or possibly from tanning. The metapodials which were first stripped of flesh and then later had the marrow extracted probably accumulated through the disposal of domestic food waste. The sheep/goat bones were representative of all elements, including both low- and high-value meat. The sheep/goat remains came from two distinct sources: butchery and domestic food waste. The pig remains were made up of high-value meat bones which accumulated through the disposal of domestic food waste. The horse remains consisted of a tooth, an ulna and a radius. The radius had a cut mark made when dismembering the carcass to aid with disposal. The dog and cat remains were either scavengers or pets that were opportunistically disposed of within the ditch. This deposit represents the rapid and deliberate disposal of rubbish to backfill the base of the ditch.

A.7.2.3 Ditch fill C005

A total of 144 fragments were recovered from ditch fill C005 and the species identified were cattle and sheep/goat. The cattle remains were comprised of two mandibles and a femur. The 11 sheep/goat bones were mandibles, metapodials, a humerus and a loose tooth. The remainder of the fragments were too poorly preserved to identify further. These remains appear to be waste from primary butchery. Ditch fill C005 represents the rapid and deliberate disposal of rubbish to backfill the base of the ditch.

A.7.2.4 Ditch fill C006

Ditch fill C006 contained 59 fragments and the species were cattle, sheep/goat and horse. The cattle remains were a mix of skull and foot bone fragments. The sheep/goat remains were a similar mix but also contained a tibia and scapula. The horse remains consisted of two teeth. These remains are representative of butchery waste which was disposed of within the ditch.

A.7.2.5 Ditch fill C007

Ditch fill C007 had 53 fragments, and only one was identifiable to species as a rodent humerus. Preservation of these fragments was poor and most were smaller than 50mm. With the exception of one hand-retrieved scapula fragment the remainder were collected from the bulk samples. These remains are representative of fragmented debris which was allowed to accumulate within this deposit.

A.7.2.6 Ditch fill C008

A total of 185 bone fragments were recovered from ditch fill C008. The species were cattle, sheep/goat, pig, cat and rodent. The cattle and sheep/goat bones were a mix of skeletal elements with evidence of butchery made by both professionals and amateurs. This suggests that these remains accumulated through the disposal of both butchery and domestic food waste. A single cat bone was present, which belonged either to a scavenger or a pet. These remains were deliberately disposed of within the ditch to backfill the lower deposits.

A.7.2.6 Ditch fill C009

Ditch fill C009 was partly waterlogged and contained 972 fragments. Cattle, sheep, sheep/goat, horse, pig, red deer, dog, cat and rodent were present. The skeletal elements from the main domesticates were all present and represent both the disposal of butchery waste and domestic food waste. A small number of horn cores may represent industrial waste. There was evidence of both professional and amateur butchery. The cattle bones usually displayed a higher level of butchery skill when compared to some of the marks on the sheep/goat and pig remains. The horse, dog and cat bones probably represent the opportunistic disposal of animals which do not appear to have first been utilised for food or in industry. This was the only fill from which a single red deer humerus was recovered. This bone had been butchered, indicating this species did form part of the diet. The lower deposits were left open for longer than the upper fills. The bone from the lower fill had suffered a higher degree of taphonomic weathering and staining due to longer exposure to the elements. This fill was intentionally used for the disposal of both butchery and domestic food waste over a significant period of time. The partly waterlogged nature of this ditch would have contributed to noxious smells and an unstable surface, which would have made sealing this deposit a necessity to contain the smell and create a suitable surface for building. This explains why the deposits above C009 all appear to represent a rapid and sustained build-up of whatever suitable material was at hand.

A.7.2.7 Ditch fill C010

Ditch fill C010 contained 15 fragments, of which only one could be identified as rodent. These remains were recovered entirely from the bulk samples and preservation was poor; most fragments were smaller than 50mm. These fragments were of little interpretive value.

A.7.2.8 Ditch fill C013

Ditch fill C013 produced a total of 12 fragments and none of these were identifiable to species. There were ribs and a vertebra belonging to a large and medium-sized mammal respectively, but no further information could be obtained.

A.7.2.9 Ditch fill C014

Ditch fill C014 contained 51 fragments of bone. The species were cattle and rodent. These remains represent a small dump of butchery waste before this deposit was rapidly sealed. The butchery marks observed on the bones appear professional and there is no evidence to suggest that either domestic or industrial waste was deposited in C014.

A.7.2.10 Ditch fill C020

Ditch fill C020 contained 51 fragments and the species were cattle, sheep/goat, horse and dog. The cattle, sheep/goat and horse primarily represent butchery waste alongside a much smaller amount of domestic waste and horn core working. The dog is probably a scavenger or pet disposed of after death. The horse remains belong to a single individual which was killed by a single blunt force trauma to the skull and then subsequently dismembered.

A.7.2.11 Ditch fill C022

A total of six fragments were recovered from waterlogged fill C022. None of these fragments were identifiable and all were smaller than 50mm. These remains were of little interpretive value. What is obvious is that this lower deposit was not used for the disposal of bone waste in the form of butchery, domestic food and industrial debris.

A.7.2.12 Ditch fill C023

Waterlogged deposit C023 had 44 fragments, and the species were sheep and rodent. These fragments probably accumulated from the short-term disposal of domestic food waste. This lower fill within the ditch was not routinely used for the disposal of bone waste.

A.7.3 Discussion

A.7.3.1 Distribution of the assemblage

The animal bone assemblage is concentrated within two contexts, C004 and C009. The lower deposits were open for longer than those from the upper layers of the ditch. This is evident by the higher level of weathering and surface staining on the fragments recovered from the lower fills. It is clear from the amounts present that the lowest deposits in this

ditch were not regularly used for the disposal of animal bone. This is in direct contrast to the upper deposits, which were rapidly filled with a mix of waste from various sources. This material was probably collected from nearby domestic tenements, butchers and workshops with the sole purpose of quickly backfilling the ditch.

A.7.3.2 Species dominance

The assemblage is dominated by domestic species, and analysis of MNI (minimum number of individuals) revealed that sheep/goat were the most economically important species followed by cattle and pig. This pattern of species dominance remains true throughout the use of the ditch. The other domestic species, horse, dog and cat, were present only in small numbers. Wild species were represented by a single red deer bone and three articulated rabbit bones. There were a small number of fragmented rodent bones but it was not possible to identify these to species.

A.7.3.3 Diet

Sheep/goat: Sheep/goat was the most economically important source of meat, and this did not alter throughout the use of this site. All of the skeletal elements were represented for this species and this included both high quality and low quality cuts of meat. Traditionally the mandible, skull fragments, vertebrae, ribs and foot bones are viewed as poor-quality cuts, whereas the long bones and scapula contain more meat. The skull, mandible, vertebrae, ribs and phalanges in all likelihood derived from butchery waste, whereas the long bones, scapula, pelvises and metapodials were domestic food residues.

Cattle: Beef had only a minor role and the cattle bones recovered were generally low-quality and dominated by foot bones. The majority of the metapodials had been marrow-cracked, whereas the phalanges were generally not butchered. It is unlikely the phalanges, especially those deposited in an articulated state, were ever intended for human consumption and instead were disposed of as primary butchery waste. The large number of phalanges could also represent tanning and leather-working waste. The cattle elements were generally of low meat quality, and this indicates that the economic status of the people

depositing food rubbish was marginal. It certainly seems that the population who had access to beef either could not regularly afford good quality cuts of beef or instead preferred lamb and mutton.

Pig: Only a small number of pig bones were recovered and these were a mix of both long bones and foot bones. The small number of pig bones highlights the insignificant role pork had within the local population's diet.

Horse: The horse remains are unlikely to have derived from domestic food refuse but there is evidence that at least one of the bones had been butchered. Horse meat was typically used as animal feed for dogs, or it could perhaps represent the disposal of small-scale industrial waste.

Wild species: Red deer were represented by a single bone, demonstrating the minor role this species had in the everyday diet of urban Edinburgh. Restrictions on hunting deer and the urban location of this site would undoubtedly have limited the accessibility and affordability of venison to the general population. The rabbit could have been a source of food, but as the bones were still articulated it is likely that this species is intrusive.

Small mammals: There is no evidence to suggest that the dog and cat remains were ever exploited for food or fur. Instead, these remains probably derived from working animals, pets or semi-feral scavengers. These animals would either have been deliberately disposed of or were accidentally reworked into the ditch fills. The rodents were undoubtedly opportunistic scavengers which were either disposed of within the ditch after death or lived there and were able to exploit it for food.

A.7.3.4 Mortality profile

To establish slaughter patterns and thereby the age of death of individual animals, tooth wear and epiphyseal fusion were analysed together. Identifying the presence of females, males and castrates within the assemblage was reliant in part on metrical data. By considering these datasets in conjunction with each other it has proved possible to establish a clearer idea of the animal husbandry techniques practised in medieval Edinburgh and the type of waste deposited in this ditch.

Sheep/goat: The age data for the sheep/goat bones demonstrate three peaks at which death occurred for this species. The first age at which death occurred for four individuals was before the age of 10 months. The majority of the animals (34) died at the next peak, which was between the ages of 18 and 24 months. A further 15 were subsequently slaughtered between the ages of three and four. There was no evidence of either neonates or senile animals within this population. Certainly no animal appears to have survived beyond the age of four years. This was clearly a meat economy as the majority of the animals were slaughtered in their prime once they had reached their optimum size, which typically occurs between the ages of two and three years. Culling animals in their prime indicates that exploitation of secondary products such as wool, milk and breeding was of secondary importance.

It was possible to identify the presence of three males within the sheep/goat assemblage. It is logical to assume that those individuals culled before the age of 10 months were surplus male animals which were slaughtered before winter. The slaughter pattern at East Market Street is similar to Advocate's Close (Robertson 2017a), Giles Street and Jeffrey Street (Tourunen 2014), where males were also identified. Therefore it is likely that the majority of these animals were in fact males deliberately selected for their meat and not required for breeding.

Cattle: The cattle assemblage was small but it was still possible to establish three peaks at which death occurred. The youngest individual died before the age of 1.5 years. The oldest animal was approximately five years at time of death. The remaining seven animals died between the ages of 2.5 and 3.5 years. This slaughter pattern is representative of a meat economy. Seven females were noted within the assemblage and all were older than 2.5 years at time of death. These animals were probably first exploited for breeding and milk production before obtaining their optimum weight size and subsequently being slaughtered. It appears that the animals were deliberately selected to provide meat, rather than being utilised long-term for secondary products.

Pig: The available evidence for the pig remains is based on three individuals. The youngest individual from the lower deposit died between the ages of 18 and 22 months. There were two individuals in the

upper layers and one was younger than 2.5 years while the eldest was approximately 2.5 years old. The pig from the lower deposit was male but it was not possible to determine the sex of the other individuals. Pigs are normally slaughtered as soon as possible, as they have no secondary products to exploit and can prove difficult to rear. These animals were deliberately fattened until they reached their optimum weight size. In all likelihood they would also have been used for breeding until they reached the desired size.

Horse: The remains of one horse were present in the upper layers, with a further individual in the lower deposits. Analysis of fusion revealed both were older than three years. Examination of tooth wear for one individual meant it was possible to identify this as a male who expired after the age of 10 years.

Dog: The dog remains belonged to four individuals scattered in the upper and lower deposits. The individual in the upper deposit died between the ages of 24 and 30 months. There were two animals deposited in C009, one of which died between the ages of 8 and 9 months, while the other was older than 1.5 years at time of death. The fourth dog in C020 expired between the ages of 24 and 30 months.

Cat: A single adult cat was present in the upper ditch along with a kitten, and the remains of two other juveniles were found in the lower deposits. There is no evidence to suggest that these animals were slaughtered for their fur but the remains could represent the deliberate culling of feral animals viewed as a nuisance and potential health hazard in times of disease outbreak.

Wild species: A single red deer bone belonging to an adult was recovered from the lower ditch. The rabbit bones were of little interpretive value.

A.7.3.5 Butchery

The butchery techniques fell into two distinct categories, those practised by professional butchers who killed, halved and quartered the carcasses while the remainder of the butchery was undertaken within a domestic setting by unskilled individuals. There was evidence of how the animals were slaughtered, dismembered and jointed in the form of poleaxing,

Table 5 Butchery marks on both domestic and wild species

Species	Cattle	Red deer	Horse	Sheep	Sheep/goat	Pig	L/M	M/M
Butchery type								
Chop	30	1	1	1	13	2	67	26
Cut	2						4	1
Saw	3				5		87	152
Skin	1				1		6	3
Hung					3			
Chop/cut	1							
Saw/skin								16
Marrow cracking	45			2	71		53	14
Poleaxeing			1		1			
Total	82		2	3	94	2	217	212
% of bone	36	100	12	14	20	17	23	42

chop marks, cut, saw and skinning marks (Table 5).

Sheep/goat: 34% of the sheep/goat bones had signs of butchery. The majority of these marks were marrow-cracking alongside a smaller number of chop, cut, saw and skinning marks. There was also evidence that three scapulas had holes in the blades to allow them to be hung. A sheep/goat skull fragment still had evidence of a blunt force trauma which was probably undertaken in an effort to kill the animal. The majority of these butchery marks appear unskilled and this suggests that they were done in a domestic setting. It is likely that the sheep/goat cuts of meat were bought not fully butchered and it was left to the individual to prepare the meat before cooking. This probably made the cost of lamb and mutton cheaper and a more affordable source of meat.

Cattle: 36% of the cattle bones had been butchered. The majority of the butchered bones were metapodials which had all been marrow-cracked. The long bones had signs of chop and saw marks and unlike the marrow-cracking, these appear more skilled. The metapodials were probably bought intact from the butcher to be cracked in the house, where the marrow would be extracted for soup and stew stock. The long bones and scapula appear to have been fully prepared by the butchers or required little further work after being sold.

Pig: The shafts of a pig femur and tibia had been marrow-cracked. There was no evidence to suggest that this was done by an experienced butcher; it was instead probably undertaken in a domestic setting.

Horse: A horse radius had a single cut mark which probably occurred when the carcass was being dismembered. A complete horse skull had first been poleaxed by being hit on the forehead, but there was also a large circular hole located behind the right eye. These blows were made by a blunt instrument such as a hammer. There was no evidence of any healing and the blow to the forehead either killed the animal outright or stunned it long enough to allow for a further attempt. The blow behind the eye could have been a second attempt or was undertaken in an effort to access the brain.

Red deer: The red deer humerus had a single chop mark on the shaft.

Large/medium mammals: Of the elements described as large mammals, 23% had been butchered alongside 42% of the medium mammal bones. These were dominated by ribs and vertebrae which were probably cattle and sheep/goat in origin. All of the vertebrae displayed similar chop marks, which would have occurred during the initial dismemberment of the carcass when the cerebral column was split. There were chop, cut and saw marks on the ribs, which would have been the result

of skinning and being detached from the body. These butchery techniques all follow the same pattern and were undertaken by professional butchers.

Small mammals: There was no evidence that any dog, cat or other small mammal had been butchered either for its meat or more probably for its fur/pelt.

A.7.3.6 Health

The general health of the main domestic species appears to have been relatively good, as evidence of pathological conditions were minimal. Three conditions were noted: osteoarthritis, enamel hypoplasia and signs of bone infection.

Osteoarthritis is identified through the presence of bone growth, pitting and eburnation. The first signs of arthritis in the form of eburnation were located on the head of a single dog femur, whereas extensive bone growth and porosity but no eburnation was present on a horse calcaneum.

Enamel hypoplasia was observed on a cattle molar, which is a sign of malnutrition. This is a common condition affecting cattle in the medieval and early post-medieval period, where in times of famine and food hardship, grazing and fodder for animals became expensive and hard to find. There are also signs of stress marks on a cattle phalanx which could have been caused by continual pressure on the joint if the individual was a draught animal.

A single sheep/goat mandible displayed signs of receding gums, which had left the roots of the teeth exposed. This was probably the result of an infection or abscess which would have caused the animal discomfort when eating.

Two large mammal and medium mammal ribs have evidence of fractures with no sign of healing. This is a common injury in large domestic species, especially in cattle. This is usually caused when the animals are herded close together and begin to brush up against each other, resulting in damage to the ribs. A further two large mammal ribs had evidence of lesions which could have been cancerous or signs of an infection.

A.7.3.7 Metric analysis

Metric analysis can provide valuable information in identifying sex, and changes in livestock and animal husbandry practices. A total of 69 bones were

measured, but given such a relatively small dataset and the nature of the bones measured it was not possible to establish whether any significant changes occurred within the animal population over time. It was possible to identify the presence of seven female cattle, three male sheep/goat, one male pig and one male horse.

Comparing this site with the measurements available from Advocate's Close (Robertson 2017a), the Parliament site (Smith 2010: 86) and Perth High Street (Hodgson et al 2011), the main domesticates are of a similar size.

A.7.3.8 Non-metric traits

Evidence of non-metric traits was observed on three cattle bones. A second premolar had failed to erupt in either its deciduous or adult form and in a separate mandible the third cusp had failed to form on the third molar. The absence of the second premolar and malformed third molar are unusual and could be caused by a heredity condition. This abnormality affecting the teeth was first observed in Scotland and accompanied the introduction of new cattle breeds in the Roman period (Robertson forthcoming c). These new species subsequently interbred with the local cattle, thereby introducing this hereditary trait into what appears to have been a relatively small breeding stock. This trait became less common but still persisted into the medieval and post-medieval period in central Scotland (Advocate's Close – Robertson 2017a; Cousland Castle, Midlothian – Robertson 2012). There was also a small hole at the base of a cattle skull. This is a common genetic trait and does not appear to have impacted on the health of the animal.

A total of 16 sheep/goat mandibles and two maxillas had evidence of abrasions and slight holes affecting the surface of the premolars and molars. This was probably the result of a gritty diet from allowing the animals to graze on sandy soils. This tooth abnormality has been observed at other sites in Edinburgh at Advocate's Close and Parliament House (Robertson 2017a; Thoms & Smith forthcoming). This could be because the animals transported to the city originate from the same flock or region. The second premolar had also failed to erupt in three mandibles. As with the cattle mandibles, the failure of this tooth to erupt could be a hereditary

condition within a particular breed of sheep/goat. This tooth abnormality has previously been observed at Advocate's Close (Robertson 2017a).

A.7.3.9 Bone modification

Two horns had been detached from the skull by sawing and one had been removed by several attempts at chopping. Aside from the presence of the horn core there was no other evidence for actual bone working in the ditch.

A total of 92 bone fragments had been modified by burning and most of these were only partly charred black or grey. Amongst the burnt bone the species which could be identified were a pig canine, two sheep/goat mandibles and a cattle phalanx. The majority of the burnt fragments were smaller than 10mm and preservation of these was mostly poor. These burnt bone fragments derived from cooking refuse which was disposed of within the ditch.

A sheep/goat metapodial had been gnawed by a small dog or cat. A rib had been chewed by a cat and one by a rodent.

A.7.3.10 Wild species

The only evidence of exploitation of wild species was in the form of red deer. As the hunting of venison was strictly regulated in the medieval period, it is likely that the deer in the ditch was purchased as a cut of meat. Rabbit was butchered and eaten at other medieval urban sites in Edinburgh (Robertson 2017a) but the presence of this species at East Market Street is more likely intrusive rather than representing part of the diet.

Other wild species which formed part of the diet were birds. This material has been reported on separately (see additional report).

A.7.4 Comparison sites

The faunal assemblage from East Market Street is similar to those previously reported from Advocate's Close (Robertson 2017a), Jeffrey Street, Giles Street, Water Street (Tourunen 2014: 44), Parliament House (Thoms & Smith forthcoming), Holyrood Parliament site (Smith 2010) and Bridgegate in Peebles (Smith & Henderson 2002). At all these sites in south-east Scotland, sheep/goat were the most economically important species throughout

the medieval period. Cattle and pig only ever had a marginal role and this is probably due to the farming techniques practised in the surrounding countryside. The favouring of sheep/goat over cattle was probably due to the available grazing in south-east Scotland.

The exploitation of sheep/goat within south-east Scotland is in direct contrast to the meat economy practised in the north-east of the country. In excavations undertaken in Perth and Aberdeen it was clear that beef was the preferred source of meat. (Hodgson et al 2011; Thoms & Smith forthcoming). Regional variability in animal husbandry techniques and food preferences in the medieval and post-medieval period is beginning to emerge with the increase in the number of urban excavations, particularly in Edinburgh (Smith 2010: 93).

The recovery of wild species tends to be a rare occurrence on Scottish medieval and post-medieval urban sites (Smith & Henderson 2002: 127). This makes the presence of red deer at the East Market Street site of note. There were a small number of deer and rabbit at Advocate's Close (Robertson 2017a) but none were recorded at either Jeffrey Street (Tourunen 2014) or Parliament House (Thoms & Smith forthcoming).

The age at which the main domesticates were slaughtered was also broadly comparable with the Advocate's Close, Jeffrey Street and Parliament sites in that both juveniles and relatively young adults were culled specifically for their meat rather than being primarily exploited for their secondary products (Tourunen 2014: 44; Thoms & Smith forthcoming).

A.7.5 Conclusion

The animal bone assemblage from East Market Street contains important information concerning how this material was accumulated, the sources from which it originally derived, what species were exploited, whether this changed over time and the status of the people who disposed of their rubbish within this ditch. The lower deposits within the ditch appear to have been left open for prolonged periods of time but they were not regularly used for the long-term disposal of butchery, food or industrial waste. It was not until lower deposit C009 was formed that the local population began to deliberately exploit it for the disposal of animal waste. The upper

deposits which subsequently overlay C009 were representative of a deliberate rapid backfill of general waste from a variety of sources, probably to seal the waterlogged deposits beneath. For this reason the ditch at East Market Street is unlike the midden features excavated at other urban sites in Edinburgh. This is because the rubbish deposited in the ditch at East Market Street was deliberately transported to the site to backfill a feature, whereas the middens are directly reflective of the activities of the surrounding tenements which used them. This does not mean that the animal bone assemblage from the ditch has no pertinent information to offer concerning the diet and animal husbandry techniques practised in medieval Edinburgh at large.

It is clear that the animal assemblage deposited within this ditch derived from butchery waste and domestic waste alongside a much smaller number of bone-working residue in the form of horn cores and possible tanning waste. The domestic species that were deposited within this ditch are typical of medieval Edinburgh in that sheep/goat were the most economically important source of meat and to a lesser extent beef and pork throughout the existence of this ditch, which was in use from the 12th to the 15th century. There is some evidence of exploitation of wild resources in the form of deer but this was only ever a marginal resource. The quality of the cuts of lamb and mutton varied, whereas the beef was generally of poor quality, and again this was consistent throughout the use of this ditch. This suggests that the domestic food was collected from low- to middle-income tenements.

APPENDIX 8 THE BIRD BONE

Jackaline Robertson

A.8.1 Introduction

A total of 66 bird bone fragments were recovered from the excavations. The good preservation of the bird bone has provided an excellent opportunity to examine the bird species exploited, and the diet and butchery techniques favoured in this part of Edinburgh.

A total of 63 fragments were recovered by hand with a further three collected from the bulk samples. The species and number of fragments identified (NISP) were domestic fowl (19), bantam (12),

goose (13), pheasant (2), duck (1), partridge (1), small bird (1) and indeterminate bird (17). The preservation of the bird bone ranged from poor to excellent, with most fragments designated as good. The remains were concentrated in the two deposits within the ditch: C004 and C009. Four fragments were described as unstratified and these are not discussed further. There was no evidence to suggest that selective disposal of particular body parts or species occurred within specific contexts at any phase within this ditch. The bird bone assemblage has derived from food debris.

A.8.2 Domestic species

A.8.2.1 Domestic fowl and bantams

As is usual for an urban medieval site, domestic fowl and bantam were the dominant species found in the ditch. Differentiating between these two species can be difficult and this can be further complicated by the presence of both males and females. This is because male bantams can be of a similar size to female domestic fowl. Nonetheless, it was possible to confidently identify both domestic fowl and bantam. Identifying sex was more problematic and only a single male domestic fowl was identified within the assemblage. Given such a small data set, it was not possible to determine which species or sex was preferred.

Analysis of epiphyses fusion revealed that all the bone fragments were fused and belonged to adults six months or more likely older (Silver 1969: 300). There was no evidence that any juveniles were present. It is possible that juvenile bones did not survive due to their small size and removal by scavengers. There is evidence of scavenging and animal gnawing by dogs, cats and rodents which could have permanently removed the more fragile bones. The absence of any juvenile bird remains from any deposits including both the lower primary fills and later backfills indicates that the exploitation of eggs was more important than consuming young birds.

A.8.2.2 Geese

The geese present within the ditch could not be identified as either the wild or domesticated breed. Geese were of secondary importance to

domestic fowl and it is likely that they derived from a domesticated breed rather than a wild variety, because the number of wild species such as duck, pheasant and partridge was much smaller in comparison to the domestic breeds. All of the geese bones belonged to adults, which indicates that the geese were primarily exploited for eggs then only later slaughtered for their meat, feathers and grease (Smith & Clarke 2011: 50).

A.8.2.3 Wild species

The wild species were duck, pheasant and partridge. The small number of wild species recovered suggests that none of these species played a major role in the diet of the inhabitants using this ditch for waste disposal. Domestic ducks are believed to be a late introduction to Scotland but it is also difficult to differentiate between the wild and domestic varieties. Either way, it was not possible to confidently identify this single duck bone as domestic and it is more likely to be of a wild species. Pheasant and partridge are woodland species and would usually have been hunted by hawking (Smith & Clarke 2011: 85). This form of hunting was normally reserved for members of the upper society such as the aristocracy and clergy, and this explains why only a few fragments of these species were recovered.

A.8.2.4 Bone modification

There was evidence of butchery, pathology and animal gnawing. Two bird bones had been inexpertly butchered, which involved defleshing. A single bantam pelvis had evidence of bone growth along the surface, which could have been the result of an infection. Three goose bones and one bantam bone all had signs of animal gnawing attributable to cats and/or dogs.

A.8.3 Discussion

The bird bone assemblage from East Market Street is similar in terms of species to that recovered from other urban sites, ie Advocate's Close, Edinburgh (Robertson 2017b), Jeffrey Street, Edinburgh (Tourunen 2014), Bon Accord, Aberdeen (Thoms

& Robertson forthcoming) and High Street, Perth (Smith & Clarke 2011). The size of the assemblages varied between the sites but the domestic species remained constant. At all five sites the pattern of bird exploitation favoured domestic fowl, bantams and geese, with some access to wild species. Utilisation of wild species appears to have been dictated by economic status and the surrounding habitat.

The bird bone assemblage from East Market Street is small but still has a valuable contribution to make with regards to understanding the diet, butchery techniques and status of the inhabitants using this ditch for the disposal of domestic food debris. Domestic bird species such as domestic fowl, bantam and geese all played an important role in the economy of Edinburgh. These adult birds were primarily exploited for eggs and only later slaughtered for their meat, feathers and grease. Wild species including duck, pheasant and partridge had only a minor dietary role. Access to wild species would have been restricted to those who could either afford to purchase these species from the flesh markets or were able to hunt them locally. The unskilled butchery techniques used to skin the birds suggests that the domestic species were probably raised locally then subsequently slaughtered and butchered within a domestic setting.

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