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A matter of life and death – trade and burial around St Giles' Cathedral: archaeological investigations at Parliament House, Edinburgh

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1. ABSTRACT

Archaeological evaluation of the Southern Courtyard of the Parliament House complex, to the south of St Giles' Cathedral in Edinburgh's Old Town, has provided a valuable insight into the lives, health and mortality of the inhabitants of the late medieval city.

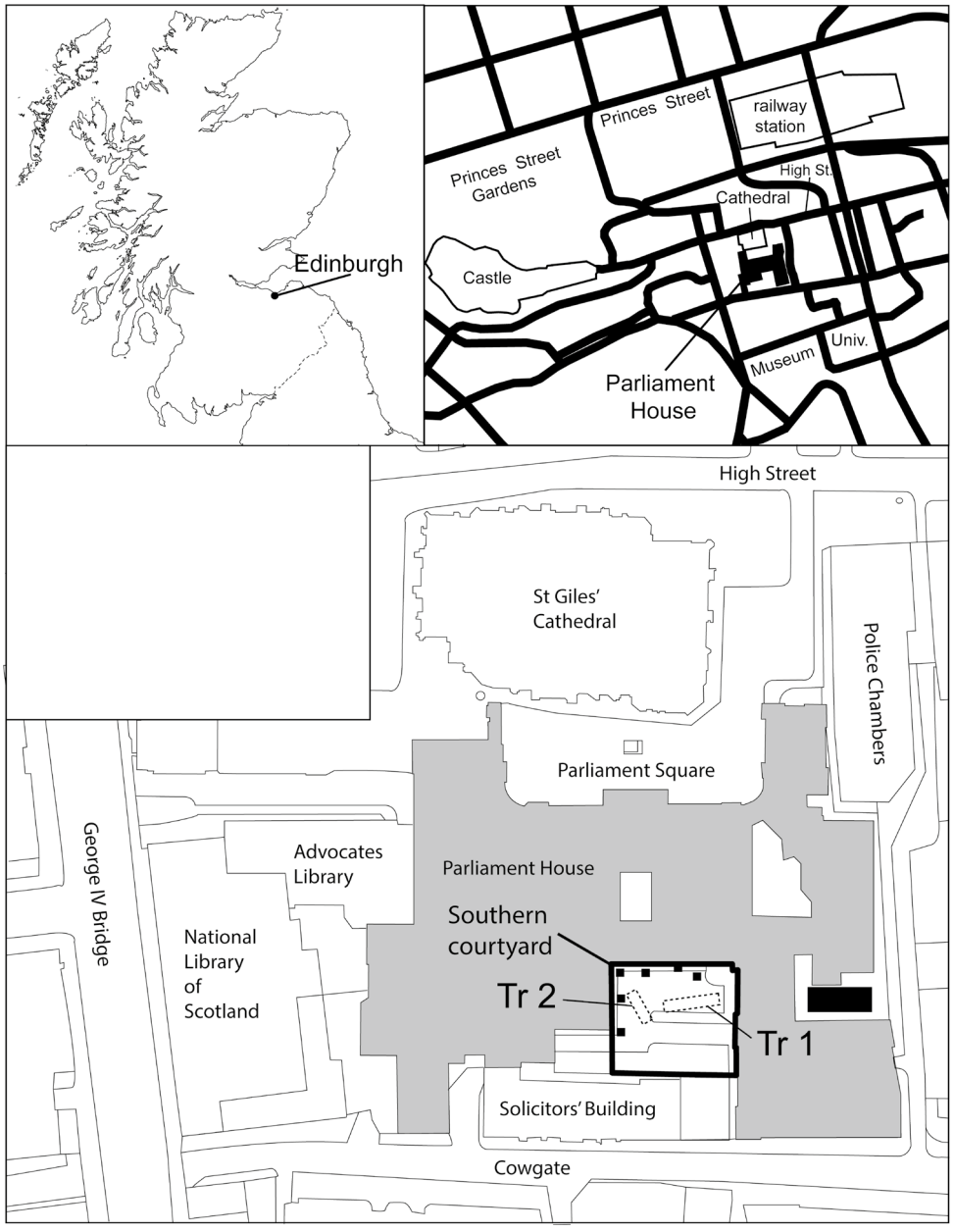
The evaluation revealed a backland area in the centre of medieval Edinburgh, with deposits rich in artefactual and ecofactual material derived from the everyday lives of the populace, underlying early burghal surfaces. The presence of artefacts including a small leather assemblage and a seal matrix may indicate production and trading activities between the High Street and the Cowgate in the late medieval period.

Above these surfaces, and underlying fragmentary evidence of the post-medieval Meal Market, numerous late medieval inhumations were recorded; these belonged to the southward expansion of St Giles' graveyard. This report details the analysis of the skeletal remains, illuminating the health and demography of the population of the city from around the mid-15th to the early-to-mid-16th century.

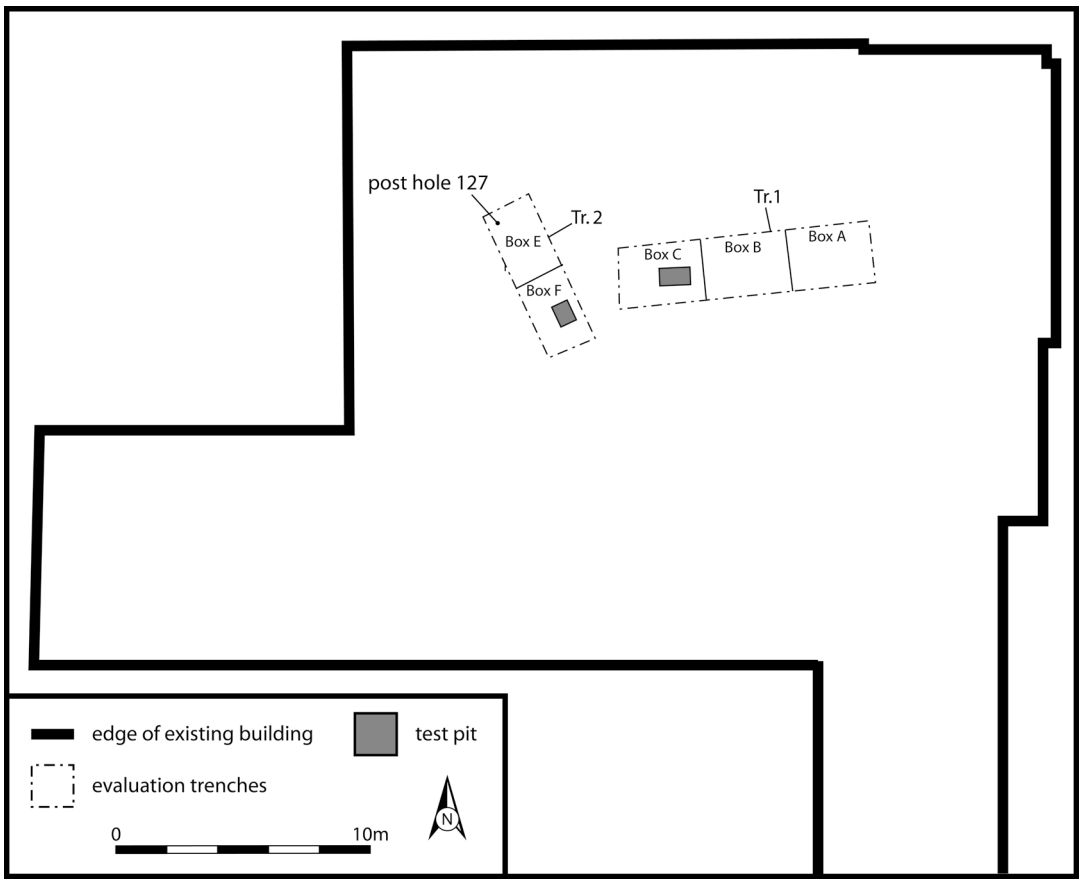
2. INTRODUCTION

Parliament House occupies a 2ha area within the World Heritage Site of Old Town, Edinburgh with Parliament Square, St Giles' Cathedral and the High Street to the north, the Cowgate to the south, Old Fishmarket Close to the east and the National Library to the west (Illus 1). The area occupied by Parliament House slopes down from Parliament Square towards the Cowgate and the building complex incorporates small landscaped spaces and courtyards, of which the Southern Courtyard is the largest. The courtyard (NGR: NT 2577 7350) is bounded to the north, east and west by Parliament House and to the south by the Solicitors' Building and the Cowgate. The natural geology of the site consists of boulder clay overlying bedrock comprising the Cementstone Group of the Calciferous Sandstone Measures of Lower Carboniferous Age (British Geological Survey 1965).

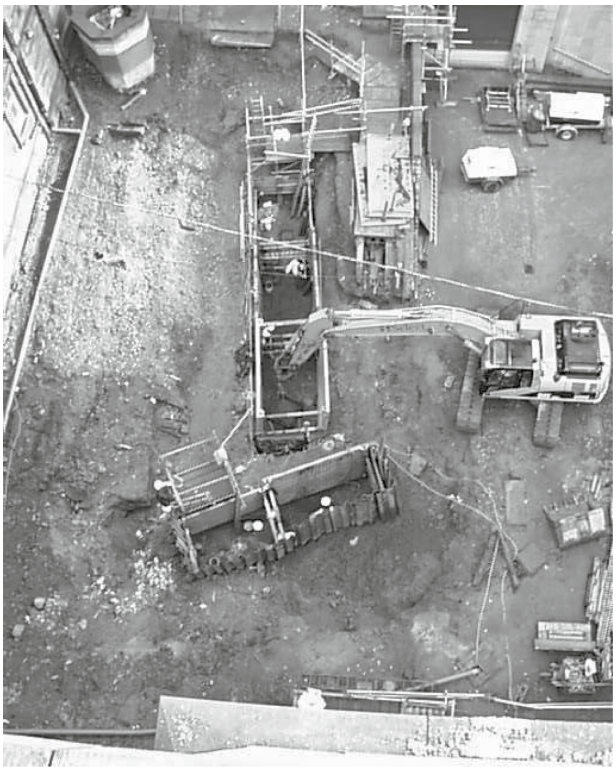
Following the recommendations of the City of Edinburgh Council Archaeology Service (CECAS), archaeological works were undertaken between 1998 and 2004 by AOC Archaeology Group in advance of the proposed redevelopment of the Scottish Law



Illus 1 Site location (© AOC Archaeology Group)



Illus 2 Evaluation trench locations (© AOC Archaeology Group)



Illus 3 View of site from west (© AOC Archaeology Group)

Courts at Parliament House. A series of watching briefs identified the presence of human bone at a depth of between 4m and 8m in the Southern Courtyard, leading to archaeological evaluation of the courtyard (Illus 2 & 3) in late 2004.

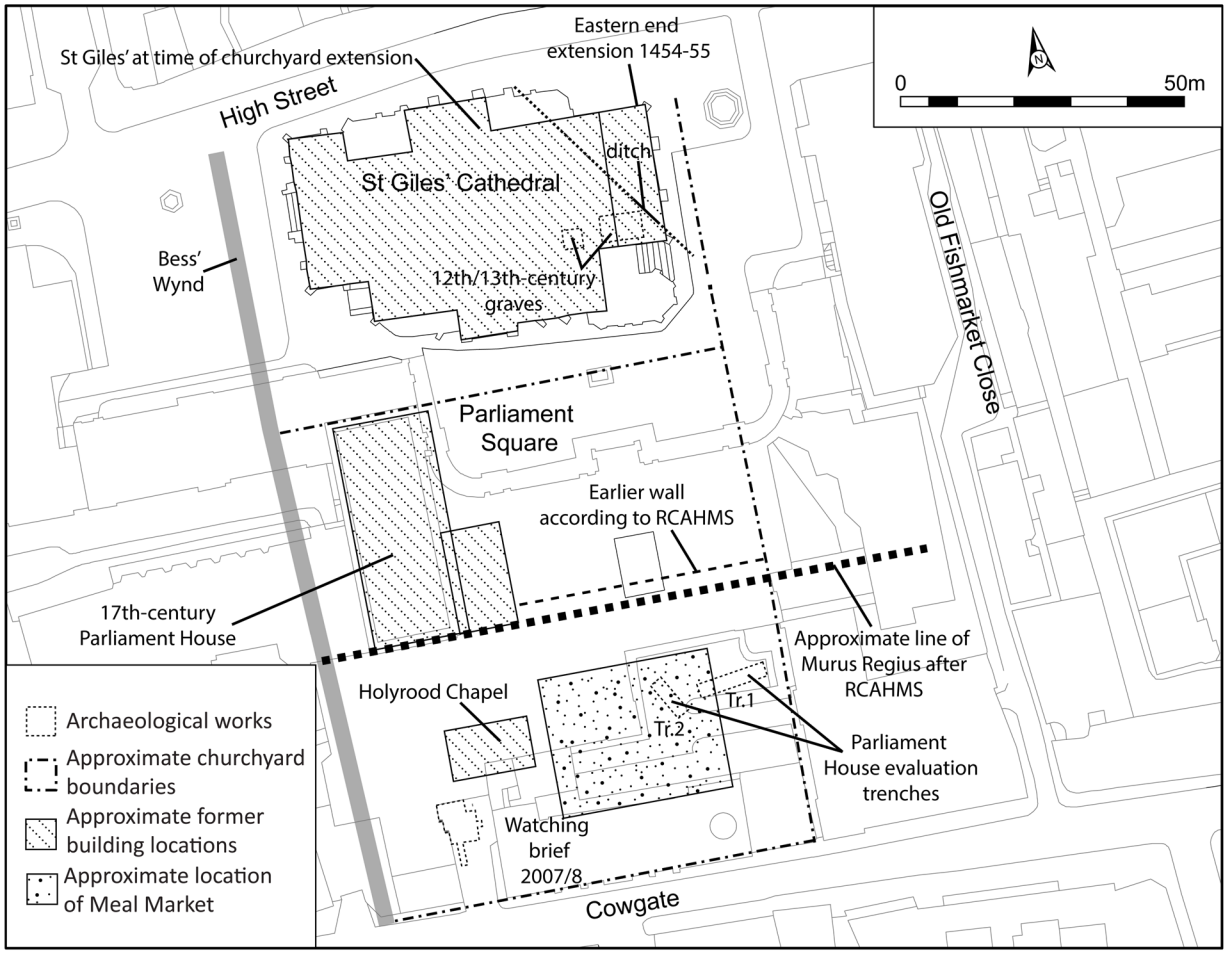
Significant archaeological remains were recorded, including inhumations within the 15th/16th-century southward expansion of St Giles' Church graveyard as well as earlier medieval deposits underlying the burial ground and the later probable surface of the 17th- to 19th-century Meal Market. The remains of 95 individuals were recovered from the burial ground; the analysis of this material (Appendix 1) has proven illuminating with regards to the population of late medieval Edinburgh.

3. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

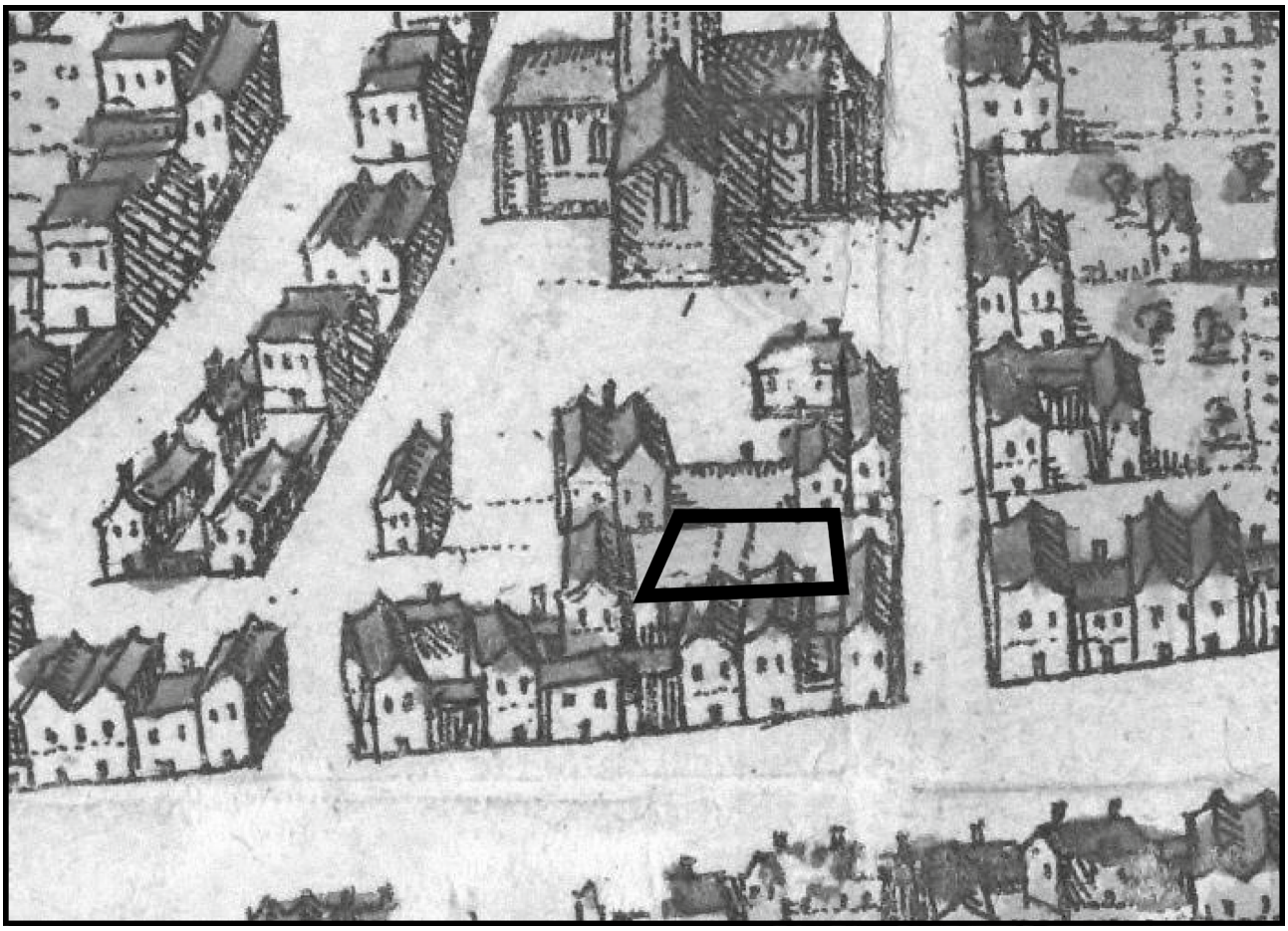
Morag Cross, Mike Roy, Lindsey Thomson & Ronan Toolis

The site now occupied by Parliament House has for over 500 years been one of the major religious, commercial, administrative and legal centres of the city of Edinburgh. The Southern Courtyard lay within the precincts of St Giles' and formed part of a southern extension of its churchyard from around the mid-to-late 15th century (Illus 4).

The church of St Giles was probably an Anglian foundation; the existence of a church in Edinburgh (belonging to the monastery at Lindisfarne) was noted in AD 834 (Lees 1889: 2) and it was the parish church of the burgh from the 12th century (Collard et al 2006: 4). The earliest known surviving fabric is medieval, belonging to its use as Edinburgh's parish church, its original structure being concentrated at the west end of the present building (RCAHMS 1951: 26). In 1981 excavations in the south choir aisle of St Giles' Cathedral revealed a ditch aligned north-west/south-east, which may have marked the eastern boundary of the parish church precincts from the time of its establishment under David I (Collard et al 2006: 9, 67–8). Collard, Lawson and Holmes projected the line of this ditch to form the later western edge of Kirkheugh, the steep vennel that ran along the eastern side of the churchyard (Collard et al 2006: 67, illus 5 and 6). To the south, the medieval town walls of Edinburgh, including the 15th-century *Murus Regius* or King's Wall, may have run roughly east/west across or very close to the Southern Courtyard area (Lawson & Reed 2003: 1; Illus 1). Nearby, at 144–166 Cowgate, a putative ditch, up to 4m wide, was identified to the south of the King's Wall (Dalland 2017: 10, 24–6), indicating potential for a similar defensive ditch feature to exist in proximity to the present site.



Illus 4 Reconstructed plan of St Giles' graveyard (© AOC Archaeology Group)



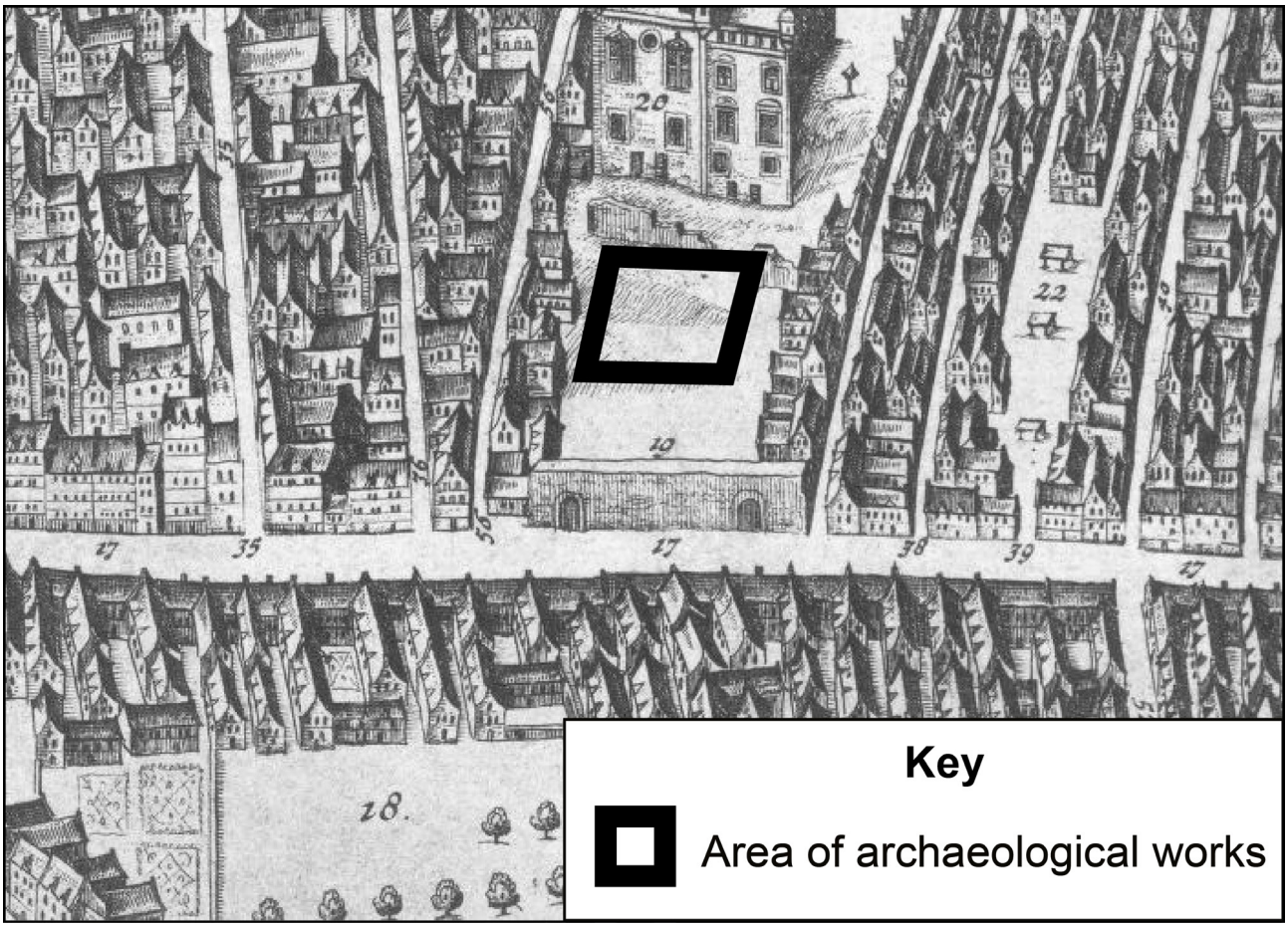
Illus 5 Braun, Georg & Hogenberg, Franz, *c* 1582, *Edenburgum*, *Scotiae Metropolis*, Cologne
(© Crown Copyright, reproduced by permission of the National Library of Scotland)

A massive ditch has recently been excavated at East Market Street, further demonstrating the potential for medieval defensive features on the edges of the burghs of Edinburgh and Canongate (Lowther 2018: 10–11).

Braun and Hogenberg's perspective view (Illus 5) depicts the church with its churchyard to the south and buildings lining the closes to either side, presumably Best's, Beth's or Bess' Wynd (Boog Watson 1923: 64–5) to the west and Kirkheugh to the east (Braun & Hogenberg 1582). The area is also illustrated, following the construction of the Parliament House, in Gordon of Rothiemay's perspective view of 1647 (Illus 6), which shows ruinous walls possibly associated with the churchyard or the *Murus Regius*. The building line to the east of the former cemetery, not quite perpendicular to the High Street, can be seen in Edgar's map of 1765 (Illus 7), preserved in Old Mealmarket Close, or Kirkheugh (Boog Watson 1923: 66–7).

The rental of various altars at St Giles', begun in 1369, provides one of the earliest descriptions of the townscape (*St Giles Reg* no. 156). The vennel leading to the burial ground seems to have had a north and south corner, suggesting a street lying east/west (*St Giles Reg*: p 276; p 280). Neither of two speculative reconstructions of the area shows such a street (Ross et al 1922: 128; Kerr 1925: 9) unless one may have run along the south side of the churchyard, which then only extended part of the way down the slope to the Cowgate.

An agreement to build five chapels on the south side of the church in 1387 (*Edin Chrs* no. 14) encroached upon an already limited external burial space. The glebe on the south side of the church was occupied by 'the priest with the cure of souls, the perpetual vicar' (*St Giles Reg*: p xxiv; Cowan 1967: 177), and in 1467–8, St Giles' was erected into a collegiate church, with 18 priests and four choristers (*St Giles Reg* no. 82; *Edin Chrs* no. 43).



Illus 6 Gordon of Rothiemay, *c* 1647, *Edinodunensis Tabulam* (© Crown Copyright, reproduced by permission of the National Library of Scotland)

Laing suggests the prebendaries lived on the west side of the churchyard, and the Provost on the east (*St Giles Reg*: p xxii).

In the mid-1440s, the churchyard was bounded to the west by a burgage plot and on the east by Kirkheugh (*St Giles Reg* nos 51, 62 and 66). The only direction to expand the burial space was south, but Provost Forbes' manse and garden stood in the way. However, Forbes donated much of his glebe in 1477–8, delineated as follows:

> That part of my garden with the pertinents … beginning at the vennel which lies on the east side of the garden, running from the south street commonly called the Cowgate as far as the said church and cemetery adjoin it; and extending from the east part of the said cemetery towards the west as far as my manse and the outbuildings on the east side of the manse, and then descending towards the south in a straight line as far as the south end of my yard or garden lying contiguous to the south end of aforesaid manse, and then under my said garden or yard towards the south, extending to the west just as the west part of my manse extends; and then descending to the south, as far as the said southern street commonly called the Cowgate; and from the west side to the east end of the said garden … as a burial ground (*Edin Chrs* no. 50; *St Giles Reg* no. 88).

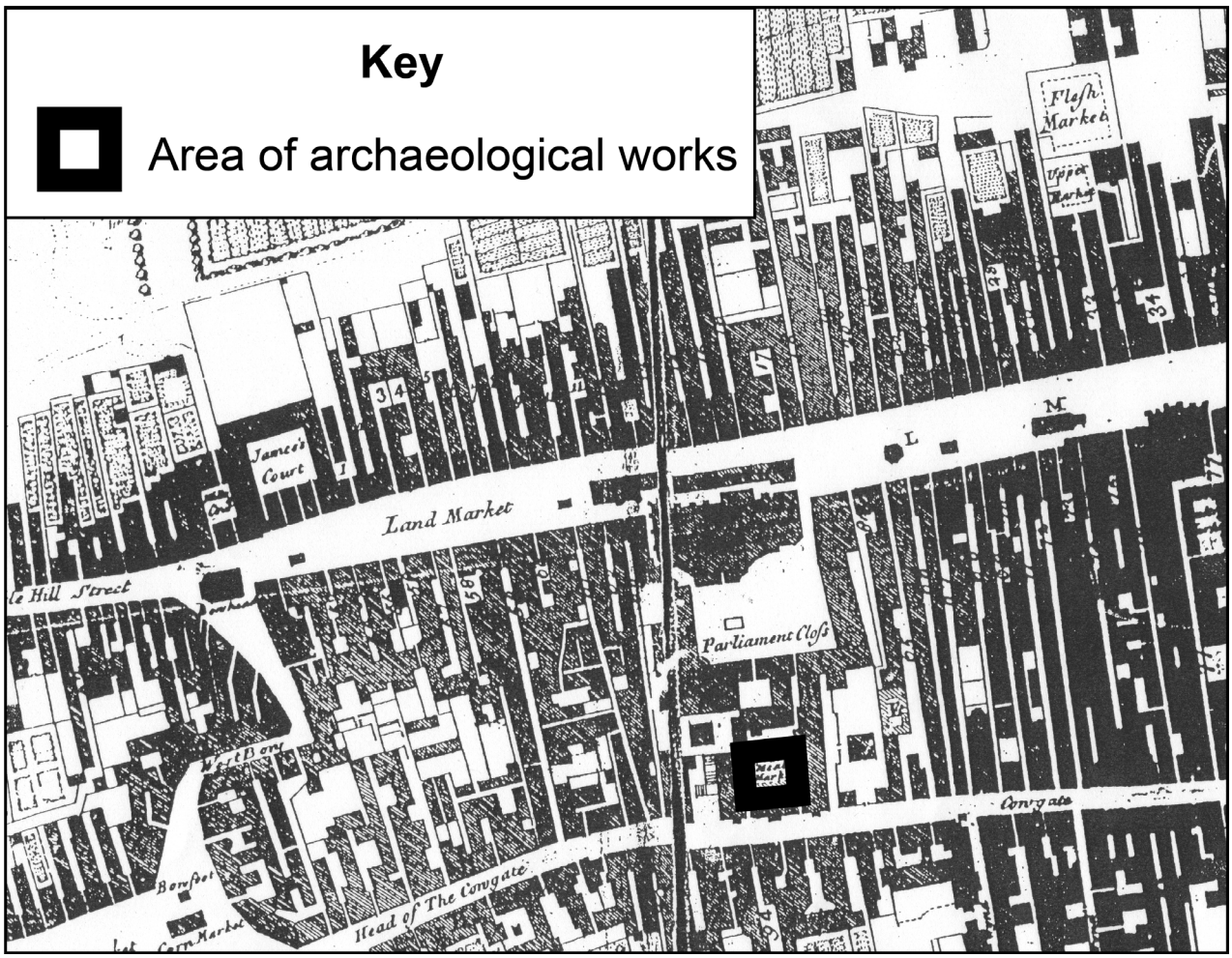
This suggests that the Provost's manse lay east/west, with its office houses to the east of it, and the gardens to the south. The donation was within part of the yards beside the manse (Wood 1974: 24). In 1496, when even this became insufficient, Forbes relinquished the northern part of his remaining glebe, which probably formed a rectilinear section to the west of the original cemetery, for additional burial space.

> That north part of our manse and glebe of the aforesaid church, next to and immediately adjoining the manse, viz the land and chamber of the curate and the school below it … extending from the said church to the north gable of the house commonly known as the stable, and from there directly in a line extending to the west as far as the lands of Alexander Gray and the late William Bigholme … (*Edin Chrs* no. 57; *St Giles Reg* no. 111).

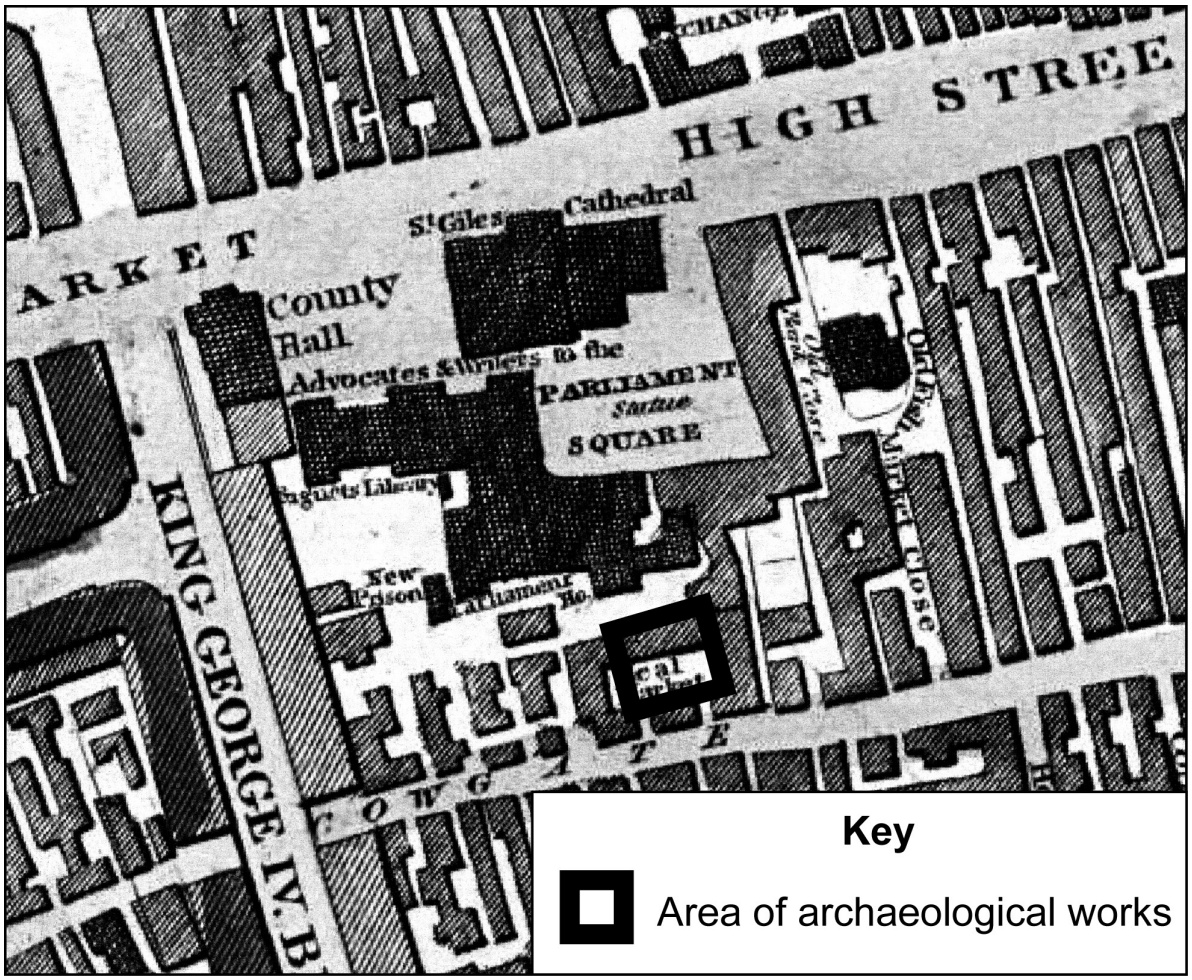
A sketch made in 1824 (ECL pYDA 1890 (1010)), after the fire of that year, purports to show part of the west wall of the churchyard, revealed during demolition work, some 250 feet (76m) north of the Cowgate. It had an ornamented entrance, which bore a date of 1620, just 12 years before Parliament House was constructed. It is possible, however, that rather than belonging to the churchyard, it may have been an element of one of the houses of the clergy.

The western edge of the graveyard was lined by houses built on a tenement called after an early owner, Alexander Gray. This was in turn subdivided into five or six lands, bounded on the west by Best's or Bess' Wynd (Edgar's Close 63), which ran from the High Street to the Cowgate. The graveyard would thus have terminated at the eastern wall of the houses approximately in a line with the eastern facade of the 'New Tolbooth' (Kerr 1925: 13, fig 2), paralleling the pattern of the eastern precinct edge. Here the 15th-century church expansion eastwards forced Kirkheugh Close to dogleg around it to reach the High Street (Collard et al 2006: 68), suggesting that the original graveyard occupied the breadth of the church from east to west.

Property and financial transactions to the west and east of the churchyard were recorded by the notary



Illus 7 Edgar, William, 1765, *City and Castle of Edinburgh* (© Crown Copyright, reproduced by permission of the National Library of Scotland)



Illus 8 Wood, John & Brown, Thomas, 1831, *Plan of the City of Edinburgh, including all the latest and intended improvements*, P Brown and T Nelson, Edinburgh (© Crown Copyright, reproduced by permission of the National Library of Scotland)

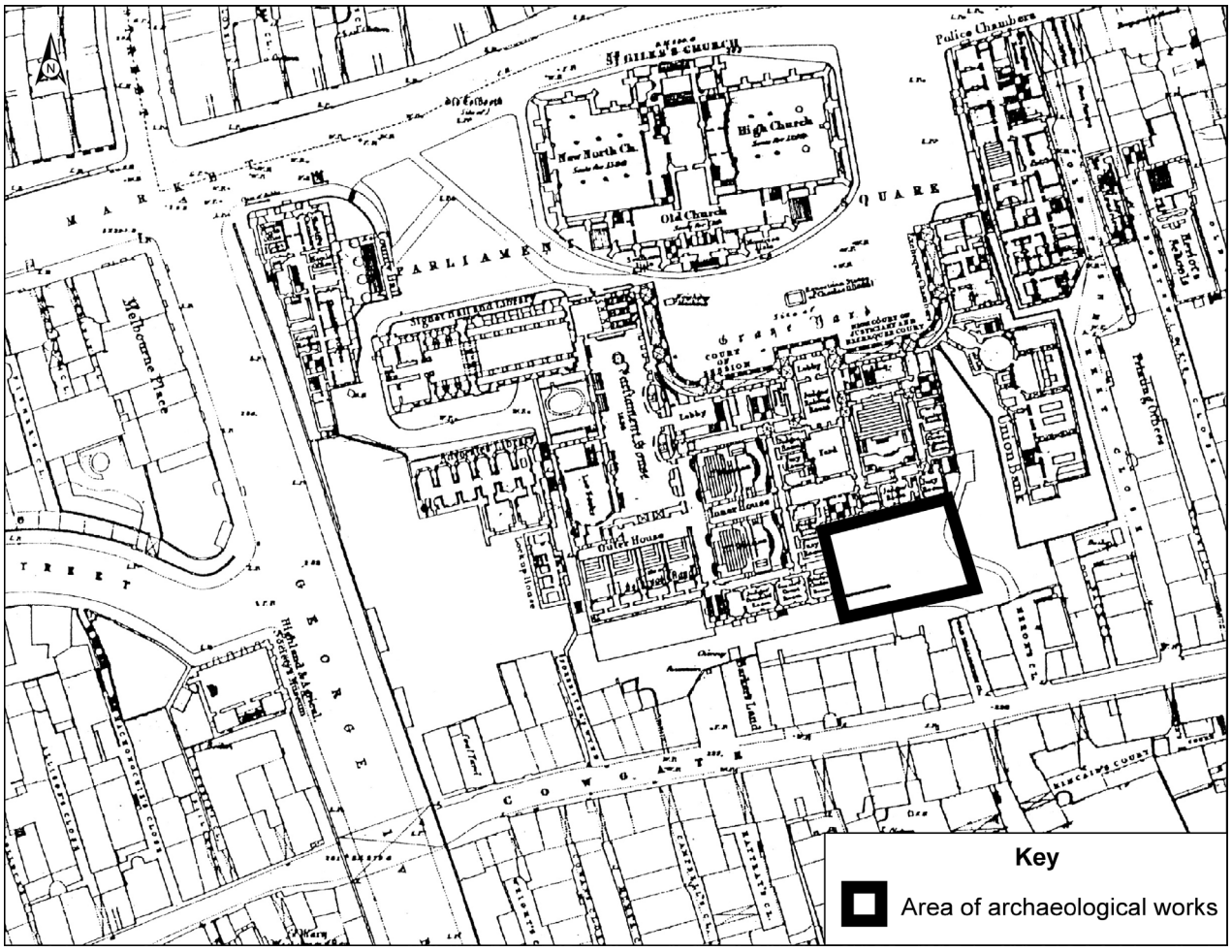
John Foular between 1500 and 1534 (Macleod 1930; Wood 1941 and 1953; Durkan 1985). The individuals involved in property transactions to the west and east of St Giles' graveyard included a mix of metalworkers (goldsmiths, cutlers, locksmiths) and other burgesses or skilled craftsmen, clergy and legal officials, as might be expected around the courts (in the Tolbooth), the booth row, and church. The church precincts functioned as a public open space for both mercantile and solemn legal activity. Agreements for property outwith Edinburgh were signed in the cemetery in 1490, which may have symbolically represented these other places (Donaldson 1952: nos 356, 1101). In 1463 the town leased 'a hall with chambers and cellars in the kirkyard' to burgess Thomas Swift, and another space was let to William Baroun, probably to store merchandise (*Edin Recs* I: 22; RMS II no. 681). In 1538 the grass market was moved from 'abouve the Tolbuith … to the fute of the kirk yaird' (*Edin Recs* II: 89), and in 1552 the burgh took income from 18 cordiners' shops, again, 'at the fute of the kirkyard'. In the 1550s the presence of a hospital and a song school in the churchyard are mentioned (*Edin Recs* II: 185, 192, 197, 285; Richardson 1910: 219).

As it was considered to be full, burial ceased in St Giles' churchyard around 1566, with the exception of the burial of John Knox in 1572 (Richardson 1910: 213–14). The Greyfriars burial ground then came into use – it had been given as a new burial ground for the town in February 1561–2 (RSS V, no. 3334; *Edin Recs* III: 132, 145–8). However, after the Reformation, at least some of the church ministers still lived in houses within the area of the churchyard (Richardson 1910: 216).

The Meal Market was moved to the lower churchyard in 1602, once timber sheds had been built on the site (Wood & Hannay 1927: 276, 300). Prior to this, it appears that shoemakers' shops were situated in the lower churchyard area (Maitland 1753: 185). Gordon of Rothiemay's 1647 plan (Illus 6) indicates the Meal Market area to be open, with a high wall fronting onto the Cowgate, pierced by two arched entrances, perhaps surviving elements of the *Murus Regius*. The Meal Market of the early 17th century was a relatively light structure made of wood, and landslip was a problem from early on (*Edin Recs* V: 289, 300, 374; VI: 135). Rothiemay's view of 1647 also depicts Parliament House at the northern end of the churchyard. Between 1632 and 1639 the original structure of Parliament House was built within the upper churchyard (Cullen 1992: 4), being erected over the site of three ministers' houses (Maitland 1753: 185; Cullen 1992: 2).

Following a fire in 1676, Thomas Robertson rebuilt the Meal Market in stone (Wood 1974: 32). The 'great fire' of 1700 destroyed most buildings east and south of Parliament Close (Maitland 1753: 112; Chambers 1824: 11–29). The redeveloped Meal Market, visible on Edgar's plan of 1765 (Illus 7), continued in its original function beyond the middle of the 18th century. By 1824 the Meal Market was a courtyard structure, as illustrated by Skene (ECL pYDA 1929 M48 (4952)), terraced into the hillside.

Another major fire, which began in the Meal Market in 1824, destroying all of Parliament Square east of Parliament House, prompted a new phase of redevelopment. The layout of Parliament Square around the 1820s can be seen in Wood and Brown's plan of 1831 (Illus 8) and between 1827 and 1835 the bulk of the present Parliament House complex was completed (Barber et al 2001: 66).



Illus 9 Ordnance Survey, 1849–53, Edinburgh, Sheet 35, 1:1056 (© Crown Copyright, reproduced by permission of the National Library of Scotland)

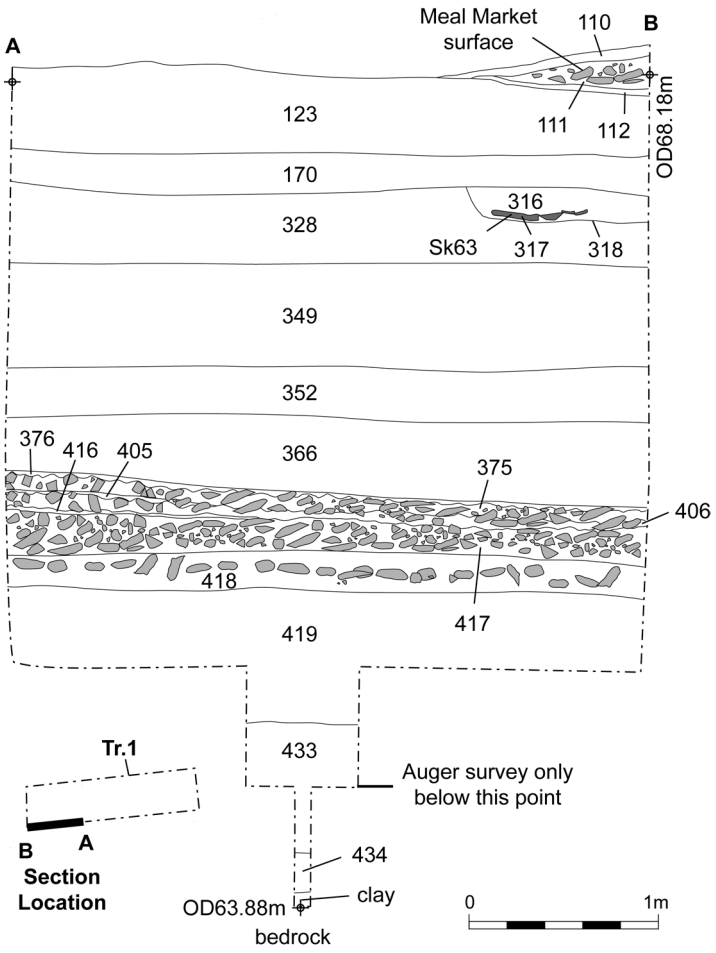
Human remains were noted during the digging of foundation trenches, both at the top of the slope near Parliament Close and beneath the supposed city wall (Anon 1833). During construction of court buildings in 1844–5, ridged, straight-sided oak coffins containing human remains were uncovered, 14 feet (4.27m) below the surface (Grant 1882: 245). The extensive development of the area at the time is clearly visible on the 1849–53 Ordnance Survey (OS) map (Illus 9), with the northern, eastern and western ranges of the Meal Market being removed. Human bones, funerary sculpture and a north/south wall – possibly the original churchyard wall – were found during the construction of the Knights of the Thistle Chapel at the south-east corner of St Giles' (Inglis 1909).

4. THE ARCHAEOLOGICAL WORKS

4.1 Introduction

A watching brief in 1999 in the Southern Courtyard identified midden deposits containing articulated and disarticulated human bone between 4m and 8m below the present car park surface (Toolis et al 2005). Bones had previously been observed during the 1992 construction of the PSA building in the south-east corner of the Parliament House site (Mark Collard, pers comm). Between January 2002 and March 2003 archaeological watching briefs (Illus 1) were undertaken at various locations around the Old Parliament House complex (Toolis et al 2005), identifying foundations and large granite boulders to a depth of up to 5.50m from the surface at the northern edge of the Southern Courtyard.

In 2004 two evaluation trenches were opened in the centre of the Southern Courtyard. Trench 1 was aligned roughly east/west while Trench 2 was orientated approximately north/south, to the west of Trench 1. Deep rubble deposits were removed and trench shoring 'boxes' were inserted to stabilise the sides of the evaluation trenches, in which archaeological hand-excavation was undertaken. These boxes formed divisions of the evaluation trenches. Thus Trench 1 (10.2m by 2.5m) was divided into Trench Boxes 1A, 1B and 1C and Trench 2 (6.2m by 2.0m) into 2E and 2F (Illus 2). The evaluation trenches were stepped, with deeper excavation undertaken in those boxes furthest from standing buildings. Box 1C was excavated to 65.15m above ordnance datum (OD) (Illus 10) while Box 2E was excavated to a depth of 65.6m OD (Illus 11). In both these areas, test pit and auger core surveys reached a depth of 63.9m OD, before reaching possible bedrock. An abundance of articulated human skeletal remains was recovered,



Illus 10 North-facing section of Trench Box 1C (© AOC Archaeology Group)

revealing an element of the late medieval burial ground south of St Giles'.

Subsequently, an archaeological watching brief undertaken by AOC in late 2007 and early 2008 on minor development works in Parliament Square and in a close to the west of the Solicitors' Building of the Parliament House complex (Engl 2008) identified disarticulated human bone and elements of two east/west-aligned inhumations, an adult and a child, in the latter location, south-west of the 2004 evaluation.

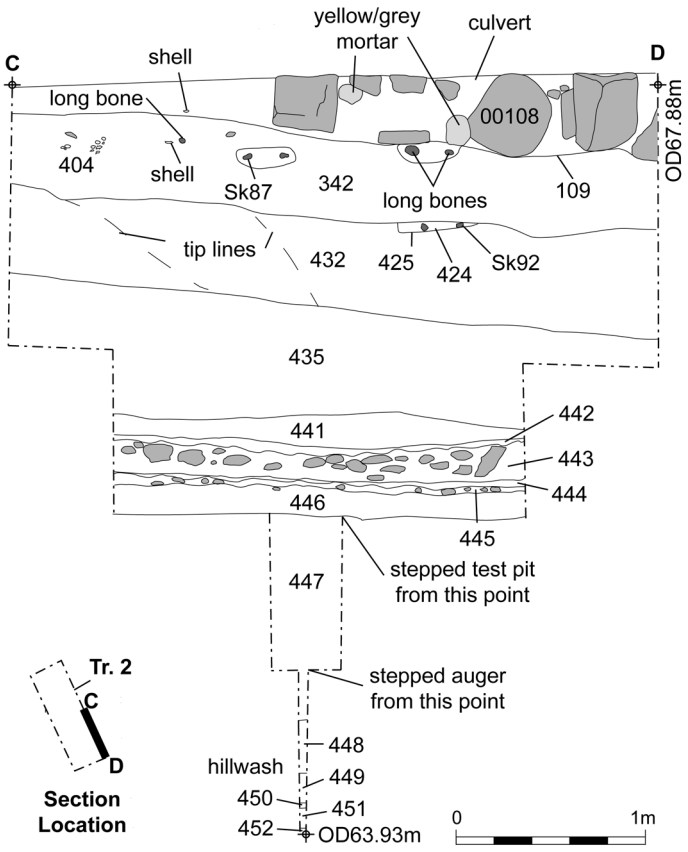
4.2 The archaeological remains

The surfaces, features and deposits identified during the archaeological works were phased according to stratigraphic and artefactual evidence (Phases 1 to 4). In addition, a programme of radiocarbon dating (Table 1) was undertaken, in large part to define the date range of skeletal material recovered from the late medieval burial ground to the south of St Giles' (Phase 3).

4.2.1 Phase 1: Medieval hillwash, dump and levelling deposits and cobble surfaces

Naturally deposited clay, sand and organic silty clay layers overlay the probable bedrock. Above these, at a depth of between 64.0 and 64.2m OD silty clay hillwash material was identified (Contexts 434 & 449; Illus 10 & 11). A depth of approximately 1.4m of dark greyish-brown silty clay dumped material (Contexts 419, 433, 447 & 448) overlay the hillwash. The pottery from these buried soil deposits included Scottish White Gritty Ware, with some imported German Stoneware (see Appendix 3).

A silt and cobble levelling deposit (Contexts 418 & 446) sealed the buried soil and acted as a bedding layer for a cobbled surface (417/445), which had been resurfaced twice in Trench 1 (Contexts 406 & 375) and once in Trench 2 (Context 443). Late medieval pottery (commonly Scottish White Gritty Ware), animal bone and leather fragments were recovered



Illus 11 West-facing section of Trench Box 2F (© AOC Archaeology Group)

Illus 12 Skeleton 32, showing truncation (© AOC Archaeology Group)

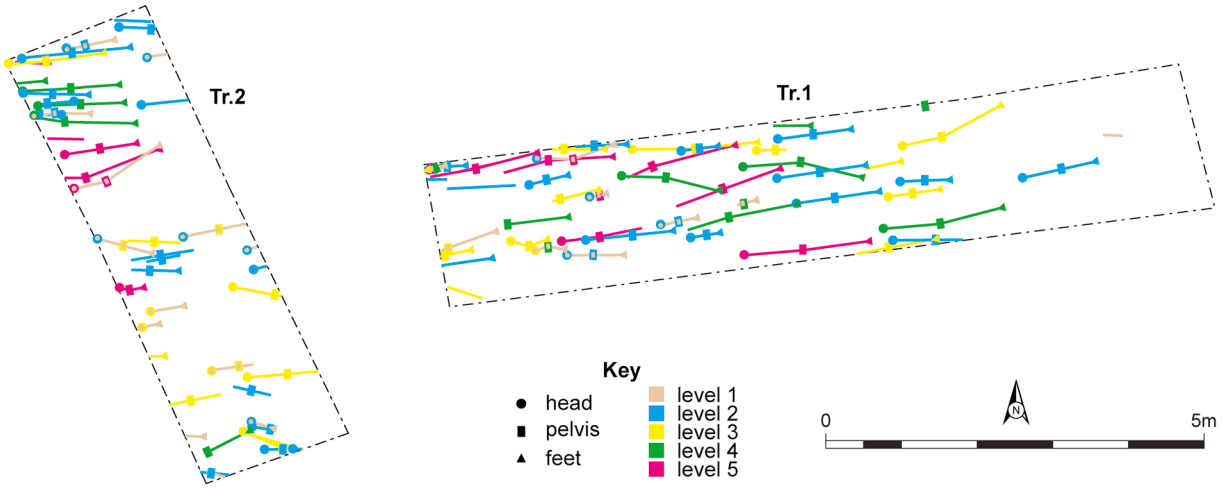
amid these cobble surfaces and the waterlogged dark silt deposits that sealed them (Contexts 405, 416 & 444). A well-preserved wood and copper alloy seal matrix (SF244) (Appendix 4) was found in Deposit 405, between cobble surfaces in Trench 1. In Trench 2 the cobble surface sloped visibly down from north to south, possibly representing the camber of a road.

4.2.2 Phase 2: Medieval trample deposits and tipped layers

A thin silt layer (Contexts 376 & 442) represented trample over the uppermost cobble surface. Above this a 1.4m-deep series of dark grey clayey silt deposits (328, 349, 352, 366, 432, 435 & 441) contained building and domestic debris, such as late medieval pottery including significant quantities of Scottish White Gritty Ware (Appendix 3), animal bone (Appendix 10) and leather (Appendix 9). Small fragments of wool textile (Appendix 8) were also recovered from these deposits. A series of tip lines were seen to slope down from north to south.

4.2.3 Phase 3: The St Giles' inhumations (mid-15th century to mid-16th century)

A dark greyish-brown clayey silt layer (Contexts 101, 123, 124, 170 & 342) was present in both trenches, from which elements of 95 articulated inhumation

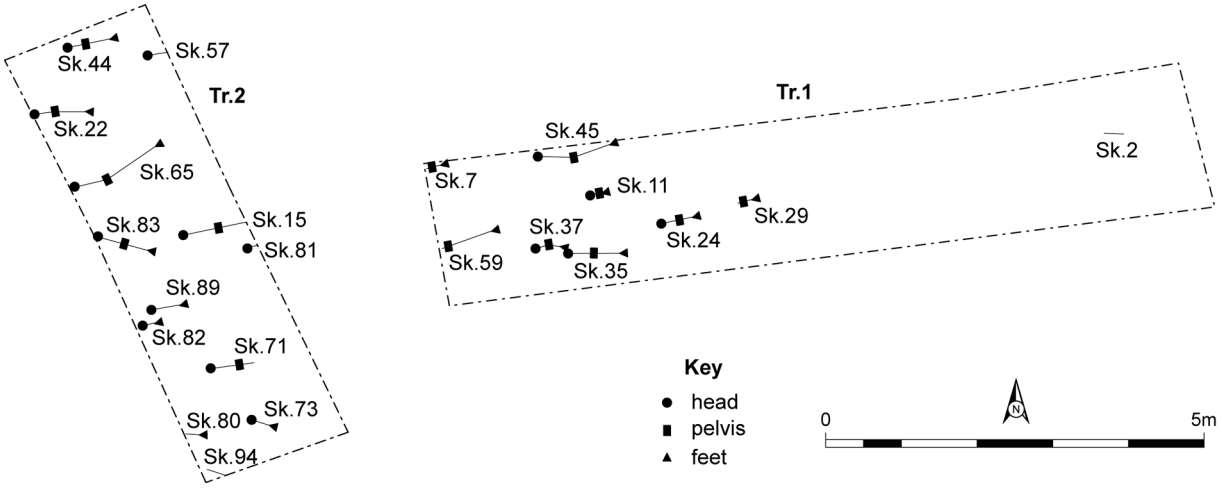


Illus 13 Plan of articulated skeletons (© AOC Archaeology Group)

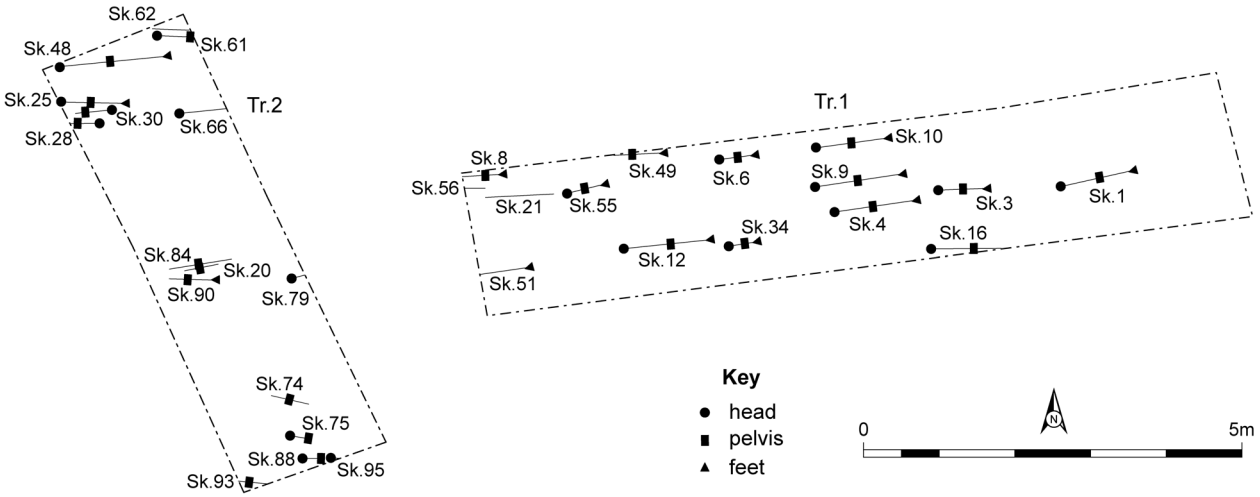
burials (Skeletons 1; 3–96) were recovered, together with much disturbed charnel. The skeletal remains were analysed in detail (Appendix 1).

The deposits containing inhumations lay between 68.15 and 67.40m OD in Trench 1, and between 68.30 and 67.30m OD in Trench 2. This burial horizon was fully excavated in just three shoring boxes; only partial excavation was possible in Boxes 1A and 2E due to the limitations of the shoring equipment. There was heavy truncation (Illus 12) of many skeletons.

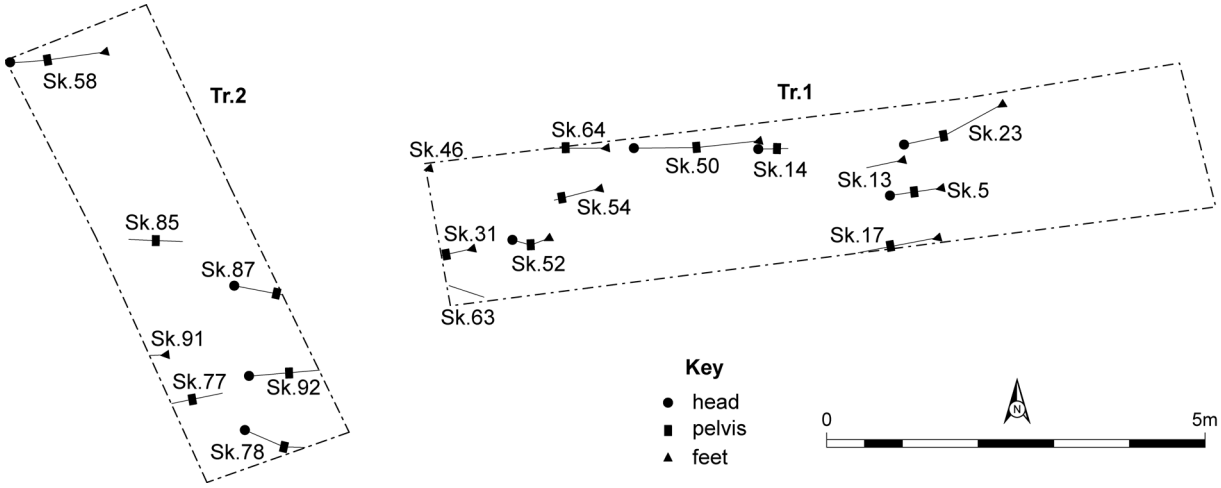
The articulated skeletons were aligned east/west in rough strings or columns, with the heads generally to the west (Illus 13). Only rarely were grave cuts clearly visible, as the burial ground had been heavily reworked. There were up to six intercutting inhumations in some areas. For example, in Box 1C, Skeleton 7 overlay Skeleton 8, which lay over Skeleton 46, which in turn lay over Skeleton 47. Skeleton 47 then appeared to overlay Skeleton 42. At the base of this sequence was Skeleton 41. The plans of skeleton positions within the evaluation area (Illus 14–18) are based on the height of burials and on stratigraphic relationships between individual burials, with Level 1 the highest and Level 5 the lowest, but do not represent clear sub-phases.



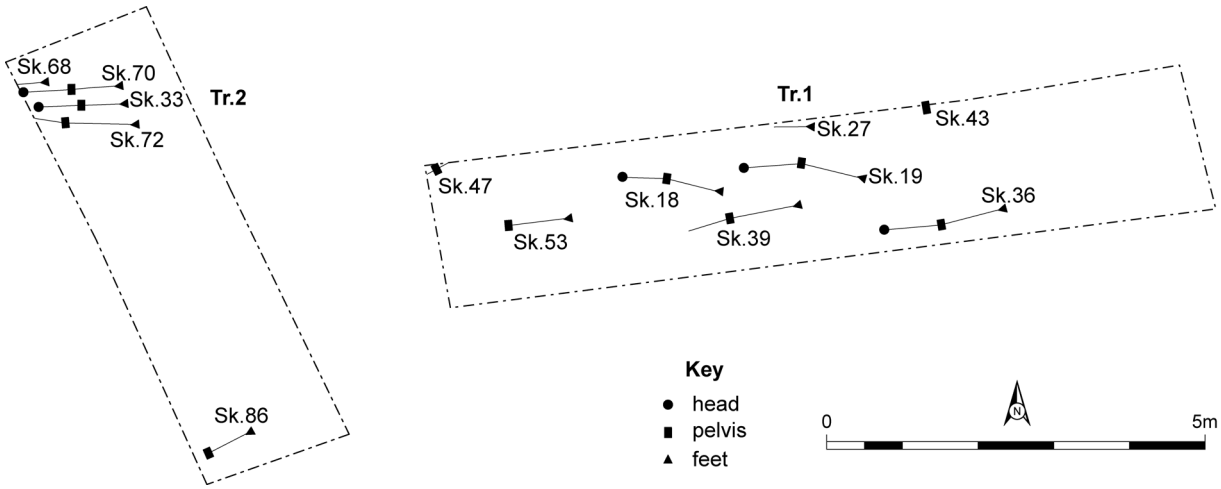
Illus 14 Plan of articulated skeletons (Level 1 – highest) (© AOC Archaeology Group)



Illus 15 Plan of articulated skeletons (Level 2) (© AOC Archaeology Group)



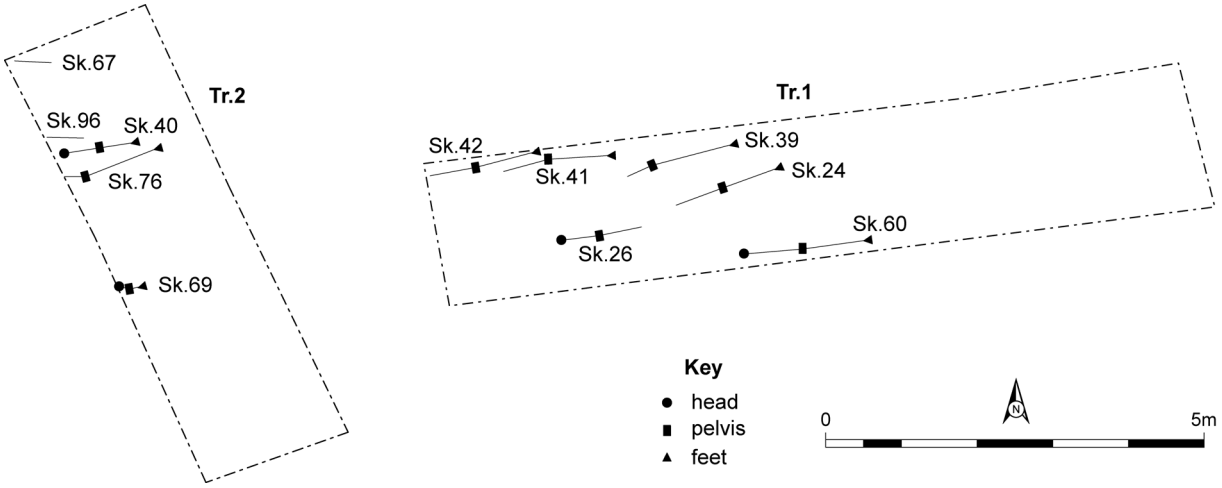
Illus 16 Plan of articulated skeletons (Level 3) (© AOC Archaeology Group)



Illus 17 Plan of articulated skeletons (Level 4) (© AOC Archaeology Group)

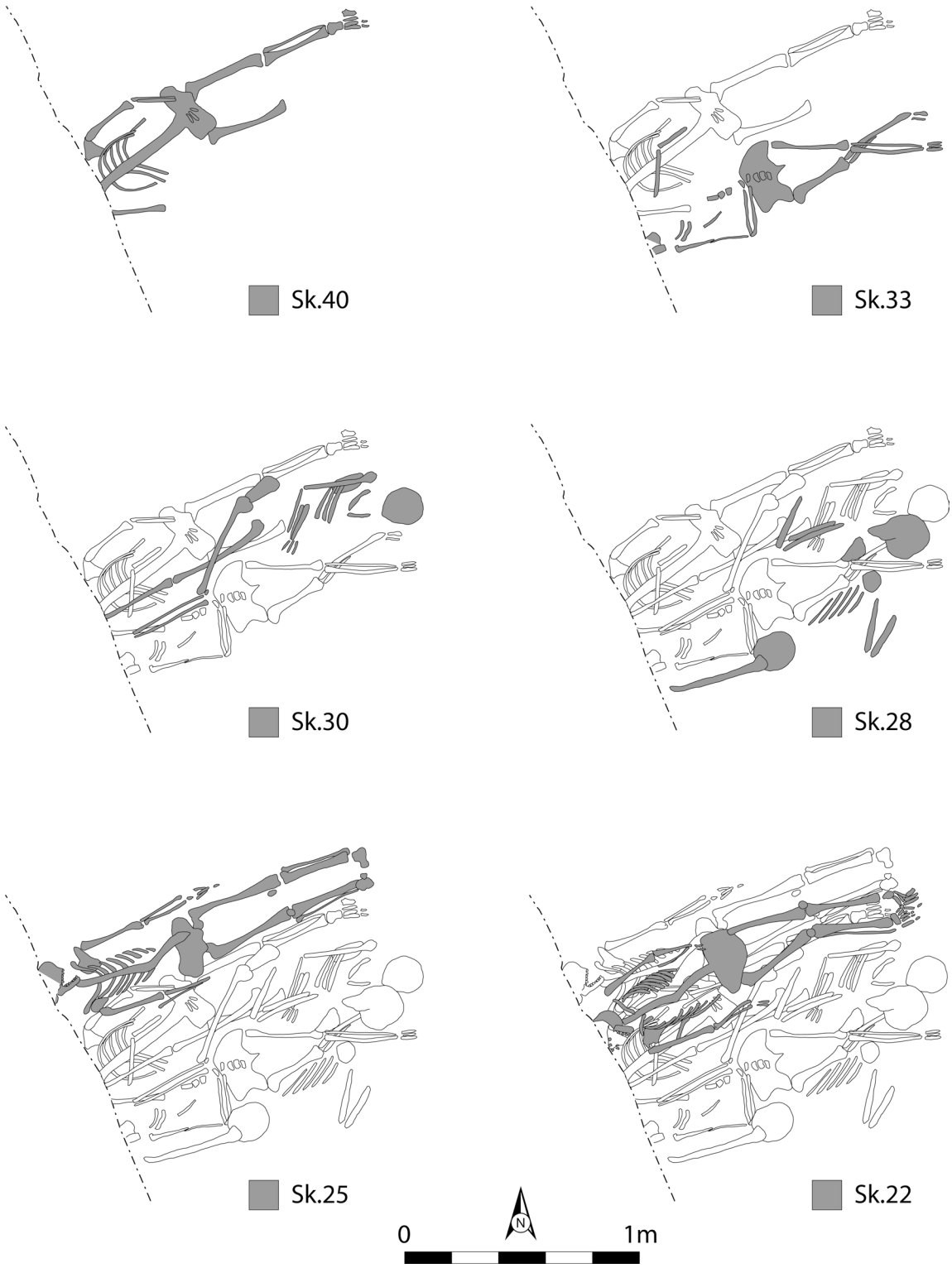
Where visible, the grave cuts were sub-rectangular in plan and generally had a shallow, U-shaped profile with a flat base. Relatively few iron and copper artefacts, indicative of shroud fastenings, were recovered (Appendix 4), perhaps due to the intensive reworking of the burial soils. Nails and fragments of wood (Appendix 7) were also rarely recovered from grave fills.

The bodies were commonly laid flat on their backs in a supine position, though several lay more awkwardly in partially flexed positions. A group of six adult skeletons (Skeletons 22, 25, 28, 30, 33 and 40) in Trench 2 (Illus 19 & 20) lay in a closely packed group, with the skeletons in contact with each other, and did not appear to have been heavily disturbed during inhumation. Three of these adults lay in unusual positions; one (Skeleton 28) lay prone, with the arms awkwardly spread-eagled and with the head to the east and the feet to the west, the opposite orientation to most inhumations in this cemetery. Skeleton 30 had a similarly contrary alignment. Under Skeleton 30 lay Skeleton 33, which though supine and on the normal alignment, had crossed legs and its left arm spread out, pointing towards the east. It is postulated that this unusual group of skeletons



Illus 18 Plan of articulated skeletons (Level 5 – lowest) (© AOC Archaeology Group)

Illus 19 Possible mass grave in west of evaluation (© AOC Archaeology Group)



Illus 20 Plans of putative mass grave (© AOC Archaeology Group)

represents a mass grave of individuals buried in a single event.

Elsewhere, there were three possible examples of double inhumation, each of which consisted of the remains of a small child overlying those of an adult. In Box 1C, Skeleton 12 was associated with the skeletal remains of a neonate, Skeleton 11. In Box 2F, the left shoulder and torso of Skeleton 84 was overlain by Skeleton 83 and the lower right leg of Skeleton 90 was overlain by Skeleton 89.

Most of the skeletons in which the original position of the body was discernible had been laid supine with straight legs and arms either straight at the sides of the body or with the arms slightly flexed, so that the hands met over the pelvis. Skeletons 16 and 32 (Illus 12) had the arms crossed over the torso.

A single probable post hole (Context 127) (Illus 2) was cut into the burial deposits in the north end of Trench 2, slight evidence for a former structure. Pottery associated with the burials in the courtyard (Appendix 3) was indicative of a date in the late medieval/early post-medieval period.

4.2.4 Phase 4: Cobble surface (early post-medieval)

Patchy remnants of a yard or road surface (Context 111), which consisted of closely packed sandstone cobbles, was encountered in Trench 1 at a depth of between 68.3 and 68.15m OD, directly above skeletal remains and under a thin layer of disturbed clayey silt, Context 110 (Illus 10). Ceramics associated with these surfaces and the overlying deposits were again of late medieval/post-medieval date. The entire area was overlain by over 4.5m of rubble overburden associated with the construction of the court buildings in the 19th century.

4.2.5 Radiocarbon dating

Samples from charred macroplant and bone samples, including samples from ten skeletons, underwent accelerator mass spectrometry (AMS) ^{14}C dating at the Scottish Universities Environmental Research Centre in East Kilbride. Calibration was conducted using OxCal v4.3 and the IntCal13 calibration curve.

The calibrated dates from the skeletal samples (Phase 3) were roughly consistent with the historically documented period of use of the churchyard extension from the late 15th to the mid-to-late 16th century, though analysis suggests that burial had commenced before the official donation of Forbes' land in the 1470s. The relatively early dates for Skeletons 58 and 60 (likely to date from the 15th century) were in agreement with their location towards the base of the stratigraphy of the burial ground, but in general the date ranges provided by the bone samples were too similar to aid understanding of the sequence of burials, being essentially statistically indistinguishable. Bayesian analysis of the dates from the Phase 3 skeletal material suggests that the duration of use of the churchyard expansion can perhaps be more closely estimated, with its start occurring between 1410 and 1460 cal AD (at the 95% probability range), and the end of its use between 1440 and 1510 cal AD (at the 95% probability range). While only a small proportion of the area of the graveyard extension was excavated, these results indicate that burial started in the area prior to the recorded donation of the glebe land in the 1470s.

The calibrated dates derived from charred macroplant remains in Phase 2 Contexts 349, 432 and 441 (underlying the grave soil) were varied, with calibrated dates ranging from the early 11th to the early 17th century. If the two earliest dates derived from Context 432 are taken to represent residual material, however, the radiocarbon dates suggest that these contexts were probably deposited between the early 15th and the early 16th centuries.

Table 1 Radiocarbon samples (* Where two or more date ranges occur, this is a result of the calibration plot.)

Lab code	Context	Graveyard level (See Illus 14–18)	Material	Radiocarbon age BP	$\delta^{13}C$ (‰)	Calibrated date 95.4% probability range*
SUERC-15550	163 (Skeleton 16)	Level 2	Bone: human left femur	435±35	-19.8	AD 1415–1514 (90.3%), AD 1600–1618 (5.1%)
SUERC-15551	166 (Skeleton 17)	Level 3	Bone: human left tibia	455±35	-19.2	AD 1409–1486 (95.4%)
SUERC-15560	190 (Skeleton 59)	Level 1	Bone: human right femur	390±35	-19.2	AD 1439–1525 (64.4%), AD 1556–1632 (31.0%)
SUERC-15555	256 (Skeleton 44)	Level 1	Bone: human cranium	430±35	-20.1	AD 1417–1516 (88.3%), AD 1596–1618 (7.1%)
SUERC-15556	260 (Skeleton 45)	Level 1	Bone: human left femur	410±35	-20.7	AD 1429–1522 (77.6%), AD 1574–1626 (17.8%)
SUERC-15557	272 (Skeleton 49)	Level 2	Bone: human left femur	395±35	-20.5	AD 1437–1524 (67.3%), AD 1558–1632 (28.1%)
SUERC-15559	304 (Skeleton 58)	Level 3	Bone: human left femur	470±35	-19.2	AD 1404–1472 (95.4%)
SUERC-15561	308 (Skeleton 60)	Level 5	Bone: human left femur	480±35	-19.8	AD 1400–1465 (95.4%)
SUERC-15565	344 (Skeleton 71)	Level 1	Bone: human right femur	360±35	-21.5	AD 1450–1530 (46.6%), AD 1538–1635 (48.8%)
SUERC-15558	349 (sub-graveyard deposits)		Charred nutshell: *Corylus avellana*	415±35	-25.4	AD 1426–1522 (80.3%), AD 1575–1624 (15.1%)
SUERC-15568	424 (Skeleton 92)	Level 3	Bone: human left humerus	375±35	-20.1	AD 1444–1528 (55.4%), AD 1544–1634 (40.0%)
SUERC-15993	432 (sub-graveyard deposits)		Cattle tooth	385±35	-22.2	AD 1440–1527 (61.4%), AD 1554–1634 (34.0%)
SUERC-15994	432 (sub-graveyard deposits)		Indet mammal bone	850±35	-19.0	AD 1049–1084 (8.2%), AD 1124–1136 (1.9%), AD 1150–1262 (85.3%)
SUERC-15566	432 (sub-graveyard deposits)		Charred grain: *Triticum*	915±35	-22.6	AD 1029–1190 (94.0%), AD 1198–1204 (1.4 %)
SUERC-15567	441 (sub-graveyard deposits)		Charred nutshell: *Corylus avellana*	420±35	-25.2	AD 1420–1522 (82.6%), AD 1575–1624 (12.8%)

5. DISCUSSION

The evaluation, though covering only a very small part of the ground between St Giles' Church and the Cowgate, has provided important evidence for the main burial ground of central Edinburgh in the late medieval period and of the use of this area from the early burghal period to the setting up of the Meal Market.

5.1 The early burgh and St Giles' Chapter

The evaluation demonstrated that this part of Edinburgh was relatively undeveloped in the medieval period, with no significant medieval structural remains being identified. The area apparently formed a backland to St Giles' Church, with buildings such as manses, offices and stables associated with the clergy. Much of this land was probably open, steeply sloping ground.

The earliest (Phase 1) archaeological deposits, visible in test pits and through auger surveys, contained sherds of Scottish White Gritty Ware and imported pottery, including German Stoneware (Appendix 3). These late medieval deposits appeared relatively homogeneous and were clearly heavily waterlogged; they are likely to have derived from waste deposition from properties on the High Street, behind St Giles' and on the lanes running downhill towards the Cowgate. Rainwater from the High Street would have run off the surfaces of the High Street and the adjacent lanes towards the Cowgate, and probably collected there, carrying sediments downhill. At a nearby site on the Cowgate less than 100m to the south-east of the Parliament House site (Dalland 2017: 9) the earliest midden deposits contained evidence for both a well-drained environment and wet, highly reducing conditions. Waterlogged plant remains from these deposits suggested the presence of nitrogen-rich ground, interpreted by Dalland as possibly an area adjacent to a stream where cattle were present.

The cobble surfaces that overlay the earliest deposits at Parliament House may represent a lane or vennel running parallel to the Cowgate, or possibly a courtyard surface associated with the various buildings known to have been utilised by the ecclesiastical community, such as the houses of St Giles' Chapter, a stable, offices and a school (*Edin Chrs* no. 57; *St Giles Reg* no. 111). The resurfacing of this floor or yard indicates a prolonged period of use. Artefacts recovered from between the cobble surfaces, including a seal matrix (Illus 30) (Appendix 4), indicate its late medieval date.

The evaluation identified no evidence of the remains of any of the various phases of the burgh wall. It is possible that the downward-sloping deposits with apparent tip lines that lay over the Phase 1 cobble surface were part of the fill of an associated ditch. At the nearby site of 144–166 Cowgate (Dalland 2017: 10) deposits excavated to the north of the putative King's Wall appeared as widespread layers, suggesting gradual deposition, while to the south of the wall a rapid build-up of dumped material was apparent. The latter has been interpreted by Dalland as possibly a ditch, up to 4m wide, on the south side of the wall. At East Market Street a recently excavated massive ditch, 5m deep and up to 13m wide, has been interpreted as evidence for an early (late 12th- or early 13th-century) defensive boundary between Edinburgh and Canongate, recut in the 14th century (Lowther 2018: 2, 10–11). However, at Parliament House, such a defensive feature would probably have truncated the earlier cobble surfaces; it is therefore more likely that these deposits represented dumped midden material in urban backlands. The presence of apparent tip lines suggests that the process was relatively rapid, perhaps intentional deposition to build up the ground level in advance of the use of the area as a burial ground.

Radiocarbon samples derived from the deposits overlying the cobble surfaces provided a broad range of calibrated dates, from the early 11th century to the early 17th century, indicative of the presence of residual material. It is possible that the deposits overlying the surfaces were mixed due to processes of intentional deposition, midden accumulation from the High Street above, hillwash action and disturbance caused by the burial ground.

Given the low-lying location of the Cowgate, the potential of the lower slopes beneath the High Street for survival of organic remains is clear – waterlogged fragments of leather and textile were recovered from the deposits and surfaces underlying the burial ground. The presence of leather at Parliament House may evidence the activity of cordiners at a relatively early date, though the likely 16th-century

date of much of this material suggests that it derived from disturbance of the burial ground (Appendix 9). The wood and copper alloy seal matrix (SF244) recovered from the road or yard surface provides evidence for late medieval trading activity in the area, whether on the High Street above, or perhaps within the ecclesiastical precincts, a public open space where trading could take place. The simple design of the seal suggests that relatively humble material was being traded.

Waterlogged plant remains provided further evidence for the economy of the area. In particular, the recovery of weld and madder (Appendix 12) as well as dyed wool (Appendix 8) may indicate the dyeing of textiles in close proximity to the site. To this day there is a 'Dyers Close' near the site, on the opposite side of the Cowgate. There was also a Dysters' Close off the Cowgate, which was removed during the construction of the George IV Bridge (Boog Watson 1923: 137).

5.2 The graveyard

The burial ground revealed in the Southern Courtyard of Parliament House clearly represented the southward expansion of the cemetery of St Giles' Church. Artefactual evidence from the graveyard soils generally dated from the late medieval to early post-medieval periods, according with the documented date of the extension (late 15th to mid-to-late 16th century). This material included a James II–III copper 'Crux Pellit' coin (SF140) from the second half of the 15th century (Illus 29). A lead token (SF114) was similar in form to those in use in England in the late 16th and 17th century, while two buckles (SF345 and SF347) were of late medieval or early post-medieval date (Appendix 4). A ceramic roof tile fragment from the burial soil was likely to have been manufactured between the 12th and 15th century (Appendix 5). The textiles recovered were typical of fabrics from urban sites in England and Scotland of the 14th to 17th centuries (Appendix 8). Radiocarbon dating of the skeletal remains (which individually appeared to range from the 15th century onwards) also broadly corresponded with the documented use of the burial ground extension from the charter of 1477–8 that allowed for burial of Edinburgh's population on Provost Forbes' land (*Edin Chrs* no. 50) until the cessation of burials at St Giles' around 1566 (Richardson 1910: 213–14) following the gifting by Queen Mary of Greyfriars, the yard of the Franciscan friary, as a burial ground in 1562 (RSS V, no. 3334; *Edin Recs* III: 132, 145–8; Lynch 1981: 34). However, Bayesian analysis of the radiocarbon dates indicates that burial is likely to have commenced earlier in the 15th century, prior to the documented expansion onto Forbes' land; it is possible that the donation formalised the extension of burial activity south of the church that had already commenced.

A depth of up to six inhumations was found on the same spot, indicating a great intensity of use but not unusual for an urban medieval cemetery. Brown & Roberts (2000: 76) note that a series of five intercutting burials were present in the medieval St Mary's cemetery in Dundee. At Whithorn a similarly intensely utilised and complex cemetery could be divided into 12 stages and five separate phases based on changes in orientation and relative stratigraphy (Hill 1997: 253). However, no such clear changes in orientation were apparent at Parliament House.

The scale of the extended burial ground was evidenced by the presence of inhumations throughout the evaluation area and also to the west of the Solicitors' Building where the separate watching brief of late 2007 and early 2008 was undertaken (Engl 2008). In the 18th century the construction of William Forbes' and James Hunter's bank to the north also led to the discovery of human remains (Richardson 1910: 220).

It is likely that the original Parliament House was erected over the site of three ministers' houses that stood in the churchyard, demolished to make way for it (Maitland 1753: 185; Cullen 1992: 2). Part of one of the ministers' houses may survive in the north wall of the Laigh Hall (Cullen 1992: 39). It is possible that this surviving wall lies roughly on the east/west-aligned boundary between the original churchyard and the gardens gifted by Provost Forbes for its extension. In any case, the greatest extent of the St Giles' churchyard has been estimated at almost 0.5ha (Collard et al 2006: 5). The evaluation (37.9m^2) therefore covered approximately 0.76% of the entire churchyard and furthermore the full depth of the burial ground deposits could not be excavated during the evaluation. The true number of articulated skeletons present in the evaluation

area was therefore probably somewhat larger than the 95 recovered. The relatively small sample size of the excavated inhumations (in comparison with the total area of the extended burial ground) means that little can be confidently inferred regarding the demography of the population. For example, the greater proportion of male to female adults (1.7:1) in the assemblage is possibly due to bias in a small sample.

Analysis of the human skeletal remains (Appendix 1) identified an apparent slight tendency for adult males to outlive adult females, a phenomenon also noted at cemetery sites in Dundee and St Helen-on-the-Walls. The Parliament House excavation also produced a relatively large proportion of sub-adults compared with other Scottish and north English medieval cemeteries (Gooder 2004: 392). The adult female population was, in general, of shorter stature than females from contemporary sites (adult males were not especially short), and in general the population was comparable in stature with the skeletons recovered from within St Giles' itself.

Isotopic analysis was undertaken of skeletons' teeth (Appendix 2) from both the Parliament House and St Giles' site. Skeleton 71 of the Parliament House assemblage, an adult male, exhibited an elevated $^{87}Sr/^{86}Sr$ ratio, reflecting a possible childhood in Perthshire or Aberdeenshire. Other than this individual, the strontium and oxygen isotopes in Parliament House skeletons reflected the local environment. The St Giles' skeletons, conversely, although having strontium isotope ratios normal for a local population, had elevated strontium isotope concentrations more consistent with the Outer Hebrides than local populations, and oxygen isotopes consistent with drinking water from warmer climates. This may reflect the way in which drinking water was obtained by this likely relatively high-status group.

Two adults, Skeletons 42 and 54, possessed deformities possibly attributable to tuberculosis, while possible cribra orbitalia was present in Skeletons 4 (a juvenile) and 57 (an adult male). However, the range of traumas and diseases present was not unusual for an assemblage of this date, and the general health and dental hygiene of the Parliament House population was generally better than that of populations from comparable cemeteries.

5.2.1 Burial practice

The dominant burial practice evident was for bodies to be laid flat in a supine position, with arms slightly flexed and hands over the upper torso or pelvis. This is not an unusual position, and was common, for example, at the late medieval cemetery at Whithorn (Cardy 1997: 551). Several had the arms laid straight at the side of the body while two adult women (Skeletons 16 and 32) had fully crossed arms over the torso. It is difficult to discern significance in such burial patterns in medieval cemeteries. The three positions described above are the most common in cemeteries across medieval England (Daniell 1997: 118).

There was no clearly significant spatial patterning of the skeletal remains according to the sex and age of the individuals, although there were signs of different degrees of disturbance. In Trench 2, 19 of the 46 skeletons were adults that could be associated with a probable sex. In Trench 1, only 11 of 49 skeletons recovered were adults of an identifiable sex. This suggests that the bodies in Trench 2 were in a better general state of preservation. The proportion of sub-adults identified in each trench did not vary greatly between Trench 1 and 2 (18 of 46 and 22 of 49, respectively).

All the identifiable female adults were located in either Box 1B or Box 2E, though the lack of such bodies in the intervening Box 1C suggests that this was not a significant spatial pattern. Adult males and infants were present throughout the evaluation area.

A relatively small number of nails were recovered from burial contexts, dispersed across these deposits (Appendix 4). It is possible that wooden pins that have not survived might have been used in lieu of iron nails (Daniell 1997: 162). Two burials had more concrete signs of the presence of coffins. Skeleton 5, an infant, was associated with a metal plate (SF30), possibly part of a corner bracket for a coffin, while the fill beside Skeleton 60, a mature adult female, contained an iron nail shank with mineralised wood. Both of these skeletons were located in Trench Box 1B near the base of the burial ground. Skeleton 60 was dated by radiocarbon techniques to the 15th century (calibrated date) and is therefore likely to have been a relatively early burial.

The paucity of artefactual evidence for coffins and the generally constricted positions of the skeletons,

with arms tight against the body, suggested that bodies were often interred in shrouds or winding cloths, or in the case of men, hair shirts woven from coarse yarn (Schofield & Vince 2003: 187). There was relatively little evidence for shroud pins, possibly due to poor preservation. Two pin shanks were recovered from the burial soils in Boxes 1B and 1C, and fine iron wire, possibly elements of shroud pins, were found with four sub-adults – Skeletons 26, 38, 83 and 85. A wire eyelet (SF400) was also found in the fill associated with Skeleton 30, a mature adult, though this body appeared to have been dumped. Evidence for burial in shrouds was therefore more commonly associated with burials of the young rather than full adults. Bain noted that the lack of shroud pins at the Holyrood cemetery might be due to the closing of shrouds with stitching (Bain 1998: 1054).

The lack of evidence for coffins contrasted with burials inside St Giles' (Collard et al 2006: 20), where the proportion of high-status burials was probably greater. Oak coffins were also observed to the south of St Giles' during construction of court buildings in 1844–5 (Grant 1882: 245). A small proportion of coffin burial was also identified at the Holyrood cemetery, which was perhaps a closer analogue to the present site, as it was the parish cemetery of the burgh of Canongate, rather than a place of elite burial (Bain 1998: 1054).

At Parliament House, the bodies lay with heads to the west and feet to the east, indicative of normal medieval Christian practice. Two individuals (Skeletons 28 and 30) lay on an opposing alignment. It was normal for this alignment of the body to be used in the burial of priests, so that on the Day of Judgement they would arise to face their congregation (Gooder 2004: 381; John Lawson, pers comm). Near Edinburgh, several such burials were identified at Newbattle Abbey (Gooder 2004: 381). The Parliament House inhumations with this alignment were recorded, however, within a mass grave, and it is likely that their unusual burial was due to the hasty disposal of these bodies; Skeleton 28 was also prone.

Skeleton 59, an adult, may have been a pilgrim. The fill associated with this burial contained a scallop, symbolic of the pilgrimage to Santiago de Compostela (Appendix 11). While unusual, this would not be unique within a Scottish late medieval context. Excavations at the Cluniac priory church on the Isle of May recorded an intentionally deposited scallop shell placed in the mouth of an adult male inhumation, perhaps a returned pilgrim (James & Yeoman 2008: 58, illus 5.23 and 5.24). Within St Giles' two burials were associated with the remains of a pilgrim's wood and iron baton (Collard et al 2006: 19). Burials in pilgrimage clothes have been identified at Worcester Cathedral, with both scallop shells and pilgrim's staffs (Daniell 1997: 167).

The presence of an intermixed, apparently dumped, group of skeletons within a mass grave may suggest the rapid disposal of bodies of socially abnormal individuals, perhaps criminals or those infected with contagious disease, such as plague. All six individuals were identified as adults, but the small size of this group precludes further meaningful comparison with the rest of the inhumations. Skeleton 28, which lay prone, had a hand located under a shoulder and flexing of the arms, reminiscent of a female skeleton recorded at the cemetery of Perth Blackfriars (Bowler et al 1995: 944), which was interpreted as a possible live inhumation, with the individual struggling against burial. An alternative explanation for a similar burial at the Carmelite Friary in Linlithgow was that distortion of the body had been caused by muscular contractions due to injuries caused by fire (Cross & Bruce 1989: 141), though the skeletal remains from the Parliament House site showed no evidence for charring, and Skeleton 28 showed no signs of particular contortion in the hands or lower limbs, suggesting that this is not an appropriate explanation for the awkward burial of this individual. Edinburgh during the late medieval and early post-medieval period suffered from numerous visitations of the plague. In the period of use of the St Giles' churchyard extension, plague was present in Edinburgh at least twice: firstly a prolonged period from 1498 to 1514 and then a shorter outbreak in 1530 (MacLennan 2001: 256–7).

Three pairs of apparently linked inhumations, in each case an adult in close proximity to a child, suggest burial in family groups. Although no skeletal traits were found to confirm the relationships of these individuals, it would be unsurprising if related individuals were buried together. Study of wills in medieval England and Wales indicates that burial with members of the nuclear family (husband, wife, child, brother or sister) was a common request (Daniell 1997: 101). It is possible

that these individuals died at the same time, due to the same cause, perhaps disease, though the lack of clear grave cuts means that it was not possible to securely ascertain whether the paired individuals had been buried at the same time or were buried in the same plot at separate times. Another, probable family, burial was evident at the nearby 14th-/15th-century cemetery site at Holyrood Abbey (Bain 1998: 1075). The three Parliament House pairs may also represent the organisation of the burial ground into discrete plots. Clusters of intercutting graves have been interpreted in this way at the 12th- to 14th-century cemetery of St Thomas' Kirk, Hall of Rendall, Orkney (Toolis 2008: 260). Inside Glasgow Cathedral, there were repeated burials in the same locations, described as 'burial shafts' during the late medieval period. These may have related to family or guild plots (Driscoll 1993: 71).

5.3 The Meal Market and Parliament House

The evaluation identified patches of a cobble surface directly overlying the burial ground, probably associated with the Meal Market of the 17th to 19th centuries. The location of the Meal Market was moved from the High Street to the lower churchyard of St Giles' at the beginning of the 17th century (Wood & Hannay 1927: 276). No structural remains that could be associated with any of the incarnations of the Meal Market were present within the evaluated area (with the exception of a single post hole), and it is likely that the cobbles represented floors or yard surfaces. It is possible that the setting out of the Meal Market in the early 17th century or of the rebuilt structures following fires in 1676 and 1700 involved terracing of the ground that naturally rose steeply from the Cowgate, thereby truncating the graveyard and removing upper cemetery deposits. There was no evidence for the utilisation of the area between the ending of burial and the erection of the Meal Market, a time when shoemakers are said to have plied their trade in the area (Maitland 1753: 185). Such evidence might also have been lost due to levelling or terracing activity.

6. CONCLUSIONS

While the evaluation was limited to a relatively small area of the Southern Courtyard of the Parliament House complex and therefore a tiny sample of the late medieval extension to St Giles' burial ground, it has provided a valuable insight into the lives (and deaths) of the inhabitants of the medieval city. This has been provided through study of evidence recovered from deposits within a largely undeveloped backland area in the centre of medieval Edinburgh and, in particular, through the analysis of the skeletal remains within the burial ground extension. This has illuminated the health and demography of the population of the city from the 15th to the mid-16th century.

The deep deposits underlying the St Giles' graveyard extension were rich in artefacts and ecofacts, which had survived in waterlogged, anaerobic conditions. The earliest of these deposits appeared to have developed gradually from the wash of material from activity on the High Street and adjacent lanes. There followed a period, possibly in the early 15th century, when the evaluated area was covered by a yard or lane surface (occupied for a sufficient period for the cobble surface to be relaid). At that time, non-ecclesiastical activity such as trade, evidenced most clearly by the survival of a seal matrix, took place in the lands surrounding the church.

The relatively rapid build-up of deposits following this period may have been in part intentional. Material from upslope may have been used to build up the area, perhaps with the intention of extending the area available for the burial ground. Such large-scale landscaping would echo the 12th-century massive artificial clay platform identified beneath St Giles' in 1981 (Collard et al 2006: 67).

The study of the human remains from Parliament House, while providing only a small sub-sample of the population of the late medieval city, indicates the relatively good health of the general population of Edinburgh between the mid-15th and mid-16th centuries (in spite of occasional outbreaks of the plague).

APPENDIX 1 THE HUMAN BONES

Melissa Melikian

A.1.1 Background

The assemblage consisted of the remains of 95 individuals. The articulated human bones were analysed in accordance with guidelines by English Heritage (2002), Historic Scotland (1997) and BABAO/IFA (Brickley & McKinley 2004). Full details of the methodology (summarised below) and a full osteological report can be found in the archive report in the National Record of the Historic Environment of Scotland. The disarticulated material was screened but contained no material that could contribute additional information and therefore was not analysed further.

The assemblage of articulated remains was compared with findings reported from other local and regional, broadly contemporary, groups to identify any patterns – osteological or funerary. These included previous excavations at St Giles' (Collard et al 2006); burgh sites at Perth (Bowler 2004; Fyles et al 2005), Glasgow (Driscoll 2002), Dundee (Brown & Roberts 2000) and Aberdeen (Cameron & Stones 2001), and Scottish monastic sites at Aberdeen, Linlithgow and Perth (Stones 1989a), Newbattle Abbey (Gooder 2004) and Whithorn (Cardy 1997). Northern English sites were also considered: St Andrew's, Fishergate, York (Stroud & Kemp 1993) and the parish church of St Helen-on-the-Walls, Aldwark, York (Dawes & Magilton 1980).

The Parliament House material underwent a comparable isotopic study with the St Giles' material. The purpose of the study was to compare the two populations in terms of diet and origins.

A.1.2 Summary of methodology

The articulated human bones were analysed in accordance with recommendations by English Heritage (2002), Historic Scotland (1997) and the IFA (Brickley & McKinley 2004). For each skeleton the results of the analysis were entered into an Access 2000 database. The following methodology was employed.

A.1.2.1 Inventory

A full skeletal inventory was created using a visual inventory and numerical scoring system. The numerical system records which bone was present in addition to which portion of the bone survives. For example, for the scapula the following elements were scored as present (1) or absent (0); glenoid, coracoid, acromion and infra-spinous area. The element was scored as present if it was represented by at least 50%. This is then represented as a 4-digit code. A full list of those elements scored can be found on the recording sheets, which can be consulted in the site archive.

A.1.2.2 Preservation and completeness

The degree of bone preservation was classed using the following criteria (Connell & Rauxloh 2003; Powers 2007):

1 = Bone surface is in good condition with no erosion; fine surface detail such as coarse woven bone deposition would be clearly visible (if present) to the naked eye.

2 = Bone surface is in moderate condition with some post-mortem erosion on long bone shafts but the margins of articular surfaces are eroded and some prominences are eroded.

3 = Bone surface is in poor condition with extensive post-mortem erosion resulting in pitted and eroded cortical surfaces and long bones with articular surfaces missing or severely eroded.

Skeletal completeness was determined according to Connell & Rauxloh (2003) and Powers (2007) on the basis that the skull equated to 20% of the skeleton, the upper limbs 20%, the torso 40%, and the lower limbs 20%.

A.1.2.3 Age estimation

Osteological methods to determine age-at-death rely on developmental and degenerative changes which affect the skeleton over the lifecourse. As these changes occur sequentially they can be roughly equated with chronological age. However, as biological changes can occur at different rates in different individuals, it is often not possible to

Table 2 Approximate age categories used in the analysis of human remains

Age category (approximate)	Age range
0	No data
1	Foetal/neonate
2	1–6 months
3	7–11 months
4	1–5 years
5	6–11 years
6	12–17 years
7	18–25 years
8	26–35 years
9	36–45 years
10	46+ years
11	Adult
12	Sub-adult

provide an exact age in years and therefore age-at-death estimates are presented in broad age categories (Table 2).

Sub-adult (to age 17) age-at-death estimation was dependent on the sequential mineralisation and eruption of the deciduous and permanent dentition (Moorrees et al 1963; Ubelaker 1978) and the maturation (state of epiphyseal fusion) and size of various skeletal elements (Scheuer & Black 2000). For epiphyseal fusion each fusion site was scored as unfused, fusing or fused for both the metaphysis and epiphysis.

Adult (age 18 and older) age-at-death was based on degenerative changes to the morphology of the pubic symphysis (Brooks & Suchey 1990), the auricular surface of the ilium (Lovejoy et al 1985) and dental attrition (Brothwell 1981). An age estimation was established using as many methods as were applicable.

A.1.2.4 Sex estimation

Estimation of sex is based on the morphology of secondary sex characteristics which develop during puberty. As a result, it is extremely difficult to determine the sex of non-adult skeletons without the use of destructive bimolecular analyses.

Surviving morphological features of the pelvis (Phenice 1969; Buikstra & Ubelaker 1994), and the skull (Acsádi & Nemeskéri 1970) were used to estimate the sex of adult individuals. A holistic approach was adopted, whereby the sex of the individual was based on as many features as applicable. From this an overall biological sex was assigned to the individual. Individuals were classed into one of the following categories:

0 = undetermined sex

1 = female

2 = probable female

3 = indeterminate

4 = probable male

5 = male

Undetermined sex was allocated where no osteological sex indicators were present. Individuals were classed as indeterminate where the sex determination was ambiguous and could not be defined as male or female.

A.1.2.5 Metric and non-metric data (normal variation)

Skeletal metric data are recorded to calculate stature, to aid in sex determination, and to identify secular trends and ethnicity. The following measurements were taken following the definitions of Howells (1973) and Brothwell (1981):

- Greatest cranial length
- Maximum cranial breadth
- Basion to bregma height
- Maximum clavicle length
- Maximum glenoid length
- Maximum humeral length
- Maximum diameter of the humeral shaft
- Maximum radial length
- Maximum ulna length
- Maximum femoral length
- Subtrochanteric antero-posterior diameter of the femur
- Subtrochanteric transverse diameter of the femur
- Maximum femoral head diameter

- Maximum tibial length
- Maximum antero-posterior diameter of the tibia
- Projective transverse diameter of tibia

Maximum achieved adult stature was calculated using the formulae of Trotter (1970) and Trotter & Gleser (1952, 1958 & 1977). The bone present with the lowest standard error was used for the calculation. Where applicable the following were calculated: cranial capacity, cephalic index, platymeric index and platycnemic index.

Non-metric traits are normal variations in skeletal morphology, whose development is influenced by interactions between genetic predisposition and environmental conditions. When studied, it is thought they can identify the 'biodistance' of one group from another as well as interrelatedness of individuals within a population. The following non-metric traits were recorded following Brothwell (1981), Berry & Berry (1967) and Finnigan (1978): metopism, coronal wormian bones, sagittal wormian bones, ossicles at lambda, os inca, ossicles in lambdoid suture, maxillary torus, mandibular torus, os acromiale, distal septal aperture, supracondylar process, vastus notch and the type of calcaneal facet.

A.1.2.6 Pathology

Pathological changes on the bones and teeth were recorded following IFA/BABAO guidelines (Brickley & McKinley 2004) as well as standard osteological references (Brothwell 1981; Rogers & Waldron 1995; Hillson 1996; Aufderheide & Rodríguez-Martín 1998; Waldron 2001; Ortner 2003).

A.1.3 Preservation and completeness

The majority (59) of the skeletons were in a moderate state of preservation (62.1% as Grade 2); 16 skeletons (16.8%) were in a poor state of preservation (Grade 3) and 23 skeletons (24.2%) displayed good preservation (Grade 1). A total of 72 skeletons (75.8%) were incomplete due to truncation. The high level of intercutting and truncation was reflected in the completeness of the skeletons, with 48.4% of individuals 50% complete or less.

A.1.4 Age determination

The age-at-death distribution can be found in Table 3. The sample consisted of 55 adults (57.9%) and 40 sub-adults (42.1%). The overall proportion of sub-adults was relatively large, perhaps suggesting poor nutrition or recurrent epidemics.

Age-at-death could be determined for the majority (32) of sub-adults, with a peak occurring at *c* 1–5 years and *c* 6–11 years. There were no individuals aged *c* 1–6 months and only one individual aged *c* 7–11 months. The prevalence of neonate or foetal deaths was 3.2% when expressed as a percentage of the total sample or 7.5% of the sub-adult sample. The relative lack of neonates and infants does not reflect the expected mortality profile for an assemblage of this period, prior to improvements in hygiene, nutrition and medical provision (Waldron 2001). This may indicate that differential treatment of neonates and infants took place at Parliament House. At Whithorn (Cardy 1997) and Raunds (Boddington 1987) certain areas of the cemetery appear to have been reserved for the burials of children and it is possible that some

Table 3 Demographic profile of the Parliament House skeletons

Sex	Age category													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	
Male	0	0	0	0	0	0	0	4	5	8	2	0	0	19
Female	0	0	0	0	0	0	0	1	4	4	2	0	0	11
Intermediate	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Undetermined	0	3	0	1	12	10	6	2	1	4	3	13	8	63
Total	0	3	0	1	12	10	6	7	11	17	7	13	8	95

Table 4 Mortality profile of the adult assemblage from Parliament House

Age category	Male		Female		Total	
	no.	%	no.	%	no.	%
7 (18–25 years)	4	13.3	1	3.3	5	16.6
8 (26–35 years)	5	16.7	4	13.3	9	30.0
9 (36–45 years)	8	26.7	4	13.3	12	40.0
10 (46+ years)	2	6.7	2	6.7	4	13.4
Total	19	63.4	11	36.6	30	100.0

degree of cemetery management was also practised at Parliament House.

For the adult individuals, estimated age-at-death is presented by sex (Table 4). This suggests that there was a peak in adult mortality between *c* 26 and 45 years of age which affected both males and females.

A.1.5 Sex assessment

Sex was estimated for all adult skeletons who possessed pelves and crania. Due to the varied levels of preservation and completeness a large number of adult individuals (25) could not be sexed. This equates to 45.5% of the adult sample and corresponds to the high degree of truncation on site. The assemblage consisted of 19 males or probable males and 11 females or probable females. This produced a sex ratio of 1.7:1 in favour of males, although the difference was not statistically significant. An approximate 1:1 ratio is to be expected in any 'normal' population where sex is governed by genetic factors, though most archaeological populations contain slightly more males than females, due to differential preservation rates.

A.1.6 Dental health

A.1.6.1 Ante-mortem tooth loss

Ante-mortem tooth loss (AMTL) is generally the result of periodontal disease or dental caries. The 30 adult skeletons for which sex could be estimated had lost 32 teeth between them, a true prevalence of 4.4% (calculated from the number of observable sockets). The left mandibular third molar was lost most frequently (20.8%), followed by the right mandibular first molar (15.4%). AMTL increased with age-at-death, from 0% in the *c* 18–25 years age category to 12.6% in those aged *c* 46+ years. The true prevalence of AMTL was 1.9% for males and 5.8% for females, a difference which was statistically significant (X^2 = 5.97, p = 0.02).

A.1.6.2 Periapical abscesses

The presence or absence of periapical abscesses could be scored for 720 tooth positions in the identifiable adult males and females. These were recognised as circular, smooth-walled apertures which form around the roots of affected teeth in response to a build-up of exudate from pus-forming bacteria. Evidence of periapical abscesses was detected in 25 tooth positions; a total prevalence of 3.5%. Periapical abscesses were only found in two of 322 maxillary teeth (0.6%): in the right second (5.3%) and third molar (6.3%). Periapical abscesses were only found in individuals in the *c* 36–45 years age category (0.7% of sites) and only in males (0.5% of sites).

A.1.6.3 Dental caries

Dental caries is the most common dental disease. Women tend to be affected by the disease more than men both clinically and in archaeological contexts (Hillson 1986). Dental caries is uncommon in prehistoric material but increases in frequency in later periods, reaching a peak in modern times (Waldron 2001). Dental caries was identified in 23 teeth; a prevalence of 3.8%. The most common tooth for dental caries was the left maxillary third molar (18.2%) followed by the right maxillary first

molar (16.7%). The prevalence of dental caries was highest in the *c* 36–45 years age category. There was no difference in the prevalence rates of dental caries between the sexes: 0.4% in males and 0.4% in the females.

A.1.6.4 Enamel hypoplasia

Enamel hypoplasia was not present in any of the Parliament House skeletons.

A.1.7 Pathology

A.1.7.1 Osteoarthritis

Osteoarthritis (OA) is one of the most common pathologies observed in archaeological assemblages and is characterised by the degenerative breakdown of the cartilaginous surfaces of a joint, exposing and polishing the underlying bone as it grinds together during movement. OA is multifactorial in its aetiology; it is related to increasing age, genetic predisposition, obesity, activity/lifestyle and environmental factors (Roberts & Manchester 1995). OA may also be caused by secondary factors such as trauma or disease. It is believed that the distribution of joints affected can serve as an indicator of lifestyle and occupation (Waldron 2001).

The distribution of arthritic changes to the extra-spinal skeleton of the adults was recorded according to Rogers & Waldron (1995) and tabulated by joint for each age category; this can be found in the site archive. OA affected 0.9% (the true prevalence rate) of all extra-spinous joints observed among the Parliament House adults. The most commonly affected site was the right acromioclavicular joint of the clavicle, with a true prevalence of 8.3%. This was followed by the right sternoclavicular joint of the clavicle (7.7%), the left acetabulum (6.5%) and the left femoral head (6.1%). Osteoarthritic changes were recorded most frequently in the *c* 36–45 years age category (1.9%). There was no osteoarthritis in the sub-adults.

Among the adults for whom sex could be estimated the true prevalence of OA was the same for females and males (1.1%). However, the distribution of joints affected by OA differed between the sexes. For males the most commonly affected joint was the right sternoclavicular joint of the clavicle (true prevalence of 16.7%) followed by the right distal radioulnar joint of the ulna, the right radiocarpal joints of the scaphoid and lunate; all 12.5%. The most commonly affected joint for females was the right acetabulum (true prevalence rate of 14.3%) followed by the right and left femoral head and the left acetabulum (all 12.5%). This difference in the location of OA may indicate a difference in activity between the sexes. However, as only one joint was affected by OA at each of the sites listed above, the sex differences were not statistically significant.

A.1.7.2 Vertebral pathology

The most common site for vertebral OA for the adults was C4 (the fourth cervical vertebra) (11.1%), followed by L4 (the fourth lumbar vertebra) (10.5%) and C3 (10%). Vertebral OA was recorded in the 36–45 years age category and the 46+ years age category but did not affect any younger individuals. The prevalence of vertebral OA was higher in females (5.6%) than males (3.8%) and the pattern varied between the sexes. In males the most commonly affected site was C7 (20%) followed by C6 (16.7%) and C5 (11.1%). In females the most commonly affected site was C4 (16.7%) followed by the C3, L3 and L4; all 14.3%.

The prevalence of intervertebral disc disease (IVD) for each vertebra was recorded in the adults. The most commonly affected site was L5 (47.6%), followed by L4 (44.4%) and L3 (31.3%). The frequency of IVD increased with age after 18–25 years and varied between the sexes, with a prevalence of 18.8% in the males and 13% in the females. In the males the most commonly affected site was T6 (the sixth thoracic vertebra) (66.7%) followed by L4 (50%) and L5 (36.4%). In the females the most commonly affected site was L5 (50%) followed by S1 (the first sacral vertebra) (42.9%), L3 and T10; both 25%.

A.1.8 Traumatic conditions

Traumatic conditions are defined as any bodily wound or injury, including fractures, abnormal placement or dislocation of a bone and the disruption in a nerve and/or blood supply (Roberts & Manchester 1995).

Two individuals had evidence of ante-mortem fractures, a crude prevalence rate of 2.1% (no. 95). Skeleton 66, a probable female aged *c* 36–45 years, had a mid-shaft fracture of the right clavicle. This is the most common fracture site of the clavicle and is generally caused by falls onto the shoulder or an outstretched hand (Crawford Adams 1987). Skeleton 90, a male aged *c* 26–35 years, had fractured second and third left metatarsals (MT2 and MT3). The fracture to MT2 affected the midshaft and had united with plantar displacement of the distal fragment at a *c* 120° angle. MT3 was fractured just below the head and had also resulted in plantar displacement of the distal fragment. Extensive remodelling was visible with new bone on the joint surfaces of metatarsals 2 to 5. This probably resulted from the force which caused the fractures also tearing the joint capsules, causing bleeding into the joint which then ossified. Most metatarsal fractures are caused by direct force from a heavy object; other causes are a twisting injury or repetitive stress (Crawford Adams 1987). This individual also had periosteal new bone formation on both tibiae (see below). There was no evidence for secondary infection in either of these individuals. This may suggest that the fractures were closed (had not broken the skin) or that some form of treatment had been administered.

Myositis ossificans traumatica was present in two individuals. This condition is caused by avulsions of tendinous and/or muscle attachments to bone generating a haematoma, which then becomes calcified or ossified (Aufderheide & Rodríguez-Martín 1998). Skeleton 20, a male aged *c* 18–25 years, had a small protrusion of new bone on the posterior-lateral aspect of the proximal portion of the right shaft of the tibia. Skeleton 91, an adult, had a spur of bone on the posterior-lateral aspect of the proximal portion of the left shaft of the tibia.

Skeleton 86, a sub-adult aged *c* 6–11 years, had a small (12mm diameter) circular, erosive lesion on the medial condyle of the right femur. This is indicative of osteochondritis dissecans, a condition which occurs when lack of blood supply causes an area of subchondral bone to die and detach from the rest of the articular surface. The medial condyle of the femur is the most commonly affected joint in modern populations, followed by the radiohumeral joint and the ankle joint (Rogers 2000).

A.1.9 Infectious disease

Infections which affect the skeleton may be specific, ie caused by a known organism such as leprosy or tuberculosis, or non-specific, ie caused by a variety of organisms or traumatic injuries (Roberts & Manchester 1995). Both specific and non-specific infections/trauma elicit an inflammatory response which results in periostitis (inflammation of the periosteum), osteitis (inflammation of the cortex), or osteomyelitis (inflammation of the medullary cavity). It is the type and distribution of lesions across the skeleton which are used to determine the cause.

There were five individuals with periostitis at Parliament House; a crude prevalence rate of 5.3% (n=95). This is relatively common in skeletal assemblages, and is recognised by 'fine pitting, longitudinal striation and sequentially plaque-like new bone formation on the original cortical surfaces' (Roberts & Manchester 1995). Periostitis was observed on the distal portion of the shaft of the right humerus and the proximal epiphysis and shaft of the right ulna of Skeleton 62, a probable female aged *c* 36–45 years. Skeleton 90, a male aged *c* 26–35 years, had periostitis on the shafts of the left and right tibiae and fibulae. Skeleton 12, a probable male aged *c* 36–45 years, had periostitis on the distal epiphysis of the left tibia. Skeleton 7, an adult of unidentified sex, had periostitis on the superior surface of the mid-shaft of the left fibula. Skeleton 23, an individual of unidentified sex aged *c* 36–45 years, had periostitis on the distal shaft of the right fibula.

Skeleton 54, an individual aged *c* 46+ years of undetermined sex, had an erosive lesion on the olecranon of the right ulna (Illus 21 & 22). The area was remodelled on the proximal and medial aspect. The lesion formed an irregular groove running the width of the olecranon which was *c* 6mm wide. The condition appears to be chronic as the lesion was not very active with little remodelling. This pathology is thought to be due to either a low-grade chronic infection or tuberculosis.

Illus 21 Anterior view of right ulna (© AOC Archaeology Group)

Illus 22 Posterior view of right ulna (© AOC Archaeology Group)

A.1.10 Miscellaneous conditions

There was no evidence of neoplastic disease, circulatory disorders, or congenital abnormalities in the assemblage. Several other conditions were, however, observed. Skeleton 4, a juvenile aged *c* 8–13 years, had microporosity present in the left orbit, indicative of cribra orbitalia. This condition is thought to be an osseous sign of haemolytic or megaloblastic anaemia, caused by a deficiency of vitamin B^{12} (Walker et al 2009), and has been used more generally as a sign of poor sanitary conditions and nutritional stress. Infants and children typically display higher rates of cribra orbitalia than adults and the lesions are generally considered to form during infancy and heal with age. At Parliament House bilateral cribra orbitalia was also seen in Skeleton 57, a probable male aged *c* 36–45 years.

Skeleton 36, a female aged *c* 26–35 years, had a small smooth lesion (12mm anterior-posterior) on the internal surface of the right mandibular ramus. This appeared to be a non-inflammatory, soft-tissue lesion.

The majority of carpals were fused in the right hand of Skeleton 42; a male aged *c* 36–45 years (Illus 23). Osteophytes were present on the articular facets of the hamate and subchondral cysts were present on the articular facets of the capitate. The distal epiphyses of the right radius had microporosity and osteophytes. The proximal epiphyses of the right second and third metacarpal were remodelled bone, with new bone and subchondral cysts. The cause of this carpal fusion with little proliferation of bone is not known. A possible diagnosis is tuberculosis or trauma. Extra-spinal tuberculosis often only occurs at one site.

A.1.11 Demographic analysis

A.1.11.1 Ratio of sub-adults to adults

The assemblage from Parliament House consisted of 55 (57.9%) adults and 40 (42.1%) sub-adults. The proportion of sub-adults is high when compared with other parish assemblages, with only St John's Kirk, Perth (78.8%) and Linlithgow (59.2%) having a higher proportion of sub-adult burials (Table 5).

Illus 23 Carpal fusion with subsequent changes to the distal articular surfaces of the metacarpals (© AOC Archaeology Group)

Table 5 Comparison of adult vs sub-adult mortality with other parish assemblages

Assemblage	Adults		Sub-adults	
	no.	%	no.	%
St John's Kirk, Perth	–	21.2	–	78.8
Linlithgow Carmelite Friary	82	40.8	119	59.2
Parliament House, Edinburgh	55	57.9	40	42.1
Aberdeen Carmelite Friary	77	64.2	43	35.8
Whithorn	1093	68.1	512	31.9
St Giles' Cathedral, Edinburgh	79	69.9	32	28.3
Nethergate, Dundee	48	71.6	19	28.4
St Helen-on-the-Walls, York	–	73.0	–	27.0
Newbattle Abbey	90	75.6	29	24.4
Fishergate, York	312	77.6	90	22.4
Glasgow Cathedral	64	81.0	15	19.0
Perth Carmelite Friary	21	100.0	0	0.0

A.1.11.2 The sub-adult mortality profile

Although there was a large proportion of sub-adults at Parliament House, the younger age categories were poorly represented with peak mortality occurring at *c* 1–5 years and *c* 6–11 years. Only three foetal/neonate skeletons were identified in the assemblage, 3.2% of the total sample and 7.5% of the sub-adult sample. This is comparable to the mortality profile of St Helen-on-the-Walls, York (Dawes & Magilton 1980), where the highest proportion of sub-adult deaths occurred between *c* 6–10 years, with an incredibly small proportion of infants recovered. Whithorn also had higher numbers of children in the older age categories (Cardy 1997), and at Newbattle Abbey, sub-adult mortality peaked at *c* 14–21 years (Gooder 2004).

At St John's Kirk, Perth sub-adult mortality peaked at *c* 3–12 months (Bowler 2004), while at Glasgow Cathedral the majority of sub-adults (67%) died in the younger age groups, *c* 0–1 year and *c* 2–5 years (Driscoll 2002). These assemblages reflect the expected mortality profiles for medieval skeletal assemblages and it is possible that those with low numbers of infants practised some form of cemetery management, with specific areas reserved for the burial of infants. This was suggested as the reason for the under-representation of the youngest age categories at Whithorn (Cardy 1997) and is thought to be responsible for the low numbers of young children recovered from Parliament House.

A.1.11.3 The adult mortality profile

The adult mortality profile for Parliament House suggested that most individuals were dying between approximately 26 and 45 years. This pattern was broadly similar for both males and females. This is comparable with findings from Newbattle Abbey, where a peak in mortality was observed between *c* 36–49 years for both males and females (Gooder 2004). At Dundee and the Carmelite friaries of Perth, Linlithgow and Aberdeen males appeared to reach old age more often than females (Stones 1989a; Brown & Roberts 2000), and at St Helen-on-the-Walls, York the majority of females (56%) had died by *c* 35 years of age compared with only 35.8% of men (Dawes & Magilton 1980).

A.1.11.4 Ratio of males to females

The assemblage from Parliament House consisted of 19 males or probable males (63.3%) and 11

Table 6 Comparison of sex ratio with other medieval assemblages

Assemblage	Males		Females		Total
	no.	%	no.	%	
Fishergate, York	220	71.2	89	28.8	309
Parliament House, Edinburgh	19	63.3	11	36.7	30
Glasgow Cathedral	35	57.4	26	42.6	61
St Giles' Cathedral, Edinburgh	44	55.0	36	45.0	80
Nethergate, Dundee	34	49.3	35	50.7	69
St Helen-on-the-Walls, York	221	48.0	239	52.0	460
Whithorn	314	46.9	356	53.1	670

females or probable females (36.7%); a sex ratio of 1.7:1 in favour of males. Other medieval assemblages demonstrate broadly similar proportions of males and females, with the only considerable male bias occurring at Fishergate, York (Table 6). This assemblage was associated with St Andrew's Gilbertine Priory and it was believed that the high number of males reflected the burial of monks within the cemetery (Stroud & Kemp 1993). At Parliament House, sex could not be estimated for 25 adults as the relevant areas of the skeleton were not preserved. It is possible that this has caused the perceived sex bias in favour of males at the site.

A.1.11.5 Metric data analysis

At Parliament House the mean maximum achieved stature was 167.8cm (5ft 5in) for males and 150.3cm (4ft 9in) for females. When compared to other medieval assemblages (Table 7), the Parliament House females appear shorter than their contemporaries, and while the males are lacking in any particularly tall individuals, the mean stature is broadly comparable with males from other sites. That the stature means from Parliament House are most comparable with those of the St Giles' individuals suggests that the population of Edinburgh experienced broadly similar living conditions in the medieval period.

Table 7 Stature comparison with other medieval assemblages

Assemblage	Male		Female	
	Range (cm)	Mean (cm)	Range (cm)	Mean (cm)
Parliament House, Edinburgh	161–171	167.8	145–161	150.3
St John's Kirk, Perth	169–170	169.5	149–163	153.5
St Giles' Cathedral, Edinburgh	155–180	167.7	149–167	155.9
Linlithgow	159–179	170.0	147–165	156.0
Whithorn	158–183	170.0	139–169	156.0
Glasgow Cathedral	160–186	172.2	147–163	156.7
St Helen-on-the-Walls, York	154–184	169.0	145–173	157.4
Newbattle Abbey	163–172	168.8	150–166	157.6
Nethergate, Dundee	161–181	169.6	147–163	158.4
Fishergate, York	155–190	171.5	145–170	158.8
Aberdeen	163–179	168.0	147–169	160.0

A.1.11.6 Dental health

The true prevalence rate for ante-mortem tooth loss at Parliament House was 4.4%. At Newbattle Abbey the prevalence was 6%. At Aberdeen this was 4% and 9% at Linlithgow. For Fishergate the prevalence for the earlier assemblage was 3.2% and 11.4% for the later assemblage. At St Helen's this was much higher at 17.5%.

For Parliament House dental abscesses were present in 0.3% of individuals. This compares with St Helen's (1.2%) and the early Fishergate sample (1.9%). At Whithorn the true prevalence rate was 2%. The total true prevalence rate for dental abscesses in this period from the survey by Roberts and Cox is 3.1% (Roberts & Cox 2003). The low prevalence at Parliament House may be indicative of diet or dental hygiene.

At Parliament House the true prevalence rate for dental caries was 3.8%. A similar level was seen at Nethergate, Dundee (3.7%). At St John's Kirk, Perth, the figure was very low at only 1.7%. The true prevalence rate for caries was 5% at Aberdeen and 8% at Linlithgow. The true prevalence rate for the Whithorn assemblage was higher at 6.4% and Newbattle Abbey (11%). The prevalence was also higher at St Helen's (6.1%) and Fishergate (4.3% and 12.1%). The true prevalence rate in the late medieval period for dental caries was 5.5% (Roberts & Cox 2003). Parliament House was relatively low in comparison, again possibly indicative of diet or dental hygiene.

A.1.11.7 Pathology

Two individuals at Parliament House had evidence of fractures; a crude prevalence rate of 2.1% (n=95). The St Giles' assemblage had 13 individuals with evidence of fractures (crude prevalence rate of 11.5%). At Glasgow fractures were seen in six individuals (7.6%) and at Whithorn in 4.7%. At Fishergate the prevalence of fractures was high at 16.2%.

At Parliament House there were five instances of periostitis; a crude prevalence rate of 5.3% (n=95). Periostitis was much higher in the St Giles' assemblage with a crude prevalence rate of 18.6%. At Glasgow periostitis was seen in two individuals; a rate of 2.5%. At Whithorn this was more frequent (9.7%). The total crude prevalence rate for periostitis in this period from the survey by Roberts and Cox is 14.1% (Roberts & Cox 2003). Parliament House was well below this level, which may be indicative of the health of the population.

A.1.12 Conclusions

This assemblage represented a cross-section of the lay population buried at the Parliament House churchyard extension during the late medieval period in Edinburgh. At this time Edinburgh saw an influx of people as it became a trading centre and emerged as the capital of Scotland.

The evaluation provided, however, an incomplete representation of the cemetery as a whole, and the skeletal assemblage may therefore be biased. The assemblage from Parliament House consisted of 55 (57.9%) adults and 40 (42.1%) sub-adults. When compared to other parish assemblages the proportion of sub-adults is high. The reason for the high frequency of juveniles is not known but could be due to an epidemic. While a large number of juveniles were represented in the Parliament House mortality profile the younger age categories were poorly represented. The relatively low number of younger juveniles has been attributed to a possible difference in burial practice for very young children. The slightly higher numbers of males to females (1.7:1) at Parliament House may be due to bias caused by small sample sizes or may represent a real difference in the sexes due to socio-economic factors.

When compared to other broadly contemporary groups, the Parliament House females appear shorter than their contemporaries, though the males are not particularly different to contemporary populations; the stature means are most comparable with those of the St Giles' individuals. While this might be indicative of diet and status, the osteological remains demonstrated better health and dental hygiene than other populations of similar date.

A number of pathologies were identified in the assemblage including fractures and possible tuberculosis. These were the normal range of pathologies for a cemetery of this nature.

APPENDIX 2 ISOTOPIC ANALYSIS OF THE HUMAN TEETH

Jane Evans

A.2.1 Background

Samples of tooth enamel, retrieved from the Parliament House and St Giles' excavated assemblages, were submitted to the NERC Isotope Geosciences Laboratory (NIGL) for strontium ($^{87}Sr/^{86}Sr$) and oxygen ($\delta^{18}O$) isotope analysis for population migration data. Details of methodologies are fully recorded in the site archive report at the National Record of the Historic Environment of Scotland, where a full report on the findings can also be found. In this report PH SK refers to Parliament House Skeleton, while PH-81 refers to St Giles' Skeleton.

Fourteen tooth enamel samples were submitted for analysis. The samples were in a range of preservation states. The majority of the teeth were in a satisfactory condition for analysis and, following cleaning, most of the enamel samples were hard and translucent, a sign of good preservation. Several samples had poor preservation with heavily cracked and friable enamel. As a result, one enamel sample was not analysed (PH SK 44).

A.2.1.1 Local bedrock geology

This area of Lothian is dominated by rocks of the Carboniferous period and the bedrock is Carboniferous Limestone with a large area of andesitic/basaltic volcanic rocks nearby. To the south, the Southern Uplands are dominated by Palaeozoic meta-sedimentary rocks, and to the north, beyond the Devonian deposits, the older Scottish Proterozoic rocks crop out.

A.2.1.2 Background to oxygen and strontium isotopic analysis of human remains

Oxygen and strontium isotopes are fixed in enamel biogenic phosphate at the time of tooth formation. Biogenic phosphate is extremely robust and the isotopic signature of enamel does not change during life, nor is it altered in the burial environment. Oxygen isotopes are derived primarily from ingested fluids and reflect the isotopic value of available meteoric/ground/drinking water. Strontium isotopes are derived from both solid and liquid food and relate to the soil-derived bio-available strontium which, in the absence of any surficial deposits such as peat, loess, tills etc, is related to the geology of the area where the food was produced. As strontium and oxygen isotopes behave independently of one another, they allow two parameters for investigating an individual's place of origin and migration patterns.

A.2.2 Analytical methods

A.2.2.1 Sr isotopes

The samples were cleaned ultrasonically for five minutes in high purity water and rinsed twice to remove loosely adhered material. The available enamel surface of the teeth was abraded from the surface to a depth of >100 microns using a tungsten carbide dental bur and the removed material discarded. Thin enamel slices were then cut from the tooth using a flexible diamond edged rotary dental saw. All surfaces were mechanically cleaned with a tungsten carbide bur to remove adhering dentine. The resulting samples were transferred to a clean (class 100, laminar flow cabinet) working area for further preparation. In the clean environment, the samples were first cleaned ultrasonically in high purity water to remove dust, rinsed twice, dried down in high purity acetone and then weighed into pre-cleaned Teflon beakers. The samples were mixed with ^{84}Sr tracer solution and dissolved in Teflon-distilled 16M nitric acid (HNO_3). Strontium was isolated using conventional Dowex resin. Following elution from the column, each strontium sample was loaded onto a single Re Filament with TaF, following the method of Birck (1986), and the isotope composition and concentrations were determined by Thermal Ionisation Mass Spectroscopy (TIMS) using a Finnigan Triton multi-collector mass spectrometer. The international standard for $^{87}Sr/^{86}Sr$, NBS987, gave a value of 0.710284 ± 0.000010 (n=20, 2SD) for static analysis. All strontium ratios have been corrected to a value for the standard of 0.710250. Blank values were in the region of 100pg. Data are presented in Table 8.

Table 8 Strontium isotope and concentration data and oxygen isotope data for tooth enamel and environmental samples from Parliament House and St Giles' Cathedral (This table presents the strontium concentration, $^{87}Sr/^{86}Sr$ isotope composition, and the phosphate oxygen isotope composition in the form of $\delta^{18}O_{VSMOW}$ (‰), which is converted to a drinking water value (Mean $\delta^{18}O_{dw}$ (‰). * Preservation rating based on Montgomery (2002).)

Sample	Sr ppm	$^{87}Sr/^{86}Sr_n$	Mean $\delta^{18}O_{VSMOW}$ (‰)	Mean $\delta^{18}O_{dw}$ (‰)	Preservation (1 = good, 6 = poor)*	Comment
St Giles' period 3						
PH-81 SK 4	109	0.71143	17.5	-7.3	4.5	root present
PH-81 SK 10	173	0.70936	18.4	-5.3	3.5	root present
PH-81 SK 11	347	0.70976	17.1	-8.0	4.0	root present
PH-81 SK 16	133	0.70958	18.2	-5.7	3.0	root present
PH-81 SK 18	168	0.70945	19.8	-2.1	4.0	root present
PH-81 SK 21	146	0.70962	18.4	-5.3	3.0	root present
PH-81 SK 48	223	0.70961	17.7	-6.8	4.0	root present
Parliament House						
PH SK 16	341	0.70916	17.0	-8.4	4.0	single root, worn, juvenile?
PH SK 45	219	0.70969	17.1	-8.0	4.0	unerupted
PH SK 58	91	0.71006	18.8	-4.3	4.0	root, worn discoloured
PH SK 60	87	0.70983	17.3	-7.7	3.5	root, worn discoloured
PH SK 71	77	0.71646	17.4	-7.3	3.0	root
PH SK 92	92	0.70905	17.7	-6.8	3.5	root, worn discoloured
Environmental samples						
PH SK 25s		0.70929				
PH SK 60d	237	0.70948				
PH SK 16d	280	0.70921				
PH-81 SK 11d	229	0.70947				
PH-81 SK 16d	168	0.70931				

A.2.2.2 Oxygen isotopes

Silver phosphate was precipitated using the method of O'Neil et al (1994), from small fragments of clean enamel (15–20mg). The fragments of enamel were cleaned in concentrated hydrogen peroxide (H_2O_2) for 24 hours to remove organic material and subsequently the H_2O_2 was evaporated to dryness. The samples were then dissolved in 2M nitric acid and transferred to clean polypropylene test tubes. Each sample was then treated with 2M potassium hydroxide and 2M hydrogen fluoride to remove calcium from the solution by precipitation. The samples were then centrifuged and the supernatant added to beakers containing ammoniacal silver nitrate solution and heated gently to precipitate silver phosphate. The silver phosphate was filtered, rinsed, dried and weighed into silver capsules for analysis. Oxygen isotope measurements on each sample were carried out in triplicate by thermal conversion continuous flow isotope ratio mass spectrometry (TC/EA-CFIRMS). The reference material, NBS120C, calibrated against certified reference material NBS127 (assuming $\delta^{18}O$ of NBS127 = +20.3‰ versus SMOW; IAEA 2004), has an accepted value of 21.70‰ (Chenery 2005). The reproducibility of NBS120C during this set of analyses was 21.64‰ ± 0.26 (1σ, n=54). Drinking water values are calculated using Levinson's equation (Levinson et al 1987), after correction for the difference between the average published values for NBS120C used at NIGL and the value for NBS120B used by Levinson. Data are presented in Table 8.

A.2.3 Results

A.2.3.1 Strontium isotopes

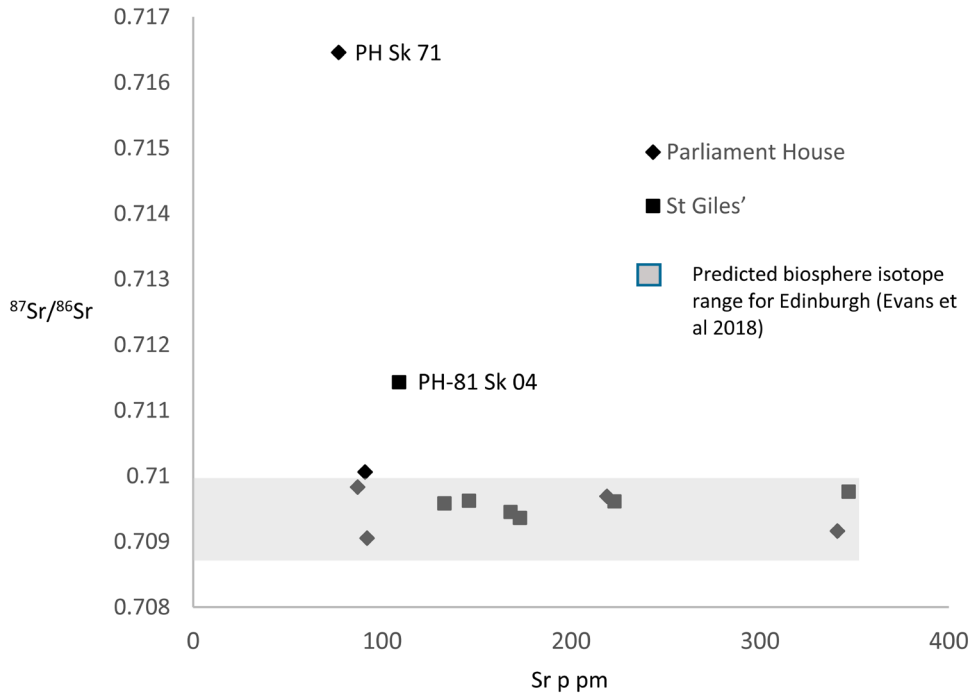
The site of Parliament House in Edinburgh is close to the coast and is underlain by limestones, sandstones and Coal Measure sequences of the Carboniferous Period. The soil leach and dentine (re-equilibrated with pore fluids during burial) give a data range 0.7092–0.7095 as recorded by the leach of soils in environmental samples provided from the burial site (Table 8), and from the dentine, which will equilibrate after burial. These values are within the predicted interquartile range of $^{87}Sr/^{86}Sr$ = 0.7088–0.7101 for biosphere values in the area of Edinburgh (Evans et al 2018). The enamel from three burials from Parliament House form a group with *c* 100ppm Sr and $^{87}Sr/^{86}Sr$ ratios of 0.7091–0.7100 (PH SK 58, 60 and 92) (Illus 24). PH SK 71 has a similar strontium concentration but a much higher, more radiogenic $^{87}Sr/^{86}Sr$ signature of 0.71646. This very radiogenic value would exclude this individual from having spent their childhood in the Edinburgh area and the closest place that cannot be excluded as a possible site of childhood origin is the area of the Scottish Highlands near Ballater, which is *c* 110 miles north of Edinburgh. The samples from PH SK 16 and SK 45 are an un-erupted molar with only partially mineralised enamel, and a poorly preserved tooth from a juvenile. Neither is considered likely to preserve a life signal and the $^{87}Sr/^{86}Sr$ values from these two samples are considered to be re-equilibrated with the burial environment.

The St Giles' site yields one outlier, but otherwise these samples give a restricted range of $^{87}Sr/^{86}Sr$ consistent with an Edinburgh childhood, with the outlier (PH-81 SK 04) giving an $^{87}Sr/^{86}Sr$ ratio of 0.71143 (Illus 25). The closest area that could generate such values is in the Southern Uplands, about 20 miles south of Edinburgh.

A.2.3.2 Oxygen isotopes (Table 8)

The Parliament House individuals have a normally distributed oxygen isotope composition of $\delta^{18}O_{phosVSMOW}$ = 17.29 ± 0.57‰ (2SD, n=5) which is consistent with data from individuals raised in eastern Britain ($\delta^{18}O_{phosVSMOW}$ = 17.2‰ ± 1.3, 2SD, n=83, Evans et al 2012). There is one outlier at this site (PH SK 58), which gives a higher value of $\delta^{18}O_{phosVSMOW}$ = 18.83‰. The data from the St Giles' site gives $\delta^{18}O_{phosVSMOW}$ = 17.86 ± 1.04‰ (2SD, n= 6). The larger uncertainty on these data, when compared to Parliament House, suggests a more diverse drinking water supply but this may simply be an artefact of the small sample numbers. This site also includes an individual with an outlying high point of 19.83‰ (PH-81 SK 18).

Regarding the two outlier oxygen values, PH SK 58 is within the 2SD range of east coast British oxygen ($\delta^{18}O_{phosVSMOW}$ = 17.2‰ ± 1.3, 2SD, n=83, Evans et al 2012), but would be a value more typical



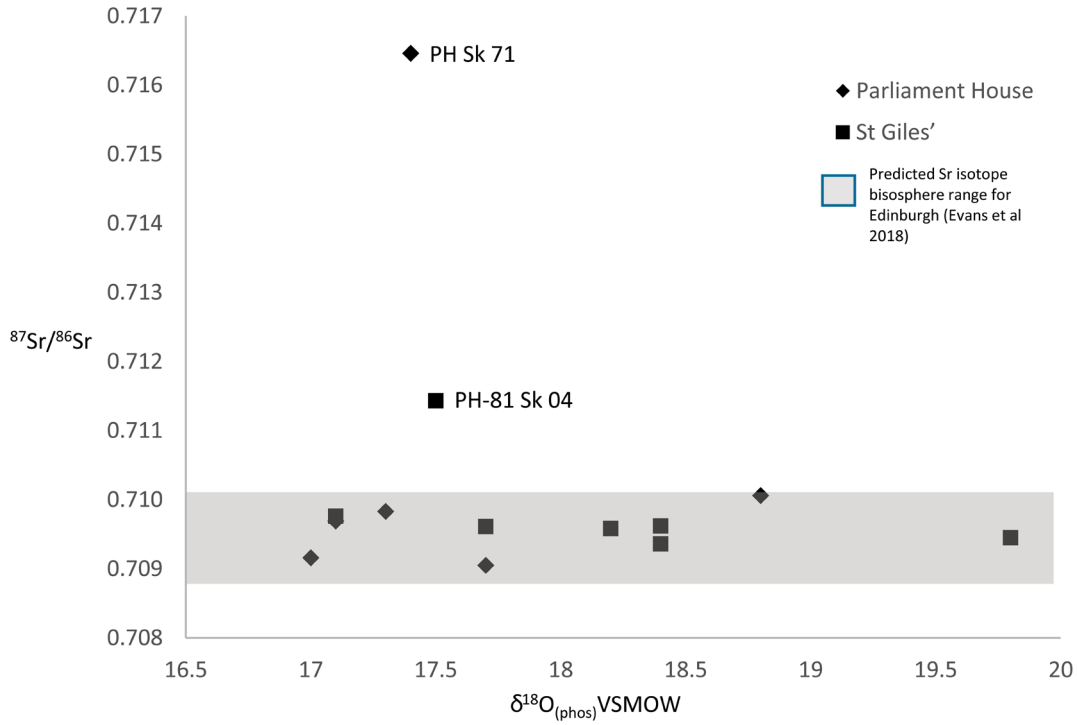
Illus 24 $^{87}Sr/^{86}Sr$ plotted against strontium concentration for samples from Parliament House and St Giles' (© AOC Archaeology Group)

of west coast sites. PH-81 SK 18, with its elevated value of $\delta^{18}O_{phosVSMOW}$ 19.83‰, is outside the 2SD range of values for west coast British data $\delta^{18}O_{phosVSMOW}$ = 18.2 ± 1.0‰ (2SD, n=40). The interpretation of these results, within the context of geographic origin, is based on the assumption that the main source of water into the body is from a drinking water source, derived from averaged rainwater compositions and typically of aquifer origin. If, for some reason, such a source is not the main water intake then the value can be modified. It is possible that either (i) the individual comes from a warmer climate where the Sr isotope systematics are indistinguishable from those in Lothian, or (ii), in the case of the single outliers, that the individual is a random statistical outlier in the population or (iii) that the water intake of these individuals was modified in some way such that it did not conform to the model of un-modified UK water source (Brettell et al 2012).

A.2.4 Conclusions

The individuals from the two burial sites in Edinburgh can be summarised thus: Parliament House is a burial site for individuals whose Sr isotopes are consistent with the local environment and whose Sr concentrations are consistent with those of most other UK archaeological studies. Their oxygen isotope composition is normally distributed and in agreement with estimates for human tooth enamel in eastern Britain ($\delta^{18}O_{phosVSMOW}$ = 17.2 ± 1.4‰, 2SD, n=615, Evans et al 2012). The group includes one outlier (PH SK 71) with an elevated $^{87}Sr/^{86}Sr$ ratio (Illus 25), which suggests a childhood spent on Palaeozoic or older rocks such as those found in the highlands of Aberdeenshire and Perthshire.

The St Giles' group is different in several ways. The majority of this group has a restricted $^{87}Sr/^{86}Sr$ isotope composition which is consistent with the local area, but they tend to have elevated Sr concentrations, such as those recorded from Machair dwelling individuals of the Outer Hebrides. The oxygen isotope composition of this group is unusual, and if they are taken to be a local group, on the basis of their Sr isotopes, their oxygen is inconsistent with local drinking water values – they record $\delta^{18}O$ values that give drinking water values typical of warmer climates. It is beyond the scope of this study to explain fully the unusual oxygen isotope features seen in the St Giles' group but it is suggested that this is related to the manner in which they obtained or processed their drinking water.



Illus 25 The fields of Parliament House and St Giles' data in $^{87}Sr/^{86}Sr$ vs $\delta^{18}O_{SMOW}$ highlighting the two main outlying samples PH SK 71 and PH-81 SK 04 (© AOC Archaeology Group)

APPENDIX 3 THE POTTERY

Derek Hall

A.3.1 The assemblage

The excavation produced 547 sherds of pottery from 68 contexts (Illus 26–28). The full pottery report is contained within the project archive to be deposited at the National Record of the Historic Environment of Scotland.

A.3.1.1 Scottish Post-Medieval Oxidised Ware

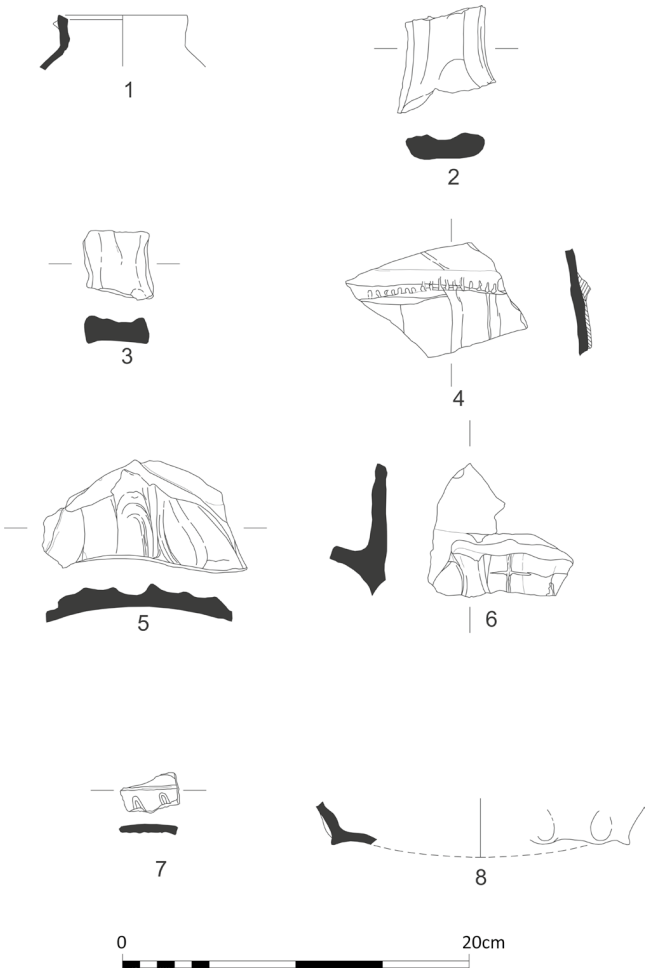
This later Scottish redware tradition dates from the 15th to 18th centuries and is often called 'Throsk-type ware' as it resembles the material being produced by the Throsk kiln site in the 17th and 18th centuries (Caldwell & Dean 1992). It was represented by 55 sherds, mainly from the graveyard and immediately underlying soils, but also within deeper deposits. Glazed jugs and skillets (cooking vessels) were the most common vessel forms represented in this fabric, although there were two bodysherds from small 'drug' jars from Contexts 170 and 328.

A.3.1.2 Scottish Post-Medieval Reduced Ware

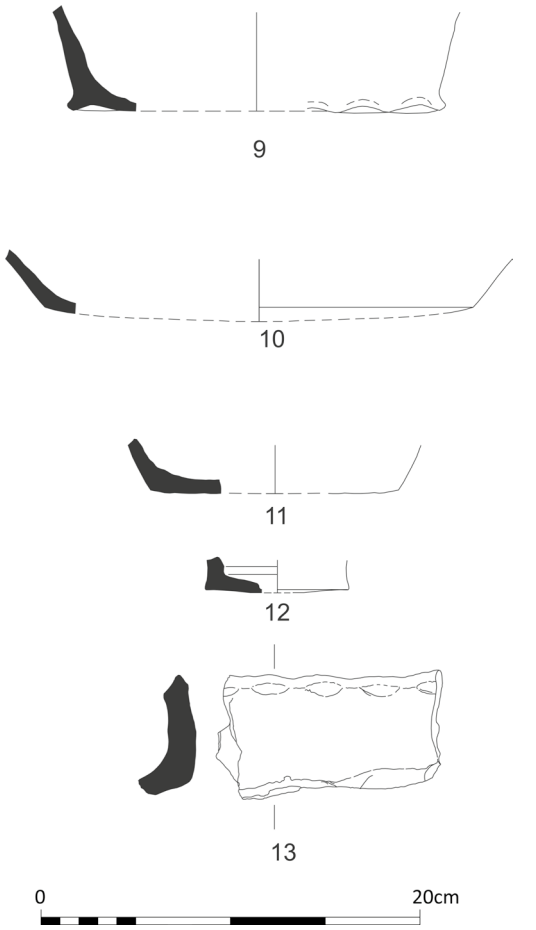
This fabric type was first identified in excavations at Stirling Castle in the late 1970s (Haggarty 1980). Essentially it is part of the Oxidised Ware tradition discussed above but it has been fired in an atmosphere with less oxygen which causes the fabric to reduce to a grey colour. There were 118 sherds in this assemblage, all from green glazed jugs; they were most commonly recovered from the graveyard and immediately underlying soils.

A.3.1.3 Scottish Redware

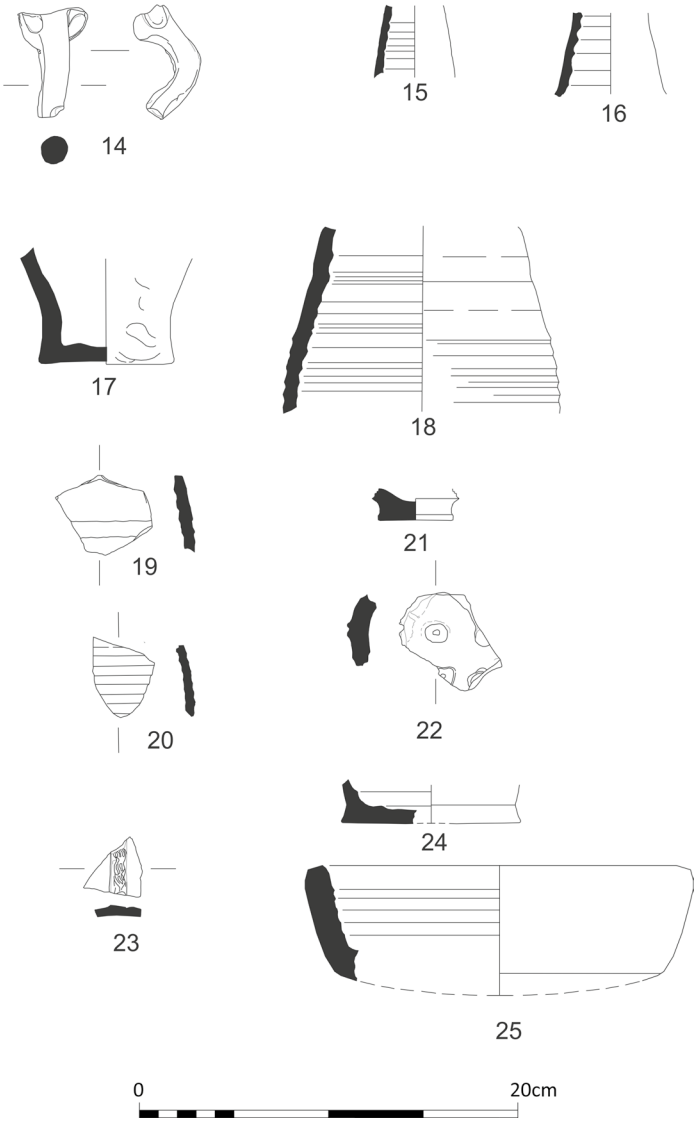
There were 20 sherds, mainly recovered from grave fills, in this fabric, which were all from glazed jugs. It has long been identified as a Scottish product, which was produced in the vicinity of the major river systems (Hall 1996; Chenery et al 2001; Chenery et al 2005; Haggarty et al 2011). From the late 12th/early 13th centuries it was the most common local product in the major Scottish burghs where there was not an adequate local supply of white-firing clay.



Illus 26 Scottish White Gritty Ware: (1) rim and neck from jar, SF133, Context 170; (2) strap handle fragment from green glazed jug, SF87, Context 101; (3) narrow strap handle fragment from green glazed jug, SF62, Context 123; (4) bodysherd with brown glazed raised applied strips from vessel glazed green brown, SF87, Context 101; (5) bodysherd and strap handle junction from green glazed jug, SF206, Context 352; (6) bodysherds and strap handle junction from green glazed jug with incised cross on junction, SF248, Context 405; (7) bodysherd from green glazed jug decorated with incised wavy lines, SF279, Context 432; (8) thumbed basal angle from jug splash glazed green, SF180, Context 328 (© AOC Archaeology Group)



Illus 27 Scottish White Gritty Ware: (9) slightly thumbed basal angle from jug splash glazed green, SF196, Context 349; (10) basal angle from unglazed jug, SF196, Context 349; (11) basal angle from green glazed jug, SF279, Context 432; (12) basal angle from green glazed jug, SF62, Context 123; (13) rim and basal angle from dripping pan internally glazed green, SF45, Context 101 (© AOC Archaeology Group)



Illus 28 Scottish Redware: (14) narrow rod handle from vessel splash glazed green, SF196, Context 349; (15) neck sherd from drug jar, SF321, Context 170; (16) neck sherd from drug jar with heavily rilled interior surface, SF190, Context 328; (17) basal angle and sidewalls from unglazed vessel, SF223, Context 376; Rhenish Stoneware (Siegburg): (18) joining bodysherds from rilled jug with ash brown glaze patches, SF217, Context 366; (19) slightly rilled bodysherd from vessel with external brown glaze patches, SF256, Context 417; (20) rilled bodysherd from unglazed vessel, SF256, Context 417; (21) basal angle from vessel glazed grey green, SF206, Context 352; Unidentified Fabrics: (22) fragment of lid, glazed green brown with raised ring and dot decoration, SF319; Context 124; (23) bodysherd from vessel glazed green and decorated with raised slashed strip and line, SF219, Context 368; (24) basal angle from vessel splash glazed green brown, SF111, Context 170; Industrial Vessel: (25) basal angle from unidentified industrial vessel, SF279, Context 432 (© AOC Archaeology Group)

A.3.1.4 Scottish White Gritty Ware

This fabric type made up the largest percentage of material from the Parliament House excavation, being represented by 252 sherds (46%). A minimum vessel count of 210 jugs, 29 jars and 4 other vessel types was represented by this group and it was consistently made up of thicker-walled vessels that would appear to date to the 14th and 15th centuries. There was a good example of a dripping pan from graveyard soil Context 101 (SF45) (Jones et al 2006). This date range covers the later end of the industry, although there were indications that earlier material was present from graveyard soil Contexts 170 and 123. The best excavated comparisons for this later group of Scottish White Gritty Ware are the finds from Bernard Street in Leith and from excavations in Inverkeithing (MacAskill 1983; MacAskill 1985).

A.3.1.5 Yorkshire Type Ware

There were six bodysherds from vessels glazed lustrous green from Contexts 110, 171, 209, 219 and 368, mainly grave fills. This fabric dates to the 13th/14th centuries and at that time appears to be the most popular imported pottery on the Scottish east coast (McCarthy & Brooks 1988).

A.3.1.6 German Stoneware

There were 23 sherds from vessels in this fabric from the production centres of Siegburg, Raeren, Frechen and Cologne (Gaimster 1997). These fragmentary sherds were all from glazed drinking vessels and dated to the 15th and 16th centuries.

A.3.1.7 North European Earthenware

There was a single sherd in this fabric from Context 386, a grave fill. This fabric was manufactured throughout Northern Europe and England from the 16th century onwards. There is no known Scottish production centre. It has been recovered from excavations at Kirkwall in the Orkney Islands (MacAskill 1982), Scalloway in the Shetland islands (Lindsay 1983), Pittenweem and Anstruther (Hall 1997) and Kelso. The Parliament House sherd was imported from the continent, possibly from Holland.

A.3.1.8 Earthenware

There was a single sherd of blue and white decorated Earthenware from the overlying rubble Context 100, which was probably of 19th-century date.

A.3.1.9 Industrial Vessel?

There was a single fragment from a vessel of uncertain function in a very smooth gritty fabric from deposits immediately under the graveyard, Context 432 (SF279). It may have been from the rim of a pottery kiln prop or vessel involved in another industrial process.

A.3.1.10 Unidentified

The 71 sherds that were catalogued in this class were too small for accurate identification to provenance.

A.3.2 Discussion

This assemblage was largely made up of very fragmentary sherds of pottery and it was not possible to reconstruct any meaningful profiles. The pottery would appear to date to the 15th or 16th century, although there were indications of earlier material being present.

APPENDIX 4 METALWORK

Julie Franklin, with contributions by Nicholas Holmes & Scott Timpany

The metalwork assemblage (Illus 29 & 30) was small and most of it related to the graveyard. Finds came either from grave fills or the surrounding graveyard soil, where they may have been redeposited from graves, or disturbed from the underlying deposits. A few unremarkable finds came from the thick layers of deposits underlying the graveyard soil. Below this was a series of cobbled surfaces, with related waterlogged deposits. Preservation of metalwork was extremely good in these lowest layers, including a copper alloy seal matrix with wooden handle in near perfect condition. The full metalwork report can be found in the site archive to be deposited at the National Record of the Historic Environment of Scotland.

A.4.1 Copper alloy

A.4.1.1 Coin

Nicholas Holmes

▸ James II–III copper 'Crux Pellit' issue (*c* 1450–82), Stewart type Ia; 20.5 × 21.5mm; 1.50g; die axis 165°. Both sides slightly off-centre; some poor striking in obverse legend; slight wear. SF140, Context 124, graveyard soil, Tr 2E (Illus 29).

A.4.1.2 Seal matrix

(with wood identification by Scott Timpany)

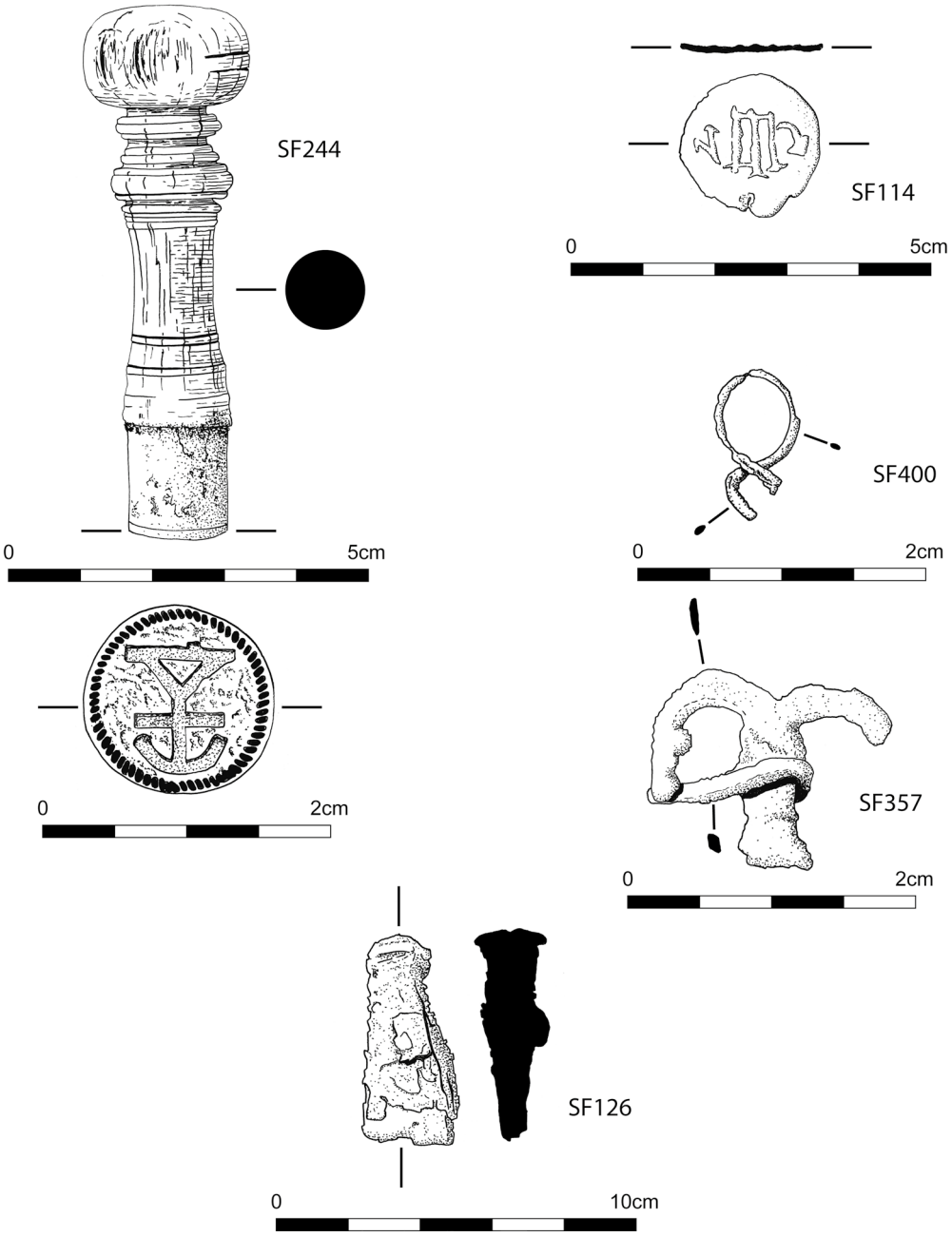
▸ Seal matrix. Turned birch wood handle with a knopped end. Copper alloy ferrule around last 14mm of handle, with soldered seam. Copper alloy disc with stamped anchor-shaped motif and decorative border soldered to end of ferrule. L: 74mm; max D: 23mm; stamp D: 14mm. SF244, Context 405, debris over cobbled surface, Tr 1C (Illus 30).

The seal matrix was found in a thin midden deposit overlying a cobbled road or courtyard surface. Though only damp when recovered, its remarkably good preservation and associated organic materials indicated that it had been preserved in anaerobic waterlogged conditions.

Traces of clay were found within the stamp, suggesting it may have been used on pottery. However, this seems unlikely for several reasons. Pottery was a relatively lowly craft, generally conducted outside the burghs due to considerable fire risk and the need for access to raw materials. Pottery stamps are simpler and more crudely executed and were probably made of wood or bone.

Illus 29 Coin of James II–III, SF140, Context 124 (© AOC Archaeology Group)

It is more likely that it was a merchant's desk seal. Two 16th-century desk seals published by Cherry (1997: fig 17.12) have similar turned handles, though in this case in ivory, reflecting the higher status of their owner. Business became increasingly bureaucratic during the 15th and 16th centuries and, though the use of merchant's marks was not new, they took on a greater importance. They could be used in correspondence and to mark ownership of goods, and provided a sign that could be read in any language (Cherry 1997: 260). The use of the anchor in the design indicated some connection to shipping, possibly involvement in importing and exporting. The design was very simple compared to other seals in use at the time, with no lettering and could have been forged without too much trouble. The low level of security suggested relatively humble goods such as agricultural produce. It was found a



Illus 30 Seal matrix SF244, Context 405; lead token/seal, SF114, Context 170; wire eyelet SF400, Context 210; buckle, SF357, Context 342; wedge, SF126, Context 227 (© AOC Archaeology Group)

stone's throw from the Lawnmarket (or Landmarket as it was formerly known) on the High Street immediately to the west of St Giles'. This was where people who worked the surrounding countryside brought their surplus to sell.

A.4.1.3 Shroud fastenings

There were remarkably few shroud fastenings among the assemblage. Wire pins, lace tags and wire eyelets are common finds in late medieval and early post-medieval graveyard excavations. Shrouds could be wound round the body and stitched, without need of metal fastenings, but increasingly during the medieval period they were secured with pins or laces. Metal lace ends are used to bind the ends of laces to prevent fraying and ease threading. Wire eyelets may have been used in conjunction with laces, or with leather thongs and wooden toggles, as the evidence suggests at Linlithgow Friary (Stones 1989b: 159). However, the small size of the finds means that statistics for their use are variable and unreliable. Many may have corroded away to nothing and where they are found it is often not clear if the finds are in situ or are residual or intrusive. Excavation of over a hundred medieval graves within St Giles' Cathedral in 1981 (Franklin & Collard 2006) found a total of 77 wire pins, 53 lace tags and four wire eyelets, concentrated in the later (late 14th century to Reformation) grave fills and surrounding graveyard soil. At Whithorn the cemetery excavations revealed a considerable number of all three types in late medieval and later graves (Nicholson 1997: 361, 375, 384). However, excavations of 51 graves outside Holyrood Palace revealed only two pins, a lace tag and a possible eyelet, none of which were directly related to graves (Bain 1998: 1061), and in 121 late medieval graves at St Andrews there were only three pins and one lace tag (Cox 1997).

At Parliament House, where the 95 graves were dated between the late 15th and late 16th centuries, a number of shroud fastenings might be expected. In fact, only one wire eyelet was found (SF400, Skeleton 30) and two lengths of copper wire, possibly pin shanks, came from the general graveyard soil (Context 170, Tr 1B/C). Wooden coffins would make the use of shrouds unnecessary, but there was scant evidence for these (Appendix 7). There are many other factors which may affect retrieval of such small metal objects, such as soil conditions (the eyelet was in poor condition), whether the burial is inside or outside a church, excavation conditions and sampling strategies.

Four graves (Skeletons 26, 38, 83 and 85) contained small fragments of fine iron wire (SF352, SF330, SF349 and SF342); two further fragments were recovered from underlying deposits (Contexts 349 and 352, SF333 and SF336). These may have been the remains of iron shroud pins, and two bent fragments may have been part of an eyelet. If these were in common usage as shroud fastenings, the unlikelihood of the survival of such fine ferrous objects and the difficulty of spotting them during excavation (all but one of these were from sample retents) could explain the lack of them at some sites.

▸ Wire eyelet. Loop formed from twist of fine wire. Diam: 6–7mm. SF400, Context 210, Skeleton 30 (adult, possible male, mass grave), Tr 2E (Illus 30).

A.4.2 Lead

▸ Lead token/seal. Disc, with twisted and broken remains of possible loop or perforation at edge. Stamped design on one face. Diam: 19mm. SF114, Context 170, graveyard soil, Tr 1B/C (Illus 30).

This may be a cloth seal, though it was only a single disc. One-part seals with perforations are known from England in the late 16th and 17th century, used as an official quality control system in the textile industry (Egan 1992). Alternatively, it may be a lead token, used as small change in England, though they are very rare in Scotland, where there was copper coinage for small change (Nick Holmes, pers comm). The design was simple and one-sided, and thus of limited diagnostic value. Crude one-sided tokens are known from 16th- and 17th-century contexts in London (Egan 2005: 167).

A.4.3 Iron

A.4.3.1 Buckles

▸ Buckle. Small figure-of-eight buckle. Remains of two oval loops and iron wire pin. L: 17mm; W: 15mm. SF357, Context 342, graveyard soil, Tr 2E (Illus 30).

▸ Buckle. Simple ring buckle with square sectioned frame and strip pin. Diam: 22mm. Context 345, grave fill, Skeleton 71 (not illustrated).

Both buckles were rather plain and utilitarian, being more commonly found in copper alloy, or sometimes pewter with iron pins. Small figure-of-eight or spectacle buckles are common in the late medieval and early post-medieval periods (Egan & Pritchard 1991: 82; Whitehead 1996: 52). Undecorated examples cannot reasonably be dated any closer than mid-14th to early 18th century, though they are more common in the 16th and 17th centuries. It was a very small example, to fit a strap no wider than 8mm, and was probably for a shoe. It was from the graveyard soil and thus may derive from a burial.

The ring buckle was a simpler and more archaic form, more common in 13th- and 14th-century contexts (Egan & Pritchard 1991: 57–65). It was found during post-excavation analysis associated with the bones of the torso of a young man. It was possibly residual, though it seems likely it was buried with the body. It was a little small for a belt buckle and a little large for a shoe buckle. It may have been used to secure two halves of an undershirt together (cf Egan & Pritchard 1991: 247, fig 158), though by the 15th century this was rather outmoded and was generally done with laces.

A.4.3.2 Coffin nails and fittings

There were 53 nails from the graveyard soils. They were found in 27 of the grave fills, though in no cases were there more than two nails in any grave, suggesting they may be displaced from other burials.

There was little evidence for wood associated with coffins (Appendix 7). In the case of Skeleton 60 there were traces of mineralised wood adhering to a nail shank, a feature commonly found where wooden coffins have decayed in situ. The nails ranged in size from small tacks (head W: *c* 7mm; shank L: *c* 20mm), suitable for fixing down a lid, to medium-sized woodworking nails (head W: *c* 15mm; shank L: *c* 50mm), suitable for fixing the corners.

Two further objects may also have been related to coffin construction. A small (32mm × 25mm) plate in the shape of a right-angled triangle with concave hypotenuse may have been part of a corner bracket (SF30, Skeleton 5, juvenile). A small wedge-shaped object may also have been of use in joinery (SF126, Context 227, Skeleton 35, mature adult male).

Excavations within St Giles' Cathedral found that among the late medieval (Period 3, late 14th century to Reformation) graves inside the church nearly half the graves (16 out of 37) contained traces of wooden coffins (Collard et al 2006: 20). This is a marked contrast to the scant evidence from Parliament House. However, it may be supposed that only the more elite members of society were buried within the church. Thus, not only are burial conditions outwith the church less conducive to good wood and metal preservation, but the people buried there were less likely to have been provided with coffins. At Holyrood Palace, only three out of the 33 14th- and 15th-century burials showed traces of wooden coffins (Bain 1998: 1054).

There was a wide range of techniques for coffin construction in the medieval period. Boyd states that at least a dozen nails were needed to make a coffin, though the use of wooden pegs for all or part of the construction would lessen this (Boyd 1989: 118). The five best preserved of the St Giles' coffins were of an unusual construction with partially open slatted bases, held together with between 24 and 60 nails (Collard et al 2006: 20).

▸ Wedge. Small wedge-shaped object with a nail-like head off-centre at the wide end. L: 59mm; max W: 27mm. SF126, Context 227, Skeleton 35 (mature adult male), Tr 1C (Illus 30).

A.4.3.3 Other ironwork

A further 17 iron nails, of various sizes and a possible broken clench bolt were found in the layers below the grave soil. The largest of these has a head width of 30mm and a shank length of 80mm and was possibly large enough for structural work, whereas smaller nails were for attaching fixtures and fittings. Clench bolts were used for securing thicknesses of wood together, such as for a door.

Three complete and well-preserved nails were found in the waterlogged conditions below the cobbled surfaces (Context 419, Tr 1C and 446, Tr 2F). All were of middling size (shank L: 50–60mm), and two had distinctive flat T-shaped heads, as opposed to the more usual round heads. T-headed nails appear in Ford and Walsh's Perth nail typology (Ford & Walsh 1987: Type F) from the later 14th century onwards, though they are never common. These two nails were nearly identical and it may be supposed they were from the same object or construction, though they were found some distance apart in different trenches.

A.4.4 Discussion

The graveyard deposits were notable for the lack of shroud and coffin fittings often found in contemporary cemeteries. This may have reflected the relatively lowly status for this area of the graveyard, or poor soil conditions, or a combination of both. There were several objects that could be related to trade: the seal matrix, the coin and the possible token, reflecting the site's location in the heart of the burgh near to various marketplaces.

APPENDIX 5 BUILDING MATERIAL

Naomi Crowley

A.5.1 The assemblage

A small assemblage of medieval structural building material was recovered from Parliament House. This comprised two fragments of window glass, a fragment of ceramic roof tile, three fragments of slate roof tile, four fragments of sandstone rubble and four fragments of mortar.

A.5.1.1 Midden deposits below burial ground

Context 328 contained a small fragment of pale green window glass, dating to the medieval or late medieval period, and three fragments of slate roof tile. Contexts 328 and 441 contained four small fragments of an off-white sandy mortar, one with a thin plaster surface.

A.5.1.2 15th-/16th-century burial ground

Contexts 123, 124 and 342 contained a small quantity of building rubble including a fragment of ceramic roof tile in a coarse red sandy fabric with a reduced core and occasional larger stone inclusions up to 15mm. This unglazed fragment had a thickness of 16mm and came from the lower part of a probable nib tile, likely to date from the 12th to 15th century. One small fragment of decayed undecorated green window glass, perhaps medieval in date, came from Context 123. Several fragments of building stone rubble were recovered, including a fragment of partially burnt fine-grained red sandstone, a fine light-coloured micaceous sandstone fragment from a larger worked stone, and a fragment of grey sandstone.

A.5.1.3 17th-century cobbled surface

Context 125 (equivalent to 111) produced half a brick in a red sandy fabric, with a width of 100mm and a thickness of 45mm. The brick had mould sand on the base and sides. Based on the dimensions and surface features, it was probably of 15th-century date and was reused in the cobbled surface.

A.5.2 Discussion

The assemblage consisted of a range of building rubble from the repair or demolition of nearby buildings. Although some of this material is datable to the medieval period, such as the ceramic roof tile, it all occurred residually in contexts dating to the 15th/16th century or later. No building material was recovered from layers below cobbled surface Context 417/445.

APPENDIX 6 INDUSTRIAL RESIDUES

Mike Roy

Thirty-one contexts produced material that was identified on site or during sample analysis as industrial residues. This material mainly comprised fuel ash slag, with occasional fragments of vitrified ceramic. The material is catalogued in the site archive to be deposited at the National Record of the Historic Environment of Scotland.

A.6.1 The assemblage

The majority of the material recovered consisted of fuel ash slag. This was generally present in small fragments within contexts associated with the burial ground. Fuel ash slag can be produced as a result of metalworking, but can also result from other processes such as the burning of daub and timber walls (Zeuner 1959) and cremation (Henderson et al 1987). The small amounts of vitrified ceramic material recovered might have derived from metalworking structures such as the lining of smithing hearths, but it is also possible that it was produced by the burning of huts or ovens constructed with clay or daub. Although there were Fe inclusions in this material, only Context 426 produced iron slag (possibly hearth slag). This small amount of material (0.36g) was associated with the burial soil around Skeleton 93.

A.6.2 Conclusion

Only small fragments of material were recovered, commonly from the processing of samples. It is likely that this represents dispersed, reworked material spread through the burial ground and underlying layers. The fuel ash slag and vitrified material may derive from non-metalworking processes such as the burning of timber and daub structures. However, the presence of metalworking in the general area can be inferred from the presence of metalworking slag within a single context.

APPENDIX 7 WOOD

Robin Inglis

A.7.1 The wood assemblage

A small assemblage of wood fragments was recovered and analysed (Schweingruber 1982) from soil samples retrieved both from contexts associated with human burials and from non-burial contexts. The assemblage consisted of small incomplete fragments of wood and root or twigs. The majority of the fragments were very small, with a length of between 10 and 20mm. There were, however, rare examples of larger wood fragments, between 50 and 100mm, which were solely found in the non-burial contexts.

A large proportion of the wood fragments, both from burial and non-burial contexts, showed signs of charring throughout their centres. There was also evidence of mineralisation around the fringes of a large proportion of the fragments. No wooden artefacts were uncovered – none of the wood fragments showed any sign of working.

Within the non-burial contexts, fragments of *Quercus* sp dominated the assemblage, with 13 examples identified. Within these contexts *Corylus* sp (seven fragments) and *Betula* sp (three fragments) were also observed, alongside single fragments of *Pinus* sp and *Salix* sp. Only four burial contexts produced wood, with only single fragments found in each. Three contained *Pinus* sp while the other context revealed a *Quercus* sp fragment.

A.7.2 Discussion

The limited quantity of material comprising the wood assemblage restricts meaningful interpretation. However, one interesting pattern was apparent: the burial contexts were dominated by pine, indicating that burials were potentially placed within pine coffins.

APPENDIX 8 TEXTILES AND YARN

Penelope Walton Rogers

Several small pieces of wool textile were recovered from the graveyard, along with short lengths of yarn that probably originated in similar fabrics. Two of the finds came from grave fills, Tr 2E, Context 210, associated with Skeleton 30 and Tr 2F, Context 343, associated with Skeleton 71, and the others from associated deposits. A full report on this material can be found in the site archive.

A.8.1 Catalogue

Tr 1 Context 349

▸ (i) Fragment of red wool textile, 5 × 4mm, woven in tabby, 14/Z/0.7 × 14/S/0.7 per cm; dyed with madder (alizarin and purpurin detected).

▸ (ii) Several lengths of dark brown wool yarn, longest 28mm, S-spun, 1.5mm diameter. Possibly unravelled from a textile.

Tr 1 Context 366

▸ Two lengths of dark brown wool yarn, 25mm and 10mm, S-spun, 1.0mm diameter.

Tr 2E Context 210 (associated with Skeleton 30)

▸ Fragments of mid-brown wool textile, largest 17 × 12mm, woven in tabby, 10/S/1.0 × 8/S/1.0 per cm; slightly felted and probably fulled. Fleece types, Semi-Fine × Semi-Fine. No dye detected.

Tr 2F Context 343 (associated with Skeleton 71)

▸ (i) Several short lengths of mid-brown wool yarn, longest 11mm, Z-spun, 1.0mm diameter.

▸ (ii) Several short lengths of dark brown wool yarn, longest 12mm, Z-spun, 0.8mm diameter.

Tr 2 Context 432

▸ Fragments of mid–dark brown wool textile, largest 20 × 20mm, woven in 2/1 twill, 6/S/1.5 × 6/S/1.0 per cm. Fleece types, Semi-Fine × Semi-Fine. No dye detected.

Tr 2F Context 435

▸ Fragment of dark brown wool textile, 10 × 7mm, woven in tabby, 4/S/2.0 × 4/S/2.0 per cm.

A.8.2 Discussion

The textiles were typical of the middle and lower range of fabric in use in urban centres in England and Scotland in the 14th to 17th centuries. They were soft 'woollens' made from carded wool, as opposed to 'worsteds' made from combed wool, and in one case, Tr 2E, Context 210, the textile had a felted appearance, which suggested that it had been fulled (probably by the mechanical beating of the fabric in a fulling mill). There were no examples of the teaselled and sheared textiles which represent the better-quality wool clothing fabric of the period.

The weave structure of the textiles was 2/1 twill in one case and tabby in the others. In England 2/1 twill was mostly displaced by tabby during the course of the 14th century (Walton 1981: 194–5), but evidence from sites such as 16–18 Netherkirkgate, Aberdeen (Gabra-Sanders 2001: 227–32) indicates that the changeover was somewhat later in Scotland, as it was in Norway (Walton Rogers 1999: 197), although tabby weave was certainly established by the later 15th century (Ryder & Gabra-Sanders 1992: 5–7). The spin direction of the Parliament House examples followed the usual pattern of S × S in the coarser fabrics and Z × S in the middle range (Walton 1981: 193), and the loose yarns appeared to belong to textiles of a similar character. The red dye, madder, represented by the chemical constituents alizarin and purpurin, was detected in the finest piece, from Tr 1, Context 349. This dye is derived from the roots of the plant *Rubia tinctorum* L and is likely to have been imported from the Low Countries (Walton Rogers 2001: 239).

Two textiles, from Tr 2E, Context 210 and Tr 2F, Context 432, were selected for analysis of the wool quality, a procedure which is based on the measurement of the diameters of 100 fibres (Ryder 1969; Walton Rogers 1995). This showed that the fleece type of warp and weft was Semi-Fine, which corresponded with the wool of the shortwool breeds, such as the Ryeland and the Southdown. This type of wool came to the fore in English and Flemish textiles in the 15th and 16th centuries (Walton 1981: 191–3 and author's unpublished data), and in Scotland it is prominent in collections from late 14th- to 15th-century Netherkirkgate, Aberdeen (Ryder 2001), and later 15th-century Fast Castle, Berwickshire (Ryder & Gabra-Sanders 1992:

10–17). Ryder equates these examples to the Old Scottish Shortwool, which has since died out, but which was probably the Scottish stock described in the early 16th century as having 'white, fine and excellent wool' (Ryder 2001: 237).

Although these were not the best wool fabrics of the period, they were competently made from good-quality wool. The three finer pieces were comparable with the tailors' offcuts found in 15th- and 16th-century levels of the Castle ditch, Newcastle-upon-Tyne (Walton 1981) and probably represented clothing fabrics, while the coarsest piece, from Tr 2F, Context 435 was more likely to be from a blanket or some other soft furnishing. Burial in a linen shroud was standard for lay members of society at this period and it is perhaps more likely that these wool textiles have been redeposited from the midden deposits immediately below the grave soil.

APPENDIX 9 LEATHER

Clare Thomas & Antonia Craster

A full report on the leather and catalogue is contained in the site archive to be deposited in the National Record of the Historic Environment of Scotland. The leather consisted of 35 items, comprising parts of shoes and clothing, as well as a belt, two decorated items, offcuts and scraps. The material was all very fragmentary and worn. It most probably represented domestic waste; there was no evidence for shoe manufacture or repair. The shoes suggest that the assemblage was of late medieval date, possibly early 16th century. It was generally not possible to identify animal species.

A.9.1 Shoes

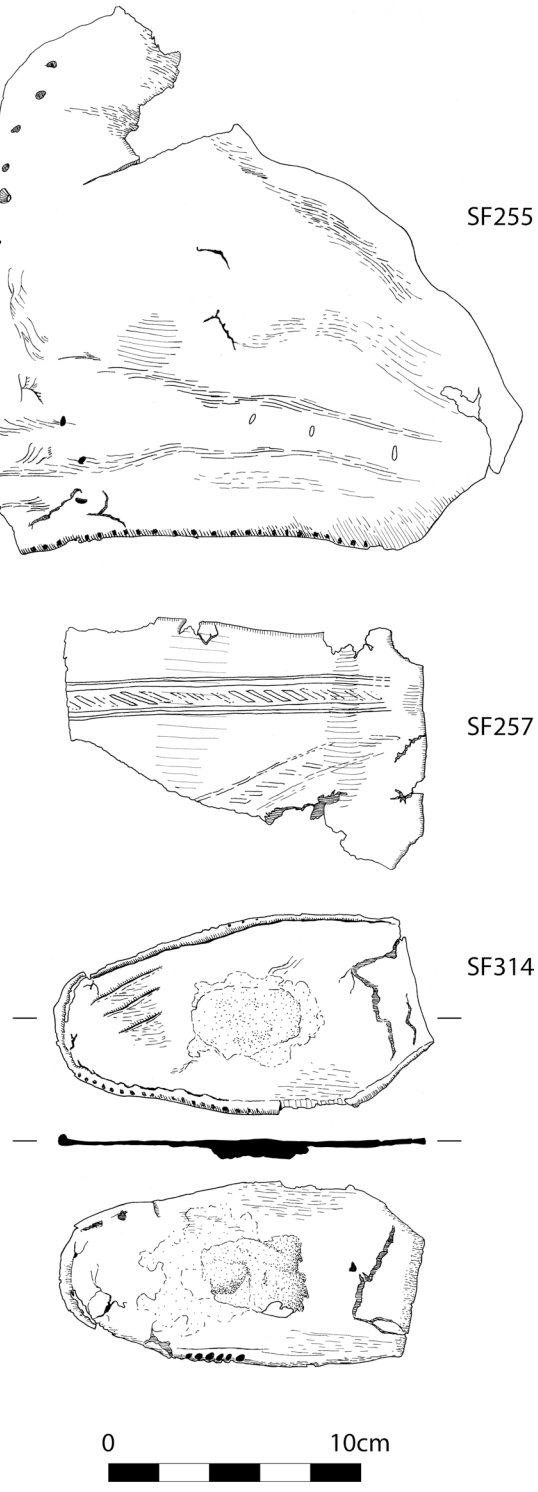
Shoes were represented by eight items from medieval cobble surfaces (Contexts 376, 416 and 442) and intervening deposits: two sole fragments (Illus 31); two heel-lifts and four upper parts. Welted construction, but an early variant, was suggested by both the long stitch length and the style of a sole forepart (SF314). The presence of heel-lifts or top-pieces also suggests that this footwear was post-medieval in date. The upper fragments included two latchets, fastened to each other with a buckle, the pin of which survived; the method of attachment to the shoe again indicated a late medieval date.

A.9.2 Clothing

Two fragments with lace holes recovered from medieval cobble surface Context 416 were most probably part of a garment such as a jerkin; they also feature slots for thongs, which might have been for adjustment of the fit. Unfortunately, there is no evidence to indicate date.

A.9.3 Belt

A strip of leather with long cut edges and remains of three holes for the pin of a buckle was a belt, either for clothing or for some other item, such as horse tack, and was recovered from the upper medieval cobble layer, Context 442.



Illus 31 Seat of sole, SF255, Context 416; decorated fragment with three cut edges, SF257, Context 417; forepart of left sole (upper and lower surfaces), SF314, Context 442 (© AOC Archaeology Group)

A.9.4 Decorated fragment

A fragment (SF257) with three cut edges, with traces of hem stitch, was decorated with two converging bands of impressed diagonal lines (Illus 31). The regularity and shallowness of these lines suggested that they may have been machine cut, indicating a date in the 19th century or later, though it was recovered from Context 417, between medieval cobble layers.

A.9.5 Conclusion

This small assemblage was distinguished by the upper latchets with remains of a buckle and by the clothing pieces. The shoe fragments suggest a date in the 16th century or later; the decorated fragment may be of 19th-century date.

APPENDIX 10 ANIMAL BONE

Jennifer Thoms & Catherine Smith

A.10.1 Introduction

Over 2,000 animal bones were recovered, both from the deposits under the burials and the earlier surfaces and from the burial contexts themselves. Full details can be found in the archive report in the National Record of the Historic Environment of Scotland.

A.10.2 Hand-excavated material

Sheep/goat was the dominant large mammal species, with cattle, pig and horse also represented. The smaller domesticates included cat and dog. Rabbit remains were minimal and probably intrusive. Bird bone included chicken. Butchery marks were recorded on sheep/goat, cattle, bird, chicken and large mammal fragments.

A minimum of 13 sheep/goat was present, most commonly in grave soil and immediately underlying deposits, but also between the medieval cobble surfaces. Epiphyseal fusion and tooth wear analysis indicated that with the exception of two individuals that died between 6 and 12 months, the sheep reached maturity, though there was no evidence that they survived beyond four years. The younger sheep were probably culled as surplus males or to satisfy demand for lamb meat; the older animals had attained their optimum size. This suggests the animals were bred primarily for their meat as opposed to being part of a dairy or wool flock. The presence of holes on the occlusal surface of several sheep teeth may have been caused by grazing on a sandy soil or being fed on gritty fodder.

The distal ends of the humerus, mandibles, scapula, radius and ulna were the dominant elements recovered. The majority of these bones are traditionally viewed as high-value meat cuts. It is most likely that these animals were slaughtered in a separate location and the meat was redistributed to this area. Without exception butchery marks demonstrated no particular evidence of skill, suggesting they occurred in a domestic situation.

At least three cows were represented in deposits ranging from the Meal Market Surface (Context 110) to medieval buried soils (Context 419). Epiphyseal fusion indicated that at least one animal died between 16 and 20 months; the remaining animals reached maturity. In contrast to the sheep/goat, the cattle assemblage commonly comprised low-value meat bones. In late medieval Scotland, mutton and lamb were typically more affordable than beef or pork, which may explain why the cow elements were of a poorer quality. Several of these low-value meat bones were charred and burnt, implying that they were cooked. The cow bones also had the highest proportion of butchery marks; most of these appear to have been made by unskilled individuals, apart from probable cow vertebrae, which were cleanly chopped in half with a sharp machete-like blade. As with the butchered sheep elements, the professional butcher was apparently only halving or quartering the animal with the final butchery completed in a domestic setting.

Pig remains consisted of six bones from grave soil and immediately underlying deposits, representing at least two animals. Tooth eruption indicated that both died between 7 and 13 months. This is typical of a late medieval assemblage where pigs were slaughtered as soon as they achieved a reasonable size for optimum meat production.

The volume of recovered horse, dog and cat remains was negligible. The horse consisted of one complete metatarsal. The dog and cat remains were concentrated in particular contexts, including the burial ground (Context 170) and the immediately underlying deposits, which suggests that complete skeletons were deposited – at least two individuals from each species were present. These animals were probably pets or scavengers, disposed of with domestic refuse.

Bird bones, including chicken, showed evidence of butchery marks; those butchering and skinning these joints of meat lacked basic training in butchery techniques as the skill required is minimal.

A.10.3 Material from sample processing

A small assemblage was recovered from bulk samples recovered from burial and non-burial contexts, consisting of small incomplete fragments of bones and teeth from large domesticated mammals, and small, more complete bones from small mammals and birds.

Present in both burial and non-burial contexts were broken tooth fragments of cattle and sheep/

goats. Smaller mammals in non-burial contexts were field mouse (*Apodemus sylvaticus*; Context 435) and possible rat (*Rattus* sp; Context 419). Rat bones were more common in the burial contexts. A metapodial fragment associated with Skeleton 63 probably came from a rabbit.

Birds were present but were not identifiable to species level. However, a fragmentary distal tarso-metatarsus from a passeriform species possibly came from a small jackdaw (*Corvus monedul*a; Context 432) or a related species. Other bird bones were ribs and foot phalanges from small species.

A.10.4 Conclusion

Most of the animal remains probably resulted from domestic refuse from the High Street above. The presence of burnt bone and unskilled butchery marks indicated that these bones were food and cooking waste. The majority of the large domesticated animals were killed as they reached their optimum size to satisfy the demand for meat.

Rabbit bone may have come from animals that burrowed into the site. Wild birds, such as jackdaws, were also present. The small mammal fauna included field mouse, which may invade human habitation in winter. Plentiful rat bones indicated the presence of a food supply, possibly the human remains themselves. Unfortunately it was not possible to determine whether the bones came from the black rat (*Rattus rattus*), which was present in medieval Scotland, or the brown rat (*Rattus norvegicus*), which did not arrive until the mid-18th century (Kitchener 1998: 79).

The animal bone experienced significant post-depositional activity. The presence of disarticulated human remains in all contexts was probably the result of disturbance by inhumation activity. There was also evidence of gnawing attributable to small mammals such as dog, cat and rodent on the animal bone (though not the articulated human bone); this activity was probably responsible for removing specific bones from the animal bone assemblage.

APPENDIX 11 FISH AND MARINE MOLLUSCA

Ruby Cerón-Carrasco

A.11.1 Fish

The fish remains from Parliament House derived from both 'burial' and 'non-burial' contexts. Eleven non-burial contexts and 53 burial contexts produced fish remains. Nomenclature follows Wheeler & Jones (1989: 122–3). A full catalogue and report can be found in the site archive at the National Record of the Historic Environment of Scotland.

The assemblage comprised marine species; no freshwater fish remains were recovered. Herring (*Clupea harengus*, family Clupeidae) was the main species present together with fishes of the cod family (Gadidae): haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*), whiting (*Merlangius merlangus*), saithe (*Pollachius virens*) and pollack (*Pollachius pollachius*). Other species included gurnard (*Eutrigla Gurnardus*), mackerel (*Scomber scombrus*), the flatfish plaice (*Pleuronectes platessa*) and remains of Elasmobranchs (shark/ray).

A.11.2 Marine mollusca

Marine shells from Parliament House were recovered from 15 non-burial contexts and 79 burial contexts. A full catalogue and report can be found in the site archive.

The most common species present was the common oyster (*Ostrea edulis*), found in shallow waters. Also present were the common mussel (*Mytilus edulis*), found on rocks in estuaries and exposed shores; the queen scallop (*Chlamys opercularis*), which is found on sand and gravel, on the extreme lower shore; and the common cockle (*Cerastoderma edule*), found on the lower shore burrowed in sand, mud or gravel.

Gastropod species included limpet (*Patella vulgata*), found on rocky shores throughout the Scottish coast; edible periwinkle (*Littorina littorea*), found on rocks, stones and seaweed on the middle and lower shore and by the shore during breeding seasons. Other edible species included the common whelk (*Buccinum undatum*), which is found on sand and mud from shallow water.

Other species recovered and classified as non-edible were the flat periwinkle (*Littorina littoralis*), rough periwinkle (*Littorina saxatilis*), small periwinkle (*Littorina neritoides*), grey topshell (*Gibbula cineraria*) and dogwhelk (*Nucella lapillus*).

A.11.3 Discussion

The deposition of fish remains at Parliament House site may be due to rubbish disposal, though their use as fertiliser and/or as elements of levelling or fill material is also a strong possibility as large amounts of the material derived from grave fills.

The beaches along the east coast provided an easily accessible resource – most of the contexts contained species which would have been easily collected from these beaches. The oyster in Scotland is particularly associated with the east coast – around the Forth before the 1800s there was productive exploitation of this shell (Lockhart 1997). Mussel is abundant in clean conditions, especially where salt and fresh water meet, such as at the mouth of burns entering the sea; the Firth of Forth was one of the most productive areas in Scotland. In Scotland, mussel was also used as bait for lines (ibid). Limpets are edible and have also been used traditionally as fishing baits. Edible periwinkles, which are found in rock pools along the shoreline and are still gathered by hand, have always been plentiful. Whelks were caught from the sea in baited pots or baskets.

The presence of scallop shell (*Chlamys opercularis*) in this assemblage, within a fill associated with Skeleton 59, is of great interest. The scallop shell is the symbol of St James and the cult of pilgrimage to Santiago de Compostela in Spanish Galicia. The first literary evidence for the scallop as the badge of the pilgrimage to Santiago de Compostela is the *Liber Sancti Jacobi*. Shells to be attached to pilgrims' cloaks were on sale around AD 1130 in booths around the paved court north of the cathedral (Hobler 1957). A sermon in the *Liber Sancti Jacobi* indicates that the two valves of the shell symbolised the Two Great Commandments. The earliest representation of a pilgrim wearing the shell is on the western doorway of Autun Cathedral in Burgundy, which dates from between 1130 and 1140. In the cloisters of Santo Domingo de Silos in Spain and Arles in Provence, France, there are sculptures depicting Christ and two of the disciples dressed as pilgrims, the scallop shell being much in evidence. The carvings at Silos date to around 1160

(ibid). A parallel for the presence of a scallop shell with human burial in late medieval Scotland exists within the Cluniac priory church on the Isle of May, where a scallop was recovered from the burial of an adult male, radiocarbon dated to between the late 13th and mid-15th century. The scallop shell appears to have been intentionally inserted within the palate of the inhumed individual (James & Yeoman 2008: 58, illus 5.23 and 5.24).

The species associated with the cult of St James appears to be that of *Pecten maximus*. It is semi-circular, with equal 'ears' and dissimilar valves – the upper are flat and reddish-brown, the lower are convex, cream or fawn with pinkish-brown markings. It can be up to 13cm long. This was the species recovered from the late medieval burial within the Cluniac priory church on the Isle of May (James & Yeoman 2008: 181). *Chlamys opercularis*, the species recovered at Parliament House, is up to 9cm in length and its anterior ear is longer than the posterior one. The only species of *Pecten* which occurs on the Atlantic coast, not far from Santiago de Compostela, is *Pecten maximus* (Rees 1957).

While it is uncertain whether the smaller species of *Chlamys* recovered with Skeleton 59 was symbolic of the cult of St James, it was certainly deliberately fished. Regardless of the significance of this bivalve as a Christian symbol, queen scallops (*Chlamys opercularis*) were extensively fished in the last century, and very large beds, which were fished for bait, existed in the Firth of Forth (Tebble 1976).

A.11.4 Conclusion

Most of the large robust gastropods (eg periwinkles) were well preserved; these usually survive well in archaeological deposits because of their strong sturdy shell. However, oysters, which have a more lamellar and easily broken shell, were also relatively well preserved, particularly in the hand-retrieved material. Most of the other shell remains only survived as broken fragments, a few showing signs of burning. This suggests that these remains were mainly derived from refuse used as fertilisers and/or as levelling/fill; most were recovered from grave fills. The exception to this interpretation was the scallop shell, which may have been deposited with human inhumation for symbolic religious purposes.

APPENDIX 12 PLANT AND INSECT MACROFOSSILS

Allan Hall & Harry Kenward

Macrofossil plant remains derived from bulk-sieved samples representing ten contexts were examined. These included seven samples that came from the material immediately under the graveyard – Contexts 328, 349, 352, 366, 432, 435 and 441. The other three contexts were 126 (post hole fill), 419 (layer beneath cobbled surface) and 442 (silt build-up over cobbled surface 443), of which only Context 419 yielded more than a very few identifiable remains. With the exception of post hole fill 126, all these deposits predated the churchyard. For the most part the plant remains in these deposits were uncharred ('waterlogged'), with a little wood charcoal but no other charred plant fragments apart from a very few cereal grains and a single charred sedge nutlet. Preservation of the plant (and insect) material was generally moderately good and certainly typical of many urban occupation deposits with moderate to low concentrations of waterlogged remains. Data pertaining to these samples are fully recorded in the archive report at the National Record of the Historic Environment of Scotland.

Though small, the assemblages of remains were typical of urban medieval occupation deposits and most of the fruits and seeds probably originated in weeds growing in the vicinity or arriving with materials such as hay and straw or other plant litter. The regular occurrence of fragments from heather certainly pointed to a component arriving from moorland or perhaps peat (eg in the form of heather brushwood or turves). Although beetle remains were extremely rare and mostly rather fragmentary, there were several well-preserved spider beetles in at least five samples. All of the taxa were typical of occupation deposits of the period and probably represented moist organic matter, including material ejected from buildings. The presence of *Trox* perhaps hinted at dumps of bone or animal skins, but these might also have lived in dry nests within structures. The few earthworm egg capsules present were not unexpected in deposits of this kind, though the occasional small freshwater snails presumably originated with the aquatic plants in imported cut wetland vegetation or water from a pond or stream. None of the assemblages showed the predominance of any particular kind of material.

Most notable among the taxa recovered were the remains of fig seeds (present in eight of the ten samples), small fragments of madder root (traces in four samples) and weld seeds (in four samples), as representatives of 'useful' plants and, in the case of the fig and madder, imported commodities. It is significant that a fragment of red wool textile, dyed with madder, was recovered from an underlying silt deposit, Context 349 (Appendix 8). Madder does not appear to have been recorded previously from archaeological deposits in Scotland, though it is known from the Anglo-Scandinavian and medieval periods from York (Kenward & Hall 1995 and Hall unpublished data), and medieval deposits in Beverley, East Riding of Yorkshire (McKenna 1992; Allison et al 1996) and Bristol (Jones & Watson 1987; Jones 1998). It was widely used in Europe in the medieval and post-medieval periods as an everyday source of red dye for textiles. Grierson (1986) gives a brief account of its history of importation and use in Scotland.

Weld, too, has a long history of use as a dye (providing shades of yellow), though it is also a plant likely to have been growing as a weed of disturbed soils, as it is today. The occurrence of the two together in the same deposits lends support to the suggestion that it was here being used as a dyeplant and by the same token it might be argued that the remains of heather might also represent imported dyestuff.

Fig is known from a number of sites in Scotland in the medieval period, so this record from Edinburgh is a useful addition to the growing body of evidence. Previously it has been identified from Paisley Abbey (Dickson 1996), at least seven sites in Aberdeen (Fraser & Dickson 1982; Kenward & Hall 2001) and from a late medieval to early post-medieval deposit as far north as Kirkwall, Orkney (Hall 1982). The seeds presumably represent imported dried fruits in all these cases. A few of the other remains from the Parliament House assemblage seemed likely to have arrived with the fig seeds as food waste: the traces of grape pip in one sample, and of raspberry, blackberry and perhaps even sloe. Clearly these were the more decay-resistant kinds of remains.

Though limited, the results of these analyses demonstrated the value of investigation of deposits of this kind, especially in an area where very few studies of plant and animal remains in archaeological occupation deposits have been undertaken.

APPENDIX 13: CHARCOAL

Robin Inglis

A.13.1 The assemblage

A small assemblage of charcoal fragments was recovered from soil samples from Parliament House. Samples were retrieved from 14 contexts associated with human burials and from seven non-burial contexts. The assemblage mainly consisted of small, heavily mineralised, charcoal fragments. As the fragments were all very small in size, the largest having a 9mm radius, there was little clear evidence of age of species due to the few rings available for analysis – mostly the number observed was under five rings. None of the charcoal fragments showed any sign of working.

The material from non-burial contexts was dominated by oak (*Quercus* sp – 14 identifications). Hazel (*Corylus avellana* – five identifications) and alder (*Alnus glutinosa* – four identifications) were also present, as were single fragments of chestnut (*Castanea sativa*), ash (*Fraxinus excelsior*) and pine (*Pinus* sp).

The burial contexts contained a similar assemblage, with oak again dominating (20 identifications) and hazel and alder as the next most abundant species (five and six identifications respectively). Small quantities of birch (*Betula* sp), elm (*Ulmus* sp) and heather (*Calluna vulgaris*) were also present.

A.13.2 Conclusion

The material recovered from both burial and non-burial contexts was dominated by small fragments of oak, with small numbers of other species present. The charcoal assemblage differed from the uncharred wood material, where pine was more frequent.

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