Anglo-Saxon to Post-Medieval Occupation at the Provost's Garden, The Queen's College, Oxford

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Artefact and Environmental Reports

Contents

List of Figures

Nb the numbering of the figures follows that of the published report

List of Graphs

Summary

The specialist contributions in this document accompany the following published report:

Teague, S, and Brown, R, 2020 Anglo-Saxon to post-medieval occupation at the Provost's Garden, The Queen's College, in *The Archaeology of Oxford in the 21st Century* (eds A Dodd, S Mileson and L Webley), 139–200. Woodbridge: Boydell and Brewer.

The excavations (centred on NGR SP 5174 0636) revealed a north-west to south-east aligned and heavily rutted metalled thoroughfare, possibly dating from the late ninth century. Its alignment could suggest that it predates the postulated eastern extension of the late Anglo-Saxon burh. Occupation to its north included a well-defined plot that contained two timber-lined sunken structures dating to the tenth century together with fence lines and pits. The structures were probably filled during the second half of the eleventh century when the road ceased to be used. The pits contained evidence for flax retting, iron smithing and possibly smelting. During the medieval period and after its acquisition by The Queen's College in 1355, the site appears to have been waste ground, used for quarrying and for the disposal of rubbish. The fills of the earlier pits produced smithing debris together with horn-working evidence, whilst the later pits contained material related to the college, such as book clasps, styli for writing on wax tablets, and Venetian glass goblets. Two of the latest pits, of mid seventeenth-century date, each contained large assemblages of clay tobacco pipes that may have been deposited during the Commonwealth and Protectorate. In the late seventeenth century, a small building was constructed, possibly a workshop associated with the rebuilding of the college at this time. The excavation archive will be deposited with Oxfordshire County Museum Service under the accession code OXCMS:2015.30.

1 POTTERY *BY PAUL BLINKHORN*

Methodology

The pottery was initially bulk-sorted and recorded on a computer using DBase IV software. The material from each context was recorded by number and weight of sherds per fabric type, with featureless body sherds of the same fabric counted, weighed and recorded as one database entry. Feature sherds such as rims, bases and lugs were individually recorded, with individual codes used for the various types. Decorated sherds were similarly treated. In the case of the rim sherds, the form, diameter in mm and the percentage remaining of the original complete circumference was all recorded. This figure was summed for each fabric type to obtain the estimated vessel equivalent (EVE).

The terminology used is that defined by the Medieval Pottery Research Group's Guide to the Classification of Medieval Ceramic Forms (MPRG 1998) and to the minimum standards laid out in the Minimum Standards for the Processing, Recording, Analysis and Publication of post-Roman Ceramics (MPRG 2001).[1] All the statistical analyses were carried out using a DBase package written by the author, which interrogated the original or subsidiary databases, with some of the final calculations made with an electronic calculator. Any statistical analyses were carried out to the minimum standards suggested by Orton (1998–9).[2]

The Pottery

The pottery assemblage comprised 4462 sherds with a total weight of 67,858 g. The estimated vessel equivalent (EVE) by summation of surviving rim sherd circumference was 20.46 for the late Saxon and medieval vessels. It was recorded using the conventions of the Oxfordshire County type-series, as follows (the alphanumeric codes prefixed with "F" are those used in the database):[3]

OXAC: **Cotswold-type ware**, AD 975–1350. 821 sherds, 8742 g, EVE = 2.16.

OXAM: **Brill/Boarstall ware**, AD 1200–1600. 651 sherds, 7667 g, EVE = 1.26.

OXAW: **Early Brill coarseware**, AD 1180–1250. 54 sherds, 713 g, EVE = 0.57

OXB: **Oxford shelly ware**, late eighth–early eleventh century. 45 sherds, 442 g, EVE = 0.20.

OXBB: **Minety-type ware**, early thirteenth–sixteenth century. One sherd, 14 g, EVE = 0.

OXBC: **Brill/Boarstall 'Tudor green' wares**, 1475–1600. One sherd, 2 g, EVE = 0.

OXBEW: **Staffordshire manganese glazed ware**, late seventeenth–mid eighteenth century. 24 sherds, 1082 g.

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[1] MPRG, *Guide to the Classification of Medieval Ceramic Forms,* Medieval Pottery Research Group Occasional Paper, **1** (1998); MPRG, *Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics*, Medieval Pottery Research Group Occasional Paper, **2** (2001).

[2] C. Orton, 'Minimum Standards in Statistics and Sampling', *Medieval Ceramics,* **22–23**, (1998–9), pp. 135–8.

[3] M. Mellor, 'A Summary of the Key Assemblages. A Study Of Pottery, Clay Pipes, Glass and other Finds from Fourteen Pits, Dating from the 16th to the 19th Century' in T.G. Hassall *et al*., 'Excavations at St Ebbe's', *Oxoniensia*, **49**, (1984), pp. 181–219; M. Mellor, 'Oxford Pottery: A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval Pottery in the Oxford Region', *Oxoniensia,* **59**, (1994), pp. 17–217.

OXBEWSL: **Staffordshire-type slip-trailed earthenware**, 1650–1750. Two sherds, 102 g.
OXBF: **Kennet Valley ware**, AD 1050–1400. 238 sherds, 3244 g, EVE = 1.73.
OXBG: **Surrey whiteware**, mid thirteenth–mid fifteenth century. Eight sherds, 112 g, EVE = 0.24.
OXBN: **Tudor green ware**, late fourteenth–sixteenth century. 37 sherds, 209 g, EVE = 0.39.
OXBX: **Late Brill/Boarstall ware**, fifteenth–seventeenth century. 407 sherds, 10743 g, EVE = 2.07
OXCE: **Tin-glazed earthenware**, 1600–1800. 108 sherds, 1852 g.
OXCL: **Cistercian ware**, 1450–1700. 21 sherds, 292 g, EVE = 1.60.
OXDR: **Glazed red earthenwares**, 1550+. 197 sherds, 6956 g.
OXEAH: **Midland blackware**, mid sixteenth–seventeenth century. 28 sherds, 327 g.
OXEST: **London stoneware.** 1680 +. Six sherds, 571 g.
OXFH: **Border wares**, 1550–1700. 153 sherds, 2837 g.
OXFH: **Brown glazed Border ware**, 1620–1700. 16 sherds, 153 g.
OXFI: **Chinese porcelain,** 1650+**.** Two sherds, 11 g.
OXK: **Michelmersh ware**, early tenth–mid eleventh century. 17 sherds, 162 g, EVE = 0.08.
OXR: **St Neots ware**, AD 850–1200. 633 sherds, 5539 g, EVE = 5.59.
OXST: **Frechen stoneware**, AD 1480–1700. 270 sherds, 6797 g.
OXST: **Raeren stoneware**, 1450–1600. 31 sherds, 1082 g, EVE = 0.46.
OXST: **Westerwald stoneware**, 1600–1800. Four sherds, 76 g.
OXST: **Langerwehe stoneware**, fifteenth century. One sherd, 107 g.
OXST: **Siegburg stoneware,** mid fourteenth–fifteenth century. One sherd, 32 g.
OXY: **Medieval Oxford ware**, AD 1070–1350. 632 sherds, 7114 g, EVE = 3.82.
OXZ: **Stamford ware**, AD 850–1150. 31 sherds, 214 g, EVE = 0.14.
WHEW: **Mass-produced white earthenwares**, nineteenth–twentieth century. 2 sherds, 159 g.

In addition, five residual sherds (69 g) of Romano-British pottery were noted. The following, not covered by the Oxfordshire type-series, were also present:

F401: **Spanish lustreware**, fifteenth century.[4] Three sherds, 185 g, EVE = 0.05.
F407: **Midland purple ware**, fifteenth–seventeenth century.[5] Four sherds, 37 g, EVE = 0.10.
F408: **Low Countries redware**, fifteenth–seventeenth century.[6] Six sherds, 199 g, EVE = 0.
F409: **Portuguese redware**, fourteenth–seventeenth century.[7] One sherd, 6 g, EVE = 0.
F415: **Ligurian majolica**, 1550–1600.[8] One sherd, 9 g.

[4] Hurst *et al*. 1986, p. 42
[5] M.R. McCarthy and C.M. Brooks, *Medieval Pottery in Britain AD 900–1600* (1988), p. 42.
[6] Hurst *et al*. 1986, p. 130
[7] Ibid., p. 69
[8] Ibid., p. 26

The bulk of the pottery consists of material which is well known in the Oxford region, although there are a small number of sherds of types which are rarely noted in the city, in the form of Michelmersh ware and an unusually wide range of imported medieval and early post-medieval pottery types, particularly the Spanish and Italian tin-glazed wares (F401 and F415) and the European redwares (F408 and F409). Michelmersh ware was noted at All Saints and St Aldates, and Spanish tin-glazed wares occurred at St. Ebbe's.[9]

It is worthy of comment that usually fairly common early to mid eighteenth-century pottery types such as Staffordshire white-glazed stoneware (Oxford fabric OXFM) and creamware (OXCRW) are entirely absent, suggesting pottery deposition at the site had ceased by the time these wares were in circulation.

Chronology

Each stratified, context-specific pottery assemblage was given a ceramic phase date ('CP') based on the range of ware and vessel types present. The veracity of each date was checked against the stratigraphic record and adjusted where necessary. The chronology, defining wares and the amount of pottery per phase is shown in Table 1. The occurrence of the major fabrics per ceramic phase is shown in Table 2.

The data in Table 1 shows that there was activity at the site from the tenth century onwards. The groups dated to MSAX all comprised single sherds and are likely be later features lacking the defining wares. The LSAX group is fairly small, but the mean sherd weight is fairly large and suggests that some of the material at least is the product of primary deposition. The rate of pottery deposition then increases substantially and remains high more or less throughout the life of the site, other than perhaps during the late fifteenth to mid sixteenth century (CP M4).

The data in Table 2 shows a fairly typical pattern of pottery consumption for sites in Oxford. In some cases, residuality is very high. For example, in CP M1, 30% (by weight) of the pottery is residual St Neots ware, suggesting extensive disturbance of earlier strata. The low mean sherd weight for the CP reflects this. This appears to be due to the fact that large amounts of earlier pottery were incorporated into the backfill of the cellared buildings (see below), a pattern of site clearance which has been noted elsewhere in the city.[10]

*Table 1. Ceramic phase chronology, occurrence and defining wares. * Raeren stoneware; **Brown-glazed Border ware; *** Typological evidence*

Phase	Defining wares	Date	Sherds	Weight (g)	Mean Sherd Weight (g)
MSAX	OXB	8th–9th C	3	54	18.0
LSAX	OXR, OXZ	10th C	117	1701	14.5
SN	OXAC, OXBF	11th C	321	3426	10.7
M1	OXY	Late 11th–12th C	579	5337	9.2
M2	OXAM	13th–14th C	1012	11,750	11.6
M3	OXBX, OXBN	15th C	248	3643	14.7
M4	OXCL, OXST*	Late 15th–mid 16th C	108	1968	18.2
PM1	OXDR, OXST, OXFH	Mid-late 16th C	950	14,284	15.0
PM2	OXCE, OXST, OXFH**	Early-mid 17th C	199	5187	26.1

[9] M. Mellor, 'The Saxon and Medieval Ceramic Finds from The Town Sites', in Dodd, *Oxford before the University*, table 6.8; Mellor, 'A Summary of Key Assemblages', p. 201.
[10] Dodd, *Oxford before the University*, pp. 51–2.

Phase	Defining wares	Date	Sherds	Weight (g)	Mean Sherd Weight (g)
MSAX	OXB	8th–9th C	3	54	18.0
LSAX	OXR, OXZ	10th C	117	1701	14.5
SN	OXAC, OXBF	11th C	321	3426	10.7
PM3	OXCE***, OXBEWSL	Mid-late 17th C	356	5334	15.0
PM4	OXBEW, OXEST	Late 17th–18th C	567	15,015	42.2
MOD	WHEW	19th C	2	159	79.5
		Total	4462	67,858	

*Table 2. Pottery occurrence per ceramic phase by fabric type, expressed as a percentage of the total weight per phase, major fabrics only. Shaded cells = residual material; *=Raeren stoneware; **=Frechen/Cologne stoneware*

Fabric	LSAX	SN	M1	M2	M3	M4	PM1	PM2	PM3	PM4
OXB	7.8%	2.1%	1.6%	0.7%	0	0.7%	0	0	0	0
OXR	85.8%	35.5%	28.4%	6.2%	2.0%	4.0%	2.1%	0	1.2%	0.7%
OXZ	6.3%	0.8%	1.0%	0.2%	0.2%	0	0	0	0	0
OXAC	-	39.5%	32.3%	23.1%	8.3%	4.0%	14.1%	3.8%	1.4%	1.9%
OXBF	-	17.2%	15.9%	7.3%	4.8%	8.3%	2.3%	1.4%	1.2%	1.0%
OXY	-	-	20.7%	34.5%	4.4%	6.1%	6.6%	3.5%	4.5%	2.1%
OXAM	-	-	-	22.2%	13.6%	13.8%	14.6%	7.6%	19.8%	0.5%
OXAW	-	-	-	5.9%	0	0	0	0.4%	0	0
OXBX	-	-	-	-	59.7%	45.7%	22.5%	19.4%	8.6%	19.9%
OXBN	-	-	-	-	3.9%	0	0.3%	0.2%	0.2%	0
OXST*	-	-	-	-	-	3.0%	3.0%	2.8%	0	2.9%
OXCL	-	-	-	-	-	6.4%	0.4%	0.3%	0.1%	0.6%
OXST**	-	-	-	-	-	-	17.4%	29.7%	20.0%	11.3%
OXDR	-	-	-	-	-	-	11.0%	21.0%	7.1%	26.1%
OXFH	-	-	-	-	-	-	3.7%	2.8%	17.5%	8.1%
OXEAH	-	-	-	-	-	-	0.1%	1.8%	1.7%	0.9%
OXCE	-	-	-	-	-	-	-	3.4%	14.6%	6.0%
OXBEW	-	-	-	-	-	-	-	-	-	7.2%
OXEST	-	-	-	-	-	-	-	-	-	3.8%
Total weight (g)	**1701**	**3426**	**5337**	**11,750**	**3643**	**1968**	**14,284**	**5187**	**5334**	**15,015**

Pottery from the Cellared Buildings

Building 1657. This feature produced 134 sherds weighing 1100 g (EVE = 1.08). The pottery occurrence per context is shown in Table 3. The assemblage mostly comprised plain body sherds, although fragments of 15 rims were noted, one of which was from a St Neots ware bowl (EVE = 0.04), the rest jars in various different fabrics. Of these, eight were St Neots ware (EVE = 0.64) and four OXBF (EVE = 0.30), along with one each of OXB (EVE = 0.08), OXAC (EVE = 0.03) and OXY (EVE = 0.03). This is fairly typical of assemblages of the period. Most of the St Neots ware jar rims were fairly large (rim diameter > 160 mm), indicating that they are

Denham's T1(2) type, and likely to be of eleventh century date.[11] Two smaller, earlier rims were also present. The sherds of Stamford ware are unglazed, which is typical of the tenth century products of the industry.[12]

Table 3. Pottery occurrence per context, cellared building 1657. Wt = weight in g

	OXR		OXB		OXAC		OXBF		OXZ		OXY	
Context	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
1687	18	88										
1688							2	90	1	3		
1689	6	75										
1692	1	4										
1736	1	1										
1743	19	105					2	9	2	8		
1745	4	32			1	11					1	6
1747	1	25										
2089	3	8										
2090	5	19					1	6				
2091	8	19					1	124				
2214	13	83	1	4			6	56				
2215	1	11			1	4						
2216	1	15	6	47			1	8				
2217	2	3									1	3
2218	3	30										
2219	1	1										
2221	1	6										
2223	9	39	1	4	1	4	9	158				
Total	97	564	8	55	3	19	22	451	3	11	2	9

None of the postholes produced any pottery, with it all occurring in the back-fills of the cellar-pit. The stratigraphically earliest contexts which yielded pottery were 1692 and 2223. The former produced just one small sherd of St Neots ware, while the latter produced nine, and the same number of fragments of OXBF (158 g), most of which refitted to form two large sherds. Also present was a sherd of OXB and another of OXAC, giving an overall CP date of SN. These stratigraphically predated contexts 1747, 2218 and 2219, which produced a few sherds of St Neots ware, which themselves predated context 2215, dated to SN, although this was stratigraphically the same date as 1688. It included two large sherds of OXBF, and hence is at least of SN date. These cross-fitted with a large sherd from 2223, and a rim sherd from 2091 (Fig. 11, no. 1). The vessel is heavily sooted and lime-scaled, showing that it was well-used before deposition.

The fills above these comprised a deposit made up of five contemporary contexts (1689, 1745, 2091, 2216 and 2221) yielding 20 sherds (147 g) of St Neots ware, but also a sherd of OXAC (11 g), a very large rim sherd from an OXBF jar (124 g), along with a further

[11] V. Denham 'The Pottery', in JH Williams, M Shaw and V Denham, *Middle Saxon Palaces at Northampton* (Northampton, 1985), pp. 46–64.
[12] K. Kilmurry, *The Pottery Industry of Stamford, Lincs.* c.*AD 850–1250,* BAR BS, **84** (1980).

sherd in the same fabric weighing 18g, and a single sherd of OXY (6 g). The rim sherd may be from the same vessel as the two large sherds from 2223, but they did not refit and so this cannot be stated with certainty. The remaining, stratigraphically latest contexts (1687, 1736, 1743, 2089, 2090, 2214, 2217) produced a fairly large but highly fragmented collection of OXR (61 sherds, 307 g), along with nine sherds of OXBF (71 g) and a single small fragment of a rim sherd of OXY (3 g). A residual sherd of OXB (4 g) was also present.

This all suggests that the cellar was more or less completely back-filled in a very short space of time. The joining sherds of OXBF from contexts 1688, 2091 and 2223 are large and fresh, and, being scattered through the pit, indicating that many of the fills are contemporary, despite being archaeologically discrete. Most of the rest of the pottery comprised small, secondary or residual sherds. If the sherds of OXBF are not included, the mean sherd weight for all the pottery from 1657 is 5.8g, suggesting very strongly that most if not all of it apart from the sherds of OXBF are the product of secondary deposition, and had been originally deposited elsewhere before being incorporated into the back-fill.

Since context 2223 is one of the two earliest deposits from the cellar-pit to produce pottery, this shows that the back-filling must have taken place after the mid-eleventh century, when OXBF first arrived in Oxford.[13] The two sherds of OXY, one of which came from the same group of deposits as the OXBF jar rim, allows further refinement. The fact that only two sherds occurred indicates that the cellar deposits date to the beginning of the currency of OXY in Oxford. Such pottery is known in the city in quantity from after the time of the construction of the castle in AD 1070,[14] but more recent excavations there have found a few sherds of it in pre-castle deposits.[15] This, and the fact that it was also occurred in mid–late eleventh century deposits at St Aldates,[16] suggests very strongly that this cellar pit was back-filled in the third quarter of the eleventh century.

Building 1527. This feature produced 91 sherds weighing 658g (EVE = 0.62). The pottery occurrence per context is shown in Table 4. Most of the assemblage was small and fragmented (mean sherd weight = 7.2 g). Eight rim sherds were noted, five of which were from jars (EVE = 0.36), two from OXR bowls (EVE = 0.12) and the other from a Stamford ware crucible (EVE = 0.14). Three of the jar rims (EVE = 0.24) are OXR, one OXAC (EVE = 0.08), and the other, probably residual, OXB (EVE = 0.04). Given that much of the pottery from 1526 is of a secondary nature, and quite possibly residual, it seems very likely that the crucible was brought in from elsewhere.

The two stratigraphically earliest fills, 1532 and 1534, are both of SN1 date. They did not produce much pottery, but the sherds of OXR from context 1534 are relatively large and include a St Neots ware jar-rim which is 12% complete. It is possible therefore that these represent the period of occupation of the building. Context 1526 is actually stratigraphically later than context 1525, and thus must also be at least of CP M1 date. Assemblages from both contexts are fairly heavily fragmented; the mean sherd weight for context 1525 is 4.4 g, while that for 1526 is 7.4 g, suggesting very strongly that most of the pottery is the product of

[13] Mellor, 'A Summary of the Key Groups', p. 54.
[14] ibid., p. 71.
[15] J. Cotter, pers. comm.
[16] Mellor 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval Pottery', p. 71.

secondary deposition. This certainly applies to the sherds of OXB and is likely to be the case for the Stamford ware, which is in the unglazed, early fabric.

It seems therefore that the building was occupied in the early part of the eleventh century and, like 1657, was back-filled in the third quarter of the eleventh century, just as fabric OXY was coming into use.

Table 4. Pottery occurrence per context, cellared building 1527. Wt = weight in g

	F100		**F101**		**F200**		**F202**		**F205**		**F300**		
Context	*No.*	*Wt*	*No.*	*Wt*	*No.*	*Wt*	*No.*	*Wt*	*No.*	*Wt*	*No.*	*Wt*	*Date*
1525	15	103			14	92	5	36			1	9	M1
1526	17	100	3	29	18	131	9	90	3	18			SN2
1532					1	2							SN1
1534	4	44			1	4							SN1
Total	36	247	3	29	34	229	14	126	3	18	1	9	

Building 1718. This structure only produced four sherds of pottery, all from context 1716. One sherd, a fragment of a ?sixteenth century colander in fabric OXBX, is clearly intrusive although it is very large (65 g). The rest comprises a sherd of OXR (15 g) and two of OXB (18g), including a small fragment of a jar rim (3% complete). This suggests that the structure was back-filled at the very beginning of the eleventh century at the latest, and possibly in the tenth century.

Building 1535. This structure is stratigraphically later than 1527, which is dated to CP M1 (see above). All the pottery came from one fill, 1607, which produced 13 sherds with a total weight of 158g. There were nine sherds of St Neots ware (97 g), three of OXAC (16 g), and a single fragment of OXBF (45 g). Five rim sherds were present, four from jars (EVE = 0.28) and one from an OXR bowl (EVE = 0.04). Two of the jars rims are in OXR (EVE = 0.13), one in OXAC (EVE = 0.05) and the other in OXBF (EVE = 0.10). This fill is earlier than a posthole (1603) which produced a single sherd of OXBF. This all suggests a date of CP SN, but given the stratigraphic relationship with structure 1527, it has to date to CP M1 at the earliest, suggesting that it had a very short life, and was both constructed and back-filled in the late eleventh century.

The Ceramic Phased Assemblages

Ceramic Phase LSAX, tenth century. 117 sherds, 1701 g, EVE = 1.74. The late Saxon assemblage is dominated by St Neots ware, which makes up 85.8% of the pottery of this date (by weight). The only other wares present are OXB (7.8%) and OXZ (6.3%). All the sherds of the latter are unglazed. Twelve rim sherds were present, ten from jars (EVE = 1.63) and two of from OXR bowls (EVE = 0.11). Three of the jar rims (EVE = 0.08) are in OXB, the rest are OXR. Most of the latter are quite small, with a rim diameter less than 160 mm, which is typical of the earlier, tenth century products of the tradition.[17]

Most of the groups of this date were quite small, with just two features, pits 1367 and 1694, producing more than twenty sherds, with nearly all the rest yielding ten or fewer, although in most cases the fragments are fairly large and unabraded, with refits within many

[17] Denham, 'The Pottery', pp. 46–64.

of the individual contexts (e.g. Fig. 11, no. 2). This particularly applies to the OXR, which has a mean sherd weight of 15.5 g (93 sherds, 1460 g). However, there were no cross-fits to different contexts within each feature group, nor were any complete or near-complete vessels noted, indicating that the pottery is mostly the result of secondary deposition. Some of the vessels (e.g. Fig. 11, no. 2) were extensively sooted. Given the good condition of the assemblage, it seems likely they were taken directly with material from domestic middens or the like and used as back-fill material. One of the cellar pits, 1718, may date from this period, although it produced very little pottery (see above).

Ceramic Phase SN, early/mid–late-eleventh century. 321 sherds, 3426 g, EVE = 2.40. Some of the cellared buildings appear to have been occupied during this period (see above), which sees the introduction of OXAC and OXBF, with the former making up over 39.5% (by weight) of all the pottery from this phase, and the latter, 17.2%. St Neots ware (OXR) makes up a significant proportion of the rest of the assemblage (35.5%), with the rest comprising Stamford ware (0.8%) and Michelmersh ware (OXK, 15 sherds, 145 g, 4.2%). A small amount (2.1%) of residual OXB was also noted.

The overall mean sherd weight for this CP (10.7 g) is lower than that of the previous one, but still reasonable. That of the St Neots ware (OXR) is somewhat lower than the value for the same material in the previous phase, being 8.6 g, suggesting that at least some of the material is residual. This is perhaps to be expected, as St Neots ware fell fairly rapidly from use in Oxford around the middle of the eleventh century.[18]

Most of the groups of pottery of this date are very small. The assemblage from context 1854 has over thirty sherds, as does that from 1406, but nearly all the other groups of this date comprise ten sherds or fewer. There seems to have been very little disturbance of strata and features of this date in the medieval period; the data in Table 2 shows just 218 g of OXR occurred in features of CP M1 or later date. Some of the residual OXR is very likely to date from the previous phase, as the presence of OXB shows that there was some disturbance of earlier features, but it impossible to say how much.

The sherds of Michelmersh ware (OXK) all appear to be from a single vessel which has an applied collar and stamped applied strips on the body (Fig. 11, no. 3). It is very similar to a pitcher from the kiln site in Hampshire.[19] Most of the fragments came from context 2205, a deposit in pit 2182. Two more sherds, one of which cross-fitted with a sherd from 2205, occurred in another deposit in the same pit, 2200. Two further sherds occurred in 1280, a deposit in pit 1281, and 1406, part of the fill of pit 1411. The former is dated to CP M2 and the latter to this CP.

Other cross-fits were noted. A piece of an OXR base from context 1711 in ditch 1710 joined with another fragment from a CP M1 deposit, 1568, part of ditch 1569. Two non-joining fragments from a decorated OXAC vessel occurred in 1660, part of the fill of pit 1661, and 1658, a deposit in pit 1569, and of CP M2 date.

Other than the Michelmersh vessel (EVE = 0.08), twenty-six jar rims (EVE = 2.16) and two OXR bowl rims (EVE = 0.16) were noted. Of the former, fifteen were OXR (EVE = 1.59), six OXAC (EVE = 0.35) and five OXBF (EVE = 0.22). Just three of the OXR jar rims had a diameter

[18] Mellor, 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval Pottery', p. 57.
[19] McCarthy and Brooks, *Medieval Pottery*.

of less than 160 mm, meaning most of the vessels were larger than the bulk of those from CP LSAX deposits, and thus later.

Ceramic Phase M1, late eleventh to twelfth century. 579 sherds, 5337 g, EVE = 3.36. The context-specific assemblages were again all quite small, with only context 1396 producing more than thirty sherds. A small number yielded around twenty or more, and most, again, having ten or fewer.

The phase saw a fairly major reorganization of the site, including the back-fill of the remaining cellared buildings, and the pottery assemblage reflects this. Residuality is very high, with OXR making up 28.4% of the pottery by weight. This material is very fragmented, having a mean sherd weight of just 6.5 g, and this explains the fact that the overall mean sherd weight (9.2 g) is the lowest of all the Ceramic Phase groups.

The mean sherd weight for the stratified material is 11.1 g, which is not unusual for the period. Oxford ware (fabric OXY, 92 sherds, 1104 g) makes up 29.5% of the non-residual material and has a mean sherd weight of 12.0 g, while OXBF, 22.6% of the CP assemblage (58 sherds, 846 g), has a value of 14.6 g. The major ware is OXAC, making up 46.2% of the group (171 sherds, 1726 g), and while some of this is likely to be residual SN material, it still has a mean sherd weight of 10.1 g. Stamford ware makes up 1.5% of the material (14 sherds, 55 g), including a small fragment of a crucible (EVE = 0.08), although it is all likely to be residual. Further residual material is present in the form of OXB (1.6%) and a single Romano-British sherd (8 g).

Sixteen residual OXR rims were present (EVE = 1.30), all jars except for two bowl rims (EVE = 0.12). Two redeposited OXB jar rims (EVE = 0.12) were also present. Of the contemporary material, 24 jar rims (EVE = 1.56) and three bowls (EVE = 0.24) were present. The former comprised nine OXAC examples (EVE = 0.56), seven of OXBF (EVE = 0.45) and eight OXY (EVE = 0.55). Two of them, one in OXY and the other in OXAC, had thumbed "piecrust" rims which are typical of the period.[20] In the case of the bowls, two were in fabric OXAC (EVE = 0.18) and the other was OXBF (EVE = 0.06). One in each fabric (Fig. 11, nos 4–5) survived to a full profile.

Oxford ware tripod pitchers were represented by three glazed sherds, although no rims, spouts or handles were present. A short tubular spout from a pitcher in OXBF was noted. Such vessels are rare but not unknown in Oxford.[21]

Ceramic Phase M2, thirteenth to fourteenth century. 1012 sherds, 11750 g, EVE = 7.42. This is by far the largest medieval Ceramic Phase assemblage, but it is also the longest, representing around two centuries of activity. The material is generally in fairly good condition, with a mean sherd weight of 11.6 g, and residuality is lower than in most of the other Ceramic Phases, with just over 7% of the pottery (by weight) being redeposited earlier material. Eleven residual St Neots ware rims (eight jars and three bowls) were noted (EVE = 0.79). When the residual pottery (114 sherds, 823 g) is removed, the mean sherd weight rises to 12.2 g, which is fairly typical for medieval urban sites of the period. Despite this, the assemblage is largely fragmented and scattered, with near-complete or reconstructible vessels largely absent, indicating that most of the pottery is the product of secondary deposition.

[20] E.g. Mellor, 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval Pottery', fig. 18.
[21] Ibid. fig. 14, no. 2.

The period sees a large increase in the proportion of glazed wares, mainly in the form of OXAM, which comprises 23.8% of the non-residual pottery. The major ware is OXY, making up 37.1% of the pottery, of which 52 sherds (594 g) are glazed fragments of pitchers and jugs. A single unglazed sherd from context 1196 has what appears to be madder staining on the inner surface. Fabric OXAC still constitutes a major portion of the contemporary assemblage (24.9%), and OXBF, along with OXAW, are significant minor wares at 8.2% and 6.3% respectively. The only other contemporary pottery present was a single (2 g) sherd of Surrey whiteware (fabric OXBG). This often occurs in small quantities at sites in Oxford (eg Blinkhorn 2012).[22]

The rim assemblage is dominated by jars (EVE = 4.49), along with jugs (EVE = 1.32). Bowls are very scarce (EVE = 0.26), but rims from other vessel types are also present in the form of double-shell lamps (EVE = 0.30), small skillets (EVE = 0.08), a lid (EVE = 0.03) and a stamped and glazed vessel (see below) which defies categorization (EVE = 0.15), all in OXAM. Non-rim fragments from a further four lamps were noted, as was a sherd of OXAC which has a post-firing drilled hole and appears to have been reworked to use as a spindle whorl. It was slightly damaged on one edge during excavation.

A total of 59 jar rims were noted, with 28 being OXY (EVE = 2.69), 17 OXAC (EVE = 0.94), 12 OXBF (EVE = 0.77) and one each of OXAW (EVE = 0.02) and OXAM (EVE = 0.07). This is fairly typical of sites of the period in the region. Fourteen thumbed "piecrust" rims were present. These are a typical late twelfth to thirteenth century form in Oxford.[23] There were just five bowl rims, three in OXAC (EVE = 0.13) and one each in OXBF (EVE = 0.04) and OXY (EVE = 0.09). There were 14 example of jug rims; six in OXY (EVE = 0.37), three in OXAM (EVE = 0.40) and five OXAW (EVE = 0.55). All the other vessel rims were in OXAM.

Many of the glazed jugs were highly decorated, as was often the case at this time, with applied strips, stamping and coloured slips all used. Particularly notable is an OXAM vessel which has decoration reminiscent of French jugs of the period, specifically Rouen types (Fig. 11. no. 6). Other British potters were making such copies at this time, such as in London, where Rouen-style jugs are usually dated to the late twelfth–mid/late thirteenth century.[24] The double shell lamps are a common find, albeit in small numbers, at sites in the Oxford region.[25] The same comments apply to the small skillet fragments.

The most intriguing vessel is a stamped and glazed OXAM item represented by two non-joining sherds, a rim sherd and a handle (Fig. 11, nos 7–8). The profile of the former suggests it has a rounded, closed form, and it also has what appears to be the beginning of the terminal of a handle or lug on the rim-top. It has no obvious parallels amongst the corpus of OXAM from Oxford.[26] The handle could be from an aquamanile, and an example with similar decoration is known from Oxford[27], but the fragment of the rim is very unlikely to be

[22] P. Blinkhorn, 'Pottery', in A.M. Chadwick, D.R. Gilbert and J. Moore (eds), *"…Quadrangles Where Wisdom Honours Herself". Archaeological investigations at Tom Quad, Peckwater Quad and Blue Boar Quad, Christ Church, Oxford* (Beckley, 2012), pp. 112–41.
[23] e.g. Mellor, 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval', fig. 18.
[24] J.E. Pearce, A.G. Vince and M.A. Jenner, *A Dated Type-Series of London Medieval Pottery. Part 2: London-type Ware*, London and Middlesex Archaeology Society Special Paper, **6** (1985), fig. 9.
[25] Mellor, 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval', fig. 54.
[26] Mellor, 'A Summary of the Key Groups'.
[27] Ibid., Fig. 51, no. 24.

from such a pot. One possibility is that it may be part of a lantern or fuming-pot[28], but the complete lack of internal sooting would suggest otherwise. A more convincing possibility is that they are fragments of a side-handle urinal[29], but these are otherwise unknown in Brill/Boarstall ware.

Ceramic Phase M3, early–mid fifteenth century. 248 sherds, 3643 g, EVE = 2.17. The assemblage from this ceramic Phase is considerably smaller than that in M2, but it is only around 50 years long, indicating that the rate of pottery deposition remains largely unchanged despite the social and political upheavals of the fourteenth century.

The overall mean sherd weight is 14.7 g, despite the fact that *c*.20% of the pottery is redeposited. The residual pottery (85 sherds, 718 g) has a mean sherd weight of 8.4 g, whereas the stratified material (163 sherds, 2925 g) has a value of 17.9 g, showing that much of it is in very good condition. Despite this, there were no reconstructable vessels, other than a few large fragments of OXBX jugs. The illustrated example is typical of the tradition at this time, with sparse glazing other than a "bib" at the front below the pouring lip.[30] Just five residual rim sherds were noted, all from jars (total EVE = 0.19).

Brill/Boarstall products are by far the major ware, mainly in the form of OXBX (74.3% of the non-residual pottery by weight), and OXAM (17.0%), although it is likely that a fair proportion of the latter is residual. Surrey/Hampshire 'Tudor green' wares (fabric OXBN) are a significant minor ware, making up 4.9%, with the rest of the contemporary material comprising three sherds of Surrey whiteware (F356; 56 g) along with single sherds of Andalusian lustreware (fabric F401; 13 g), Midland purple ware (14 g; fabric F407), and Low Countries redware (fabric F408; 27g)

The stratified rim sherd assemblage was dominated by jugs (EVE = 0.94), all in OXBX, other than a small fragment of an OXBN example (EVE = 0.16), along with smaller quantities of bowls (EVE = 0.15) and a single OXAM jar rim (EVE = 0.11). This is not an unusual pattern for later medieval assemblages, as metal had largely replaced pottery for cooking vessels by this time.[31] The other vessel rims were present were a skillet (EVE = 0.12) and a lugged costrel (EVE = 0.48), both in OXBX, and three fragments of Surrey/Hampshire 'Tudor green' lobed cups (EVE = 0.18). The costrel is quite an unusual vessel type, although a few other Brill/Boarstall examples have occurred in Oxford.[32]

Two non-rim fragments of OXAM puzzle jugs were also noted. One of them is a hollow tubular handle, while the other is the terminal of either a similar handle or a false spout (Fig. 11, no. 9). Puzzle jugs are rare finds in Oxford, although a near-complete, highly decorated vessel is known from excavations at Oxford Town Hall and dated to the late thirteenth century.[33]

As noted above, the sherd of Andalusian lustreware is a rare find in Oxford, with such pottery generally not common at inland sites in England, other than those of high status.[34]

[28] MPRG 1998, forms 8.3 and 8.7.
[29] Ibid., form 10.28.2.
[30] Mellor 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval', p. 132.
[31] McCarthy and Brooks, *Medieval Pottery*, p. 101.
[32] e.g. Mellor, 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-Medieval', fig. 67 no 8.
[33] Ibid., fig. 57, no. 1.
[34] A. Gutiérrez, 'Cheapish and Spanish. Meaning and Design on Imported Spanish Pottery', *Medieval Ceramics*, **21** (1997), 73–82.

However, this fabric and Low Countries redware are reasonably common finds in the port of London.[35] This is the most likely source for the vessels occurring at this site, given that other pottery from the London region such as Surrey whitewares and Border wares are present. The sherd of lustreware (Fig. 11, no. 10) is from a rim with a slightly unusual form but appears most likely to be the rim of an albarello, a waisted jar which was a common product of the tradition, and often imported containing luxury foodstuffs such as spices, honey, marmalade or syrup. A near-complete Valencian lustreware example occurred at Eynsham Abbey,[36] and a sherd from another Spanish vessel, from Seville, was also noted there.[37] The sherd from here is in quite poor condition, with the tin glaze heavily degraded, although a band of lustre and another of blue paint are still visible. The Low Countries sherd is from the rim of a plate or dish.

Ceramic Phase M4, late fifteenth–mid sixteenth century. 108 sherds, 1968 g, EVE = 0.93. This assemblage is fairly small given the length of the Ceramic Phase and suggests a period during which there was a relatively low level of activity. The overall mean sherd weight is fairly high (18.2 g), and this includes residual material which makes up around a quarter of the pottery (33 sherds, 456 g). A lot of the redeposited pottery is in good condition, and the sherds quite large, suggesting they were the subject of minimal disturbance. Three jar rims were also present (EVE = 0.21). The contemporary pottery (75 sherds, 1512 g) has a mean sherd weight of 20.2 g.

The non-residual component of the assemblage is once again dominated by Brill/Boarstall products, with OXBX comprising 59.4% of the material (by weight), and OXAM 17.9%. Some of the OXAM is very likely to be residual. Cistercian ware is well-represented (8.3%). The only other pottery types present were six sherds of Raeren stoneware (59g; 3.9%) and one each of OXBC (2 g), Langerwehe stoneware (107g; 7.1%), Minety-type ware (14 g) and Surrey whiteware (34 g), of coarse Border ware type.

Just seven vessel rims were noted, with the only jar being the Surrey whiteware example. It had a bifid rim-form (EVE = 0.08), a common early–mid fifteenth century product of the tradition.[38] The rest of the rim assemblage consisted of two bowls in OXBX (EVE = 0.22), two OXAM jug rims (EVE = 0.23), and two Raeren stoneware mug rims (EVE = 0.19). This is a fairly typical range for the period. The rest of the assemblage comprised body sherds.

Ceramic Phase PM1, mid–late sixteenth century. 950 sherds, 14,284 g. This is the second-largest Ceramic Phase assemblage from the site. Residuality is quite high, however, with around 40% of the material (530 sherds, 5707 g) being redeposited medieval wares. The contemporary pottery (420 sherds, 8577 g) has a mean sherd weight of 20.4 g.

The non-residual material is still dominated by OXBX (37.5%), although imported Frechen/Cologne stonewares also make up a significant proportion of the material (29.0%), as do glazed red earthenwares (OXDR; 18.3%). Other regional and continental imports in the

[35] A.G. Vince, 'The Saxon and Medieval Pottery of London: A Review', *Medieval Archaeology,* **29** (1985), e.g. figs 22, 32 and 33.
[36] A. Gutiérrez, 'The Spanish Jar', in A. Hardy, A. Dodd and G.D. Keevil, *Aelfric's Abbey. Excavations at Eynsham Abbey, Oxfordshire, 1989–92* (Oxford, 2003), pp. 199–200.
[37] P. Blinkhorn, 'The Pottery', in A. Hardy, A. Dodd and G.D. Keevil, *Aelfric's Abbey. Excavations at Eynsham Abbey, Oxfordshire, 1989–92* (Oxford, 2003), p. 186.
[38] J. Pearce, *Border Wares* (London, 1988), p. 85.

form of Border ware (OXFH; 6.2%) and Raeren stoneware (5.0%) are significant minor wares at this time, with Cistercian ware (OXCL) comprising just 0.6%. A wide range of other wares were represented by small numbers of sherds. Other English wares were present in the form of Surrey/Hampshire 'Tudor green' (12 sherds, 46 g), Midland purple ware (1 sherd, 4 g) and OXEAH (1 sherd, 13 g), but an unusually wide range of imported wares were also present: Low Countries redware (3 sherds, 148 g), Andalusian lustreware (1 sherd, 10 g), Siegburg stoneware (1 sherd, 32 g), and Ligurian majolica (1 sherd, 9 g).

Most of the assemblages have a similar character, comprising less than thirty sherds, with a few large fragments of contemporary wares in most. This indicates that there was certainly a primary element to the deposition of some of the pottery. The German stonewares are all vessels associated with the storage and consumption of drink, mainly bottles and drinking jugs. Red earthenwares and Border wares are a largely utilitarian mixture of cooking- and tablewares, with the OXBX assemblage mostly bowls, although the base of a chafing dish, ie a portable stove, was also noted (Fig. 12, no. 11), as was the handle from another puzzle jug. The Low Countries redware assemblage includes a small rim sherd from a plate or shallow dish similar to that from CP M3, and may be residual, but a large fragment of a rim, probably from a *grape*, a specialist cooking vessel,[39] was also present. The sherd of Ligurian tin-glaze is from the rim of a shallow dish or plate with an even coating of mid-blue glaze, and with a dark blue painted design on the rim-flange. It is very similar to a shallow dish from Alkmaar in the Netherlands, albeit with the decoration in mirror image.[40] The Andalusian sherd is also from the rim of a plate or dish and has a badly degraded glaze with no sign of any decoration other than thin concentric cordons of lustre on the lower surface of the rim-flange. It is probably residual.

The range of imported wares is worthy of comment, as, the German stonewares aside, it is unusual for sites in Oxford. The pottery assemblage from the Nun's Garden, Queen's College[41], did not produce any of the exotic tin-glazed or Low Countries wares seen here. It is possible that the presence of Low Countries wares here may be related to the fact that Nos 35–6 High St., whose back gardens later had the Provost's Garden constructed on them, had two tenants described as "Ducheman" in the late fifteenth century.[42] If this is the case, the presence of the imported majolica may be an indicator that they were perhaps merchants or were at least of sufficient wealth to be able to indulge themselves with what was relatively expensive display pottery and imported foodstuffs. The fact that the sherd of Ligurian Maiolica is virtually identical to another vessel from Alkmaar is certainly another factor that offers support to a Dutch connection. Given the small quantities of such pottery present here, their absence in the much smaller contemporary assemblage from the Nun's Garden may simply be the result of the vagaries of archaeological sampling.

Frechen/Cologne stonewares, usually in the form of bottles, mugs or drinking jugs, are well-known at sites in Oxford, and, indeed, most of the world with contacts to Europe at that time, but the quantity occurring here is unusually large. For example, such pottery made up just under 10% of the material from the sixteenth–eighteenth century groups from Merton

[39] J.G. Hurst, D.S. Neal and H.J.E. Van Beuningen, *Pottery Produced and Traded in North-West Europe 1350–1650,* Rotterdam Papers **6** (1986), e.g. fig. 59.
[40] Ibid., fig. 11 no. 20.
[41] J. Cotter, 'Post-Roman Pottery', in Teague *et al*., 'Nun's Garden', pp. 159–67.
[42] Teague *et al*., 'Nun's Garden', p. 146.

College.[43] The only comparable assemblages are those from Tom Quad at Christ Church, where between a quarter and a third of the pottery from the early post-medieval assemblages were German stonewares of this type, and from the Old Cloisters, Brasenose College.[44] In the case of Tom Quad, the period saw two visits from Elizabeth I and her entire court, and, later, Charles I and his parliament on at least two occasions, not to mention the Royalist army, meaning large amounts of drinking pottery would have been required. The presence of large quantities of German stoneware at this site, particularly the Frechen/Cologne material in this and the following Ceramic Phase is likely to be for different reasons and may also be related to the "Ducheman", as the later sixteenth–seventeenth century cross-Channel stoneware trade was more or less monopolised by Dutch traders.[45]

Ceramic Phase PM2, early to mid seventeenth century. 199 sherds, 5187 g. This is another assemblage with a fairly large mean sherd weight, 26.1 g, but also with a fairly significant residual component, with around 20% (84 sherds, 1019g) being redeposited, meaning the stratified material has a high mean sherd weight of 36.2 g. Most of the groups comprised less than 20 sherds, but also usually with one or two very large fragments, showing some of the material was the product of primary deposition.

Frechen/Cologne stoneware is the major ware, making up 36.9% of the non-residual assemblage by weight, which is a remarkably high proportion for a site in Oxford. Glazed red earthenwares are also very well represented, as is usually the case at this time, and comprise 26.2%, along with Brill earthenwares (OXBX), with 24.1%. A fairly wide range of minor wares was present: tin-glazed earthenware (OXCE; 4.2%); Border ware (OXFH; 2.8%), including brown-glazed sherds; Midland blackware (OXEAH; 2.2%); and Cistercian ware (OXCL; 0.3%). Also present were three sherds of Westerwald/Cologne stoneware (64 g), along with the only sherd (6 g) of Portuguese redware from the site, a small body sherd from a closed form, and a single sherd of Low Countries redware (17 g). The last two aside, this is a fairly common range of fabric types at this time in Oxford.

The Frechen/Cologne stoneware comprises mainly bottles and jugs, some with *Bartmann* face-masks and armorial moulded prunts on the belly. One of these survived to a full profile (Fig. 12. no. 12). A fragment of another vessel has the rather unusual moulded design of a rampant lion, the arms of Scotland. It cannot be said with certainty that this is what it represents, but the arms of many other countries including England are known from stoneware bottles of this type.[46] The stonewares aside, the rest of the assemblage consists largely of utilitarian earthenwares, mainly jars, bowls and jugs, with one OXBX bowl surviving to a full profile, although small numbers of fragments of finer table wares in the form of painted OXCE dishes, plates and bowls were also noted.

[43] P. Blinkhorn, 2006, 'Pottery', in D. Poore, D. Score and A. Dodd, 'Excavations at No. 4a Merton St., Merton College, Oxford: The Evolution of a Medieval Stone House and Tenement and an Early College Property', *Oxoniensia*, 71 (2006), pp. 258–78.
[44] J. Cotter, 'Pottery', in K. Brady, R. Bashford, V. Hughes and H. Webb, 'Brasenose College, Oxford. Archaeological Investigation Report', unpublished Oxford Archaeology report (2016), https://library.oxfordarchaeology.com/5553/; Blinkhorn, in Chadwick *et al*., *"…Quadrangles Where Wisdom Honours Herself",* pp. 112–41.
[45] D. Gaimster, *German Stoneware 1200–1900* (London, 1997), p. 309.
[46] e.g. Ibid., p. 213.

Ceramic Phase PM3, mid–late seventeenth century. 356 sherds, 5334 g. It is striking that the pottery from this ceramic Phase has a general mean sherd weight which is much lower than that of the previous one, with a value of 15.0 g. Residuality is once again fairly high, with *c.*28% of the assemblage (131 sherds, 1520 g) consisting of redeposited material, but even with this removed, the mean sherd weight of the stratified material is 17.0 g, which is still less than half of that of the stratified CP PM3 material. Again, most of the context-specific assemblages were quite small, but many had one or two large sherds. The exception was context 1013, a fill of pit 1085, which produced over 100 sherds.

The non-residual assemblage is once again dominated by Frechen/Cologne stoneware, which makes up 27.9% of the material, but with relatively large amounts of Border ware (26.0%) and tin-glazed earthenware (20.5%). Glazed red earthenwares are relatively scarce (9.9%), as is OXBX (12.1%) and small quantities of Midland blackware are also present (2.4%). Single sherds of Westerwald/Cologne stoneware (12 g) and Chinese porcelain (10 g) were also noted.

Large quantities of drinking pottery are present. All the German stoneware is again bottles, jugs and mugs, and 25% of the OXCE is fragments of mugs with purple manganese decoration on the exterior. Such vessels were a staple product of the London tin-glazed industry in and around the third quarter of the seventeenth century.[47] They are mainly represented here by rims and bases, and, after being checked for cross-fits, it is clear that they are all from different vessels. One of the sherds (Fig. 12, no. 13) has a post-firing graffito on the base which appears to be the Union flag but may be a maker's or owner's mark. A fragment of a costrel in brown-glazed Border ware also occurred. These appear to have been a largely seventeenth century product of the industry.[48] The Chinese porcelain is the complete foot-ring of a tea-bowl.

The rest of the assemblage consists of more utilitarian wares, but some of the OXCE is of extremely high quality, such as a painted bowl from context 1153, which has parallels with a pot from a dump of manufacturing waste at Mark Brown's Wharf in London.[49] Another fragment of this bowl occurred in a CP M4 feature (1143). Both sherds are illustrated here (Fig. 12, no. 14). The decoration is Orton's "Group A" style, and typical of the first half of the seventeenth century.[50]

Ceramic Phase PM4, late seventeenth–eighteenth century. 567 sherds, 15,015 g. This is largest Ceramic Phase group from the site, and also has the largest general mean sherd weight at 42.2 g. Residuality is fairly high during this phase, with 178 sherds (2317 g) or just over 15% (by weight) of the pottery being redeposited. Unusually, when the residual material is removed, the mean sherd weight of the stratified material is lower, at 31.6 g. This is due to the fact that some of the apparently redeposited material is in very good condition and near-complete, suggesting that some of it had been curated for some time. It includes at least two partially complete Raeren mugs which are very unlikely to date to any later than 1550, and a large fragment of a Spanish lustreware shallow dish, which is hard to date due to the degraded

[47] C. Orton, 1988 'Post-Roman Pottery', in P. Hinton (ed.), *Excavations in Southwark 1973–76 and Lambeth 1973–79*, MoLAS and DGLA Joint Publication, **3** (1988), p. 321.
[48] Pearce, *Border Wares*, p. 31.
[49] Orton, 'Post-Roman Pottery'.
[50] Ibid. p. 321.

glaze, but the form and fabric suggest it is most likely to be Valencian and to date from the fifteenth century.

The stratified material is dominated by glazed red earthenwares, including Brill/Boarstall types, and mainly in the form of bowls, with former making up 30.8% of the non-residual assemblage and the latter 23.3%. Frechen/Cologne stonewares are still very common, comprising 13.4% of the group, with significant minor wares being Border ware (10.2%) and Staffordshire manganese ware (8.5%). Tin-glazed earthenwares also make up a significant proportion of the assemblage, 7.1%, including a number with Chinese-style decoration which are typical of the last quarter of the seventeenth century.[51] English stoneware is rare, comprising 4.5% of the group, and Midland blackware 1.0%. The only other contemporary pottery present is a partially complete posset cup in Staffordshire slipware (OXBEWSL).

A large, near-complete OXBEW tankard from context 1672 has a stamped "AR" ale-mark of Queen Anne on the body (Fig. 12, no. 15). Her reign lasted from 1702–14, with these marks thought to date to the early years.[52] A small tankard in the same fabric was also well-represented, and a near-complete English stoneware (OXEST) mug or "tavern gorge" also occurred, but neither was stamped. The complete lack of white salt-glazed stoneware (OXFM) from the site suggests that pottery deposition did not continue beyond the third decade of the eighteenth century. Such pottery is usually fairly common on early–mid eighteenth century sites in the city, such as at St Ebbe's.[53] Taken together, this indicates very strongly that pottery deposition at the site ended sometime between *c.*AD 1705 and 1730, which corresponds with a period of intense rebuilding at the college, including the nearby library, and would indicate that the area of the site covered by these investigations was given over to the Provost's Garden after that time.

It is also striking that a considerable proportion of the assemblage consists of drinking pottery. All the Frechen/Cologne stoneware, along with the OXEST, OXBEW, OXBEWSL and OXEAH, nearly 21% of the pottery in total, is cups, mugs, tankards or bottles. Some of the earthenwares are also drinking pottery, such as a bottle in OXBX. This is almost certainly due to the fact that the area appears to have functioned as a "builder's yard" during this phase. Large quantities of drinking pottery are a feature of sites which featured heavy physical work in both the medieval and post-medieval periods.[54]

As well as the drinking pottery, there was a large collection of utilitarian tableware, particularly in the form of Border ware. Two usual vessels were noted. One, a piece of a lobed dish, which is virtually identical to another from London dated to the mid–late seventeenth century[55], and the other, a globular vessel with a pedestal foot which does not have a parallel in Pearce's corpus, but may be a baby-feeder (Fig. 12, no. 16). Full profiles of other vessels in this fabric were present, such as a shallow flanged dish and a skillet. The former has a lot of wear and scratches towards the centre of the upper face, suggesting it was well used by the time of disposal. Such vessel were staples of the tradition and made and used throughout

[51] C. Orton, 'Post-Roman Pottery', p. 327.
[52] M. Bimson, 'The Significance of 'Ale-Measure' Marks', *Post-medieval Archaeology*, **4** (1970), p. 166.
[53] Mellor, 'A Summary of the Key Groups', pp. 201–3.
[54] E.g. P. Blinkhorn, 'The Pottery', in P. Blinkhorn and G. Pugh, *Excavation of the Medieval Waterfront at King Stable Street, Eton, Berkshire* (Oxford, 2000), pp. 19–24
[55] Pearce, *Border Wares*, fig. 18.

most of its life. The tin-glazed earthenwares also fall into this category, with most vessels being bowls or dishes, although a few fragments of chamber-pots were also present.

Illustration Catalogue (Figs 11–12)

1. Contexts 1688, 2091 and 2223, fabric F202. Rim and body from a jar. Thick sooting on outer surface, heavy lime-scaling on the lower interior.

2. Context 1695, fabric OXR. Jar rim and upper body. Grey fabric with grey-brown surfaces. Outer surface heavily sooted, lime-scaling on the inner.

3. Context 2205, fabric OXK. Rim from a decorated ?pitcher. Grey fabric with reddish brown surfaces.

4. Context 1899, fabric OXAC. Full profile of bowl. Grey-brown fabric with darker surfaces. Sooting on exterior.

5. Context 1510, fabric OXBF. Full profile of bowl. Dark grey fabric with variegated dark brown and dark grey surfaces.

6. Context 1497, fabric OXAM. Body sherd from highly decorated jug. Pale orange fabric with light grey inner surface. Outer has alternate vertical bands of red slip and rouletted strips in the body-clay, all over glaze appearing yellow over the latter.

7. Context 1996, fabric OXAM. Rim from an ?urinal. Pale orange fabric with buff inner surface, rich, glossy, apple-green glaze on the outer surface.

8. Context 1512, fabric OXAM. Handle from same vessel as no. 7. Same colour and glaze.

9. Context 2336, fabric OXAM. Hollow handle/false spout terminal from a puzzle jug. Orange-pink fabric with a variegated yellow and green glaze.

10. Context 2068, fabric F401. Rim sherd from an ?albarello. Uniform white fabric. Degraded tin glaze with horizontal bands of gold lustre and blue paint.

11. Context 1032, fabric OXBX. Fragment of the body and base of a chafing dish. Buff fabric with orange-pink surfaces, rich glossy green glaze on the inner surface of the dish, some areas of burning.

12. Context 1667, Frechen/Cologne stoneware. Full profile of a *Bartmann* jug. Grey fabric with a pinkish-brown inner surface, brown speckled outer.

13. Context 1188, OXCE. Mug base. Pinkish-buff fabric with white glaze and purple sponged decoration on the outer body, plain white glaze on the interior. “Union Flag” graffito on the unglazed base.

14. Contexts 1143 and 1153, OXCE. Polychrome bowl. White fabric with lead glaze on the outer, white tin-glaze on the interior with blue, green and ochre decoration, and a clear lead glaze over all.

15. Context 1672, fabric OXBEW. Near full profile of a tankard with an “AR” ale-mark. Buff fabric with brown, manganese streaked glaze all over except the outer base-pad.

16. Context 1646, fabric OXFH. Lower part of ?baby-feeder. White fabric with glossy green glaze on the outer surface, patchy on the inner.

2 CERAMIC BUILDING MATERIAL AND FIRED CLAY *BY CYNTHIA POOLE*

Introduction and Methodology

A large assemblage of ceramic building material and fired clay was recovered from the excavation, amounting to about 1700 fragments weighing in the order of 100 kg. The majority of this is ceramic building material (CBM) of which roughly half (681; 49,745 g) was fully processed and recorded. The unprocessed CBM (*c.*850 fragments) was rapidly scanned to extract significant pieces, such as decorated floor tile, to be retained as part of the archive and approximately 80% (658 fragments, 44,267g) of this was quantified and assessed to some degree; the remainder (estimated to be *c.*170 fragments) has not been assessed in any respect. The bulk of the assemblage was discarded during either assessment or post-excavation recording in accordance with Oxford County Museum Services guidelines. Details are recorded in the archive. The assemblage is quantified by phase and material in Table 5.

The assemblage has been recorded in varying degrees of detail on an Excel spreadsheet as far as possible adhering to guidelines set out by the Archaeological Ceramic Building Materials Group.[56] Fabrics were characterised mainly on the basis of macroscopic characteristics and to a lesser extent with the aid of x20 hand lens. The fabrics have been assigned where possible to the Oxford fabric series for medieval tile from the Oxford region, which was originally devised for the Hamel site, Oxford[57] and to the related reference collection housed by OA. The fabrics have been amply described in previous publications and are not repeated here.[58] However, designation of fabrics of unwashed CBM was frequently a best guess.

The CBM assemblage is heavily dominated by late medieval to early post-medieval building material, providing evidence of the architectural features used in the buildings constructed on or close to the site at this period. The character and date of material relates predominantly to Phases 2b–3b, reflecting the status and preferences related to the first college buildings. A few pieces of nineteenth- to twentieth-century stoneware sewer pipe and engineering brick occurred intrusively in earlier deposits; details are recorded in the archive.

In addition to the CBM and fired clay, a small assemblage of mortar and plaster amounting to 102 fragments (472g) was recovered, mostly from sieved samples, apart from two pieces of painted wall plaster. All was recovered from pit fills of medieval and later post-medieval date. This material will not be discussed further here.

[56] ACBMG, *Ceramic Building Material, Minimum Standards for Recovery, Curation, Analysis and Publication* (2007).

[57] S. Robinson, 'The Tile', in N. Palmer, 'A Beaker burial and Medieval Tenements in The Hamel, Oxford', *Oxoniensia*, 45 (1980), microfiche 2.D09–D14.

[58] E.g. J. Cotter, 2006 'Ceramic Building Materials', in Poore et al., 'Excavations at No. 4A Merton Street', pp. 292–305.

Table 5. Quantification of ceramic building material (CBM) and fired clay (FC) by phase

	CBM		FC		Mortar / Plaster		Stone		Total	
Phase	**No**	**Wt (g)**	**No**	**Wt (g)**	**No**	**Wt (g)**	**No**	**Wt (g)**	**No**	**Wt (g)**
Unphased	8	478							8	478
1	6	41	42	922					48	963
2a	44	2938	6	163	16	24	1	3	67	3128
2b	230	11,626	3	123	79	192	14	957	326	12,898
3a	324	16,829	37	113			16	1359	377	18,301
3b	553	37,120					40	2603	593	39,723
4a	232	17,260	1	25	7	256	8	635	248	18,176
4b	11	857							11	857
Modern	8	1046							8	1046
Total	**1416**	**88,195**	**89**	**1346**	**102**	**472**	**79**	**5557**	**1686**	**95,570**

Roman tile

A small quantity (six fragments, 569 g) of residual Roman tile including a tegula was recovered from deposits dated to Phases 2a and 3b. A few fragments of Roman tile, usually residual in later deposits, are not uncommon on excavations in Oxford.

Fired Clay

Fired clay amounting to 105 fragments weighing 1349 g was recovered predominantly from Saxo-Norman and early medieval deposits. Material recovered from the Saxo-Norman levels (Phase 1) mostly proved to be fired clay apart from a single intrusive fragment of roof tile. Fired clay from this period was of indeterminate form, probably from ovens, except for a fragment of vitrified furnace or smithing hearth lining from the fill of pit 1367. Two further fragments of vitrified furnace lining were recovered from Phase 2a pit 1659. Analysis of the slag shows that both smelting and smithing of iron was taking place during the Saxo-Norman and early medieval phases

Fired clay from Phase 2a was recovered from pits and the cellar pit. This included five fragments measuring 14–44 mm thick with a roughly moulded exterior surface and interwoven wattle impressions on the interior. Most of the wattles measured 11–15 mm in diameter with one larger of 21mm. These probably derive from ovens rather than buildings, possibly supporting a suspended floor in a two-chamber structure, rather than forming the oven walls. An additional three fragments with wattle impressions ranging in size from 10–18 mm diameter were found in late medieval (2b) and later post-medieval (4a) phases. Fragments from a possible metalworking mould were found in an earlier post-medieval pit (1353).

Roof tile

Roof tile (1153 fragments, 52,833 g) formed the bulk of the assemblage. Over half were plain flat fragments, including a proportion of glazed pieces that could derive from either peg tile or ridge tile.

The typical medieval roof tile (mainly thirteenth to fifteenth century) was produced in a limited range of fabrics, the most common being an orange-red sandy fabric (Fabric IIIB).

The tile recovered from Phase 2a was dominated by slightly earlier group VII fabrics (thirteenth to fourteenth century). These are primarily the cream VIIA, pink VIIB and VIIBB with a reddish surface and grey core, all characterised by small chalk inclusions or leached voids in a moderately sandy clay matrix. These were probably produced somewhere in north-east Oxfordshire and are generally dated to the early to mid thirteenth century. The medieval roof tile is generally recognisable by its fairly rough finish and irregular manufacture.

Rectangular peg tiles with two peg holes at the upper end measured on average 10–15 mm thick, but a significant number were thicker (up to 20 mm). None of the peg tile was glazed, but glazing cannot be discounted as only the upper sections with the peg holes could be positively identified as peg tile, which is normally only glazed on the lower exposed end. No complete peg tiles survived and only one with a complete width of 177 mm made in fabric IIIB was found. Peg holes in tiles in fabrics IIIB, IVA/B and VII are circular, sometimes tapering to the base or punched at an angle, and range in size from 10–17 mm diameter. They were centred 20–41 mm from the top edge and 28–67 mm from the nearest side. Where both peg holes survived the distance between them was very variable, ranging from 29–100 mm. One tile with a rounded edge had a very neatly punched peg hole 12 mm in diameter, which was centred 78 mm from the edge, and is very similar in character to a type with just a single peg hole, recently recognised at 114–119 St Aldates. A distinctive feature on eighteen peg tiles was thickening around the base of the peg hole, frequently in the form of a distinct ridge of surplus clay 25–35 mm in diameter on the underside of the tile. On one 'blind' peg hole the unpierced skin of clay across the base formed a distinct boss on the underside. Three tiles with small peg holes of 9 mm and one drilled post-firing of 8 mm may have been used in conjunction with nails rather than wooden pegs.

A fairly small proportion of the roof tile (59 fragments, 4075 g) was formed by the distinctive late medieval peg tile recognised by Cotter from the earlier excavations in the area of the medieval kitchen.[59] They were made in the same fine red fabric with a thick grey core, as noted by Cotter akin to some late medieval/early post-medieval redware pottery fabrics. The fabric bears some similarity to VIIBB and it is possible that some unwashed examples were recorded as this earlier fabric. The examples from the present excavation have the same distinctive neat smooth finish with knife-trimmed surfaces and edges. No complete examples survived, the largest individual fragment having a width greater than 90 mm and length in excess of 195 mm. Thickness for this type ranged from 14–21 mm, with the main peak between 16 and 18 mm (67% of fragments). They had neatly punched cylindrical peg holes measuring 12–17 mm diameter with a halo of surplus clay around the base 24–36 mm in diameter, which had sometimes been neatly pared off. A second distinctive feature of some peg holes was an inner lip at the top, apparently formed by a thin skin of clay pulled up in extracting the punch. The holes were centred 20–39 mm from the top edge and 33–45 mm from the nearest side edge. The majority of this type was found in pit fills and layers from late medieval Phase 2b to post-medieval deposits of Phase 4a in fairly equal proportions through these phases. Two fragments found in early medieval pits 1281 and 1334 may be intrusive or caught in the top of the slumped fills.

Four pieces of roof tile had been burnt along one edge, a characteristic that is usually indicative of it having been used in the pitched floor surface of a heath or oven.

[59] J. Cotter, 'Pottery', in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', p. 196

Ridge tile

Ridge tile (125 fragments, 9227 g) was identified in a variety of fabrics and forms ranging from late twelfth to fifteenth century in date. Pieces of plain glazed tile (33 fragments, 1580 g) are also likely to be fragments of ridge tile.

The earliest type of tile found was a small number (11 fragments, 1085 g) made in the cream-buff oolitic limestone gritted fabric IB, which dates to the late twelfth to early thirteenth century. This type is thought to have come from north-west Oxfordshire.[60] It was used for glazed crested ridge tile, and over half the fragments had evidence of cut triangular spurs, often with thumb prints at the base from attaching the crest. They were quite crudely made and thinly glazed with amber or green bands alongside the crest deteriorating to splashes towards the edges. These ranged from 11–19 mm thick. Three were found in Phase 2b late medieval pits and the remainder in early- to mid-post-medieval deposits of Phases 3a and 3b.

Ridge tile in fabric groups III and VII was probably plain glazed with a rounded or angular apex and without a crest. Amber and brown glaze occurs most frequently with olive green slightly less common. These ranged in thickness from 9–25mm. None of the glazed fragments in fabric VIIA could be certainly identified as ridge tile, but some of these occurred in the early medieval Phase 2a deposits. Only five examples with evidence of a crest, all made in fabric IIIB, were recovered from Phases 2b and 3a pits. One had an asymmetrically cut triangular spur 39 mm long and 20 mm high. Two had pyramidal spurs 37 x 34 mm and 25 mm high. Other fragments only retained the cut concave scoops between spurs.

The group in fabric IIIA (23 fragments, 1990 g) is all likely to be ridge tile, though some small scraps could not be positively identified as such. The fabric has a distinctive pink or pale grey colour containing a high density of well-sorted rose or white quartz sand. The character of the fabric is similar to the Brill/Boarstall pottery fabric (OXAM). The tile has a smooth neat finish often with a knife-trimmed underside. They measured 10–14 mm thick. All pieces with evidence of a crest had an amber glaze, whilst other plain fragments in this fabric were coated in amber, bottle green, dark green or olive-brown glaze. The crest survived on three examples consisting of triangular cut spurs 54–5 mm long with a concave gap between spurs. Tile in this fabric is generally dated to the fourteenth century.

Floor tile

Floor tile (99 fragments, 15,681 g) was recovered from late medieval to modern deposits, but 70% were found in post-medieval deposits of Phase 3b (seventeenth century) suggesting this was a major period of refurbishment. These include both decorated and plain medieval and late-medieval to early post-medieval tiles. Reference to floor tile designs are prefixed LH and refer to numbering used in the catalogue of Oxfordshire floor tiles produced by Haberly.[61]

The earliest type was a corner fragment of 'stabbed Wessex' tile made in fabric IIIB (ctx 1474) in one of the most commonly found designs LH.XXIV/XXV. It was well preserved with the white inlay 3.5–5.5 mm thick, though most of the amber glaze had worn away. Keying in the form of 12 hemispherical stab marks were arrayed as a series of arcs across the base.

[60] Ibid.
[61] L. Haberly, *Mediaeval English Paving Tiles* (Oxford, 1937).

This type of floor tile was produced between 1270 and 1330. The uniformity of the fabric is consistent with those made by the Brill-Boarstall production site.[62]

A second tile (ctx 1181) made in a coarse gritty variety of fabric IIIB had quite a crude rough finish, but no keying in the base. It was stamped in a gyrony design, where each quadrant of the tile was divided into four squares in turn subdivided to produce eight triangles of alternating yellow and green. The tile measured 26 mm thick and is estimated to have a size of *c.*160 mm square, which would equate with the variant of design CVII noted by Haberly at Queen's College. Stamped designs are generally attributed to the Penn production, but the fabric if correctly identified suggests this may be a more local product. The design though associated with Penn production is a fairly common one and may well have been produced by other workshops.

Plain floor tile (21 fragments, 1436 g) made in fabric IIIB comprised both glazed, in amber or brown, and unglazed examples. These measured 21–2 mm and 26–7 mm thick and one of the thinner examples had a complete width of 150 mm. The thicker examples may have been slightly larger in size similar to the decorated example above.

In addition, three other pieces (311 g) all from pit 1353 made in fabric IIIB appeared to have stamped decoration of the Penn type rather than inlaid. One fragment was too small to identify the design and the remaining two are similar to LH.CLXVIII and LH.CCLI. The outlines are cleaner than many stamped tiles, so it is possible they are in fact thinly inlaid. Only one of these had a complete thickness of 29 mm. There is some variation of fabric in IIIB ranging from those with very uniform well-sorted quartz sand inclusions *c*.0.5 mm, which can probably be equated to Brill/Boarstall floor tile production, to those with more poorly sorted and mixed medium-coarse quartz sand and small grits, which bear a stronger resemblance to the sandy clay used in fired clay, which is presumed to be of local origin. These differences are usually only apparent in the roof tile, but in this assemblage it is also apparent amongst the floor tile, including both plain and decorated, with a crude finish, thin inlay or stamped and an absence of keying and may hint at more local production in the Oxford area. Evidence of floor tile production in the form of wasters has been noted at Bagley Wood between Oxford and Abingdon.[63]

Floor tiles with stamped decoration (15 fragments, 3018 g) from the Penn/Chilterns tileries were found in pit fills and other deposits dating to Phases 3a and 3b, apart from one in a late medieval (Phase 2b) pit (2368). These were made in fabric IVB, a light red, pale orange, salmon or pink fired fine sandy clay with cream marl laminations and pellets, containing small red iron oxide inclusions 0.5–3 mm. These ranged in thickness from 21–8 mm and appear to fall into two sizes: a smaller category represented by two tiles 130 and 133 mm wide and a larger variety represented by a single tile measuring 151 x 155 mm. The tiles have cut bevelled edges and flat unkeyed bases, and are coated in an amber glaze over a printed design in white slip. The designs on eight pieces were too fragmentary or poorly preserved to be identified. Of the remainder one may be similar in design to LH.CLXVIII, composed of intersecting circles, but in the Queen's College example has a quatrefoil rather than a fleur-de-lys as the corner motif. Another corner fragment contains the base of a fleur-de-lys springing diagonally from the corner and may be part of design LH.CCLI. A third consists

[62] M. Farley, 'The Production of Medieval Decorated Floor-tiles at Boarstall, with a note on Boarstall's Late Medieval Map', *Records of Buckinghamshire*, 57 (2017).
[63] Mellor, 'Oxfordshire Pottery', pp. 17–217.

of only the corner motif of a quatrefoil quadrant, bisected by the tile edges. This motif occurs in the corners of other tiles, which are decorated with a design of an eagle with wings outspread and with a single head facing right forming a variant of LH.CCLV. This design had been previously recognised at Queen's College when it was suggested that it may have had a second beak, though not double headed like an imperial eagle.[64] However, the beak-like projection previously identified has more the appearance of crest on the eagle's head. A parallel for this tile was found at Eynsham Abbey, though in that example the eagle was depicted with a shield on the eagle's breast. The tiles from Queen's College are insufficiently complete to establish whether a shield was also present. A single example of tile LH.CCLIX was found in layer 1313 and depicts the rebus of Robert Langton, who endowed Queen's College to build the chapel in 1519. Designs LH.CCLIX and LH.CCLV are both linked to the chapel and can be dated to 1519.[65]

Plain glazed (10 fragments, 3171g) floor tiles and unglazed (20; 2728 g) floor or quarry tiles made in fabric IVA/B of late medieval and early post-medieval date were found in pit fills and layers from Phases 2b through to 4a. Most of the glazed examples were coated with a dark green-black glaze, though some had amber-olive green glaze. A range of sizes are represented: thickness varied from 15 to 37 mm. One complete tile measured 128 by 130 mm and 28 mm thick and two broken tiles were over 150 mm wide. One tile 30 mm thick and 135 mm wide had been scored and snapped to form a triangular tile. The apparently unglazed examples may be as much due to wear rather than an original absence of glaze. The plain glazed tiles may have been used in conjunction with the decorated tiles to form plain borders around blocks of decorated tile, though differences in size could indicate some were used as plain paved areas. The absence of any examples with a white slip to create lighter coloured yellow tiles suggests it is unlikely that any were laid in a chequerboard pattern of contrasting light and dark tiles in the manner of Flemish floor tiles.

The unglazed quarry tiles in fabric IVA/B and post-medieval redware had a greater size range than the standard floor tiles based on the evidence of thickness from 22–66 mm thick. No other dimensions survive though one was greater than 160 mm wide. The fragments were identified as quarry tiles from the cut bevelled edges, but where no edges survived it was not always possible to differentiate bricks from quarry tiles.

Brick

Bricks were concentrated in pit fills and layers of Phases 3a to 4a. They were made in fabrics similar to those used for earlier tiles and included a red-orange coarse sandy fabric akin to IIIB, lighter orange or pink laminated fine sandy clay that appears to continue the group IV fabrics and fine sandy orange-red fabric that is typical of post-medieval brick. The bricks are of sixteenth–seventeenth century type measuring 42–60 mm thick and 100–118 mm wide. Some fragments which were very crudely finished could be late medieval in date, though much of the brick had a fairly rough finish. Grey vitrified surfaces were common, which may indicate their use for diaper work in walling. However, it could be a secondary effect as many had extensive burning and sooting especially along the edges with one brick worn to a width

[64] J. Cotter, 'Pottery', in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', fig. 13.
[65] Haberly, *Mediaeval English Paving Tiles*, designs CCLIX and CCLVIII.

of only 80 mm as a result of heat damage. It is probable that much of the brick had been used in the construction of an oven, fireplace or chimney.

Wall tiles

A group of early post-medieval Anglo-Netherlands tin-glazed wall tiles (eight fragments, 254 g) were recovered from a Phase 3b pit (1085). These were made in cream and pink fine sandy fabrics that are Flemish in origin. The had smooth flat or cut bevelled edges and measured from 14–17 mm thick. They were glazed in a decorative design in blue, green/turquoise and ochre on a white ground. Two pieces had a possible foliate or floriate design. Five fragments had a floral design with fleurs-de-lys in the corners and blue petalled flowers with yellow centre and turquoise leaves. A frame of concentric circles enclosed a scene of a possible building on one tile. This style of tile dates to *c.*1575–1625.

Conclusions

Ceramic building material is rarely found in a primary context and most recovered in excavation is residual, deposited long after its date of production, only being discarded when buildings need to be repaired or rebuilt. The original medieval buildings continued to be used following acquisition by Queen's College and were not replaced until much later in the post-medieval period. The medieval buildings were roofed with peg tile, capped with a mix of plain and decorative crested ridge tile, both glazed and unglazed. The variations in the character and fabrics of the roof tile and in design of the ridge tile no doubt reflects the division of the area originally into a number of tenements each with its own house on the street frontage. The use of ceramic floor tile appears to have been fairly limited and again the difference in quality suggest some variation in the wealth or aspirations of the owners of the different properties.

The increase in CBM discarded in the late medieval phase may be linked to the acquisition of the properties by Queen's College and reflect repairs and alterations made as a result of the changed status of the buildings. Much of the material relates to the earlier use of the buildings, but the appearance of the distinctive thick neatly trimmed peg tile during the late medieval phase no doubt heralds its first use for changes made by the college. The bulk of this particular type of tile occurs in the post-medieval Phases 3a–3b suggesting this in turn was replaced during further alterations or re-roofing in the early seventeenth century. Cotter suggested these tiles may have been used on the kitchen, possibly representing a later fifteenth-century re-roofing, though their use may not have been exclusive to that building.[66]

The use of floor tile in the college chapel is well documented and precisely dated to 1519 by the college accounts. The Penn floor tiles that can be linked to the benefactor of the College, Robert Langton, probably derive from the chapel, but other contemporary buildings may also have been paved in the same manner. The brick was probably introduced at about this time with the insertion of chimneys and fireplaces into the medieval buildings. The group of Anglo-Netherlands wall tiles provides the only evidence for interior decorative features of the college buildings. Wall tiles may have been used in fireplace surrounds, as skirting or in kitchens.

[66] Cotter, in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', pp. 165–217.

3 GLASS *BY IAN R. SCOTT*

There are 313 sherds of glass, comprising 193 sherds of vessel glass, 118 sherds of window glass, a small spherical bead-like piece (Phase 1) and a small piece of part-melted glass (Phase 4a). Almost half of the assemblage by sherd count (n=151) comes from Phase 4a contexts. The glass has been identified and quantified by fragment count (Tables 6–9).

Phase 1 (Late Ninth to Eleventh Century)
The glass from Phase 1 is tiny sphere of glass (D: 4mm) from fill 1689 of pit 1657. It is clearly not a bead as there is no piercing.

Phase 2b (Fourteenth to Mid Fifteenth Century)
The vessel glass from Phase 2b comprises just one piece from each of pits 1885 and 2003. Both sherds are partly de-vitrified and are probably from the bases of vessels, but the form and date of both vessels is unclear. The remaining glass from Phase 2b comprises eight pieces of medieval window glass all of which is partly de-vitrified. Three sherds were recovered from pit 1538 and include a small sherd of partly de-vitrified colourless glass with a painted fleur de lys (context 2337). Single pieces of window glass were recovered from pits 1772 and 2141, and three pieces from layer 1095. The latter included one sherd with two lines of red-brown paint.

Phase 3a (Late Fifteenth to Sixteenth Century)
The glass from Phase 3a comprises 26 sherds of vessel glass and eleven sherds of window glass. Much of the glass was found as single sherds. Although there is more vessel glass and window glass from Phase 3a contexts when compared to the earlier phases, most of the glass occurs as single sherds. Notable pieces include a base from a late sixteenth- or early seventeenth-century beaker with a rigaree decoration (layer 1032) and sherd from another similarly decorated beaker base (layer 1345), a small body sherd from a possible Venetian or façon de Venise goblet (context 1066, pit 1065), and piece of a conical façon de Venise goblet or beaker in colourless glass with white vetro a fili (layer 1403). Amongst the vessel glass is the base of pedestal beaker of late sixteenth- to early seventeenth-century date from layer 1295. Pit 1839 (Context 1630) produced the neck of a wine bottle which is probably of early eighteenth-century date and therefore presumably intrusive. The window glass from Phase 3a contexts is either post-medieval or residual medieval.

Phase 3b (Seventeenth Century)
There is a little more vessel glass from Phase 3b when compared to Phase 3a, but considerably more window glass. Much of the window glass is unremarkable, and the only pieces of note are the four refitting fragments from pit 1873 which are painted with natural-looking stems. The glass is de-vitrified and opaque suggesting that it may be medieval.

The vessel glass includes the base of pedestal beaker of late sixteenth- or early seventeenth-century date (context 1156, pit 1475), a small fire-polished rim sherd from a cylindrical beaker with incurving rim and a rim sherd from a beaker in colourless glass (context 1109, pit 1106), and part of free-blown flask or bottle of sixteenth- or early seventeenth-century date (context 1067). Three sherds from a small bottle or globular phial were recovered from pit 1475 (context 1151, pit 1069). However, the vessel glass also includes an

early wine bottle neck (context 2052, pit 2053) and three examples of wine bottle seals. One example from pit 1085 (context 1013) shows tennis players (Fig. 13, no. 1) and although incomplete and lacking licensee's initials is similar to seals of Thomas Wood who between 1647 and 1663 was the licensee of The Salutation and operated the tennis court which lay behind the tavern.[67] There are two other seals from pit 1073 (context 1074) that are a little later in date. One shows a vintner's bush flanked by the initials H.B. above three tuns (Fig. 13, no. 3). Humphrey Bodicot was the licensee of the Three Tuns between 1639 and 1660.[68] The second seal has a plain shield with a chevron. There are single small fleur de lys to each side and above the shield (Fig. 13, no. 2). Similar shields but with the addition of three tuns are found on a number of seals with initials, and these are identified as belonging to later licensees of the Three Tuns.[69] It may be that the seal with plain chevron also belongs to the *Three Tuns* but in the absence of initials we cannot confirm this or identify the licensee.

Phase 4a (Early to Mid Eighteenth Century)

There are significantly more sherds of vessel glass (n=101) from Phase 4a contexts, and over half of the glass comes from wine bottles (n=53). The assemblage is dominated by a small number of deposits. The biggest single deposit is pit 1187, fill 1197, which produced 17 sherds of window glass, 43 sherds of vessel glass and a single piece of melted glass, possibly waste. The vessel glass was dominated by 19 fragments of wine bottle, seven fragments of bottle, including a small onion-shaped bottle or globular flask, and five sherds from cylindrical phials, including the upper portion of one example with part of its stopper *in situ*. There were two sherds from a possible jar, single sherds from two drinking vessels, including the base of pedestal tankard, and eight sherds that are undiagnostic to vessel form. One of the wine bottle sherds, the upper portion of a squat early eighteenth-century form, had the letters 'MB' scratched into its shoulder. There are also three sherds forming a large part of a 'globe and shaft' wine bottle of later seventeenth-century date. Pit 1046 produced 24 sherds of glass including 12 sherds of window glass, six sherds from wine bottles, five sherds from bottles or flasks and a single sherd from a phial or pharmaceutical bottle. A smaller assemblage of eleven sherds was recovered from cut 1050, including two wine bottle seals (context 1036). One seal is on an almost complete onion-shaped bottle with deep domed kick and lacking only the top of the neck. The seal shows three wine tuns and is dated '1707'. Leeds published a drawing of a similar seal of the same date which he thought might be to be assigned to the 'Three Tuns'.[70] The second seal has a bell flanked by the initials E. H. (Fig. 13, no. 4) and Leeds suggested this might be for The Bell in Magdalen Street, that the licensee may have been Edward Haynes, and that it may date to the later seventeenth century.[71] Pit 1665 produced 17 sherds including 14 sherds from wine bottles, two sherds from a small flask or phial and a single sherd of window glass.

In general, the Phase 4a glass assemblage is dominated by wine bottles but has fragments from cylindrical phials or pharmaceutical bottles of eighteenth-century date, and some pieces of other flasks or bottles. There is only a little other vessel glass, although there

[67] E.T. Leeds, '17th- and 18th-century Wine Bottles of Oxford Taverns', *Oxoniensia*, **6** (1941), p.45, pl ix, 1.
[68] Ibid., p. 48, pl x, 23.
[69] Ibid., pp. 48–50, pl x, 24–34.
[70] Leeds, '17th- and 18th-century Wine Bottles', p. 55, fig. 12
[71] E.T. Leeds, 'Glass vessels of the XVI Century and Later from the Site of the Bodleian Extension in Broad Street, Oxford', *Oxoniensia,* **3** (1938), p. 155, pl xii, D 8.

is the upper portion of a sand glass of late medieval or early post-medieval date, from context 1138.

The window glass, which is broadly of post-medieval date, comprised mainly small pieces. Although 41 pieces were identified these include one group of 11 tiny fragments recovered by sieving from context 1044. Half of the remaining window glass (n=16) is from context 1197 and includes two refitting pieces from a small lozenge-shaped quarry.

Phase 4b (Late Eighteenth to mid Nineteenth Century)

The glass from Phase 4b contexts is much more limited. The vessel glass (n=16) comprises mainly wine bottle (n=12). The base of a small flask in dark green glass with white trailing was recovered from pit 1123. There are only two pieces of window glass.

Conclusions

The assemblage is not large and comprises mostly post-medieval glass. There is very little glass from Saxon or medieval contexts (Phases 1 and 2) and this includes eight pieces of probable window glass, of which two pieces are painted. The glass from Phases 3 and 4 is post-medieval in date, with both late sixteenth- to early seventeenth-century glass, and later seventeenth- and early eighteenth-century glass respectively. The latter comprises sherds from wine bottles, including seals, together with pieces of flasks and pharmaceutical bottles or phials. There are only a very few pieces from drinking vessels and no obvious pieces from tablewares.

Catalogue of Illustrated Glass (Fig. 13)

1. **Wine bottle seal**. Tennis players. Missing upper portion with licensee's initials. Dark green glass with opaque weathering. D: 47 mm. Fill 1013, pit 1085. Phase 3b. Almost certainly T.W. for Thomas Wood of The Salutation, 1647–63.
2. **Wine bottle seal**. Plain shield with chevron, single very small fleur de lys to each side and above the shield. Dark green glass. D of seal: 40 mm x 37 mm. Fill 1074, pit 1073, SF 11. Phase 3b.
3. **Wine bottle seal**. Vintner's bush flanked by initial H.B. above three tuns. Green glass. D: 34 mm x 33 mm. Fill 1074, pit 1073, SF 14. Phase 3b. Licensee Humphrey Bodicot, at the Three Tuns, 1639–60.
4. **Wine bottle**, with squat body form and long tapered neck with cracked off a slightly tooled rim, and horizontal string rim. Seal: bell flanked by initials E H. Green glass. Ht extant: 160 mm. Fill 1036, pit 1050. Phase 4a. Possibly for The Bell in Magdalen Street; the licensee may be Edward Haynes. Later seventeenth century?

Table 6. Summary quantification of glass by context and glass type (fragment count)

Phase	Vessel	Window	Other	Total
1			1	1
2b	2	8		10
3a	26	11		37
3b_	36	55		91
4a	108	42	1	151
4b	17	2		19
unphased	4			4
Total	**193**	**118**	**2**	**313**

Table 7. Summary quantification of glass from Phases 1 and 2b by context and glass type (fragment count)

Phase	Cut	Category	Context	Vessel	Window	Other	Total
1	1657	cellar pit	1689			1	1
			Total			**1**	**1**
2b	1538	pit	2335		2		2
			2337		1		1
	1772	pit	1775		1		1
	1885	pit	1884	1			1
	2003	pit	2007	1			1
	2141	pit	2114		1		1
		layer	1095		3		3
			Total	**2**	**8**		**10**

Table 8. Summary quantification of glass from Phases 3a and 3b by context and glass type (fragment count)

Phase	Cut	Category	Context	Vessel	Window	Total
3a	1061	pit	1060	4		4
	1065	pit	1066	2	2	4
	1251	pit	2054	1		1
	1319	pit	1300		1	1
	1320	pit	1298	1		1
	1327	pit	1325	1		1
	1353	pit	1364	1	1	2
			1366		1	1
			1385	2		2
	1588	pit	1574	1		1
	1639	pit	1630	1		1
	1905	pit	1907	1		1
	2053	pit	2177	1		1
	1251	pit	1246	1		1
	1244	foundation trench	1243	1		1
		layers	1025		1	1
			1032	2	1	3
			1174	1	4	5
			1295	2		2
			1345	1		1
			1403	2		2
			Total	**26**	**11**	**37**
3b	1069	pit	1067	4	11	15
			1068		2	2
	1073	pit	1074	2		2
	1085	pit	1013	12	30	42
			1084	4	4	8
	1093	pit	1090	1		1
	1106	pit	1109	1		1
	1314	pit	1315		3	3
	1475	pit	1143	3		3
			1151	4		4
			1156	2		2
	1873	pit	1872		4	4
	2053	pit	2052	1		1
	2168	pit	2178	1		1
		layers	1003	1		1
			1017		1	1
			Total	**36**	**55**	**91**

Table 9. Summary quantification of glass from Phases 4a and 4b by context and glass type (fragment count)

Phase	Cut	Category	Context	Vessel	Window	Other	Total
4a	**1046**	pit	1043	10	1		11
			1044	2	11		13
	1050	pit	1036	3	1		4
			1037	3	2		5
			1038	1			1
			1051		1		1
	1093	pit	1089	2	2		4
	1106	pit	1114	1			1
	1187	pit	1197	43	17	1	61
	1213	pit	1214	3			3
	1218	pit	1222	2			2
	1221	pit	1219		1		1
			1220	4			4
	1314	pit	1138	1	1		2
	1648	pit	1646	8			8
	1665	pit	1664	16	1		17
	1671	pit	1666	4			4
	1845	pit	1843	2			2
	1187?	pit	1188	2			2
		layers	1001	1			1
			1083		1		1
			1115		2		2
			1272		1		1
			Total	**108**	**42**	**1**	**151**
4b	**1123**	pit	1121	16	2		18
		layer	1128	1			1
			Total	**17**	**2**		**19**

4 CLAY TOBACCO PIPES *BY DAVID A. HIGGINS*

Methodology

The pipe fragments have been individually examined and a summary of each context group logged on an Excel worksheet, a copy of which forms part of the site archive. The layout of the worksheet is based on the clay tobacco pipe recording system that has been developed at the University of Liverpool.[72] The summary lists number of bowl (B), stem (S) and mouthpiece fragments (M) from each context and gives two dates for them, the 'range' being the widest possible range represented by the pipe fragments and the 'deposit' being the most likely date of deposition, based on an assessment of group as a whole and/or the latest closely datable pieces present. The worksheet also notes the number of identifiable heel (H) and spur (Sp) bowls represented in each group. 'Die numbers' refer to the as yet unpublished catalogue of pipe marks that is being compiled by the author, a copy of which is housed in the National Pipe Archive in Liverpool.

The Pipe Assemblage

The excavations produced 978 fragments of pipe, comprising 190 bowl, 752 stem and 36 mouthpiece fragments from 71 different contexts. The majority of the fragments date from the seventeenth to mid-eighteenth century, with late eighteenth- and nineteenth-century material being completely absent. The pipes provide an accurate means of dating the contexts within which they occur, and a context summary has been provided for the site archive that tabulates this information. Although the excavations recovered a good range of bowl forms spanning the whole period from *c.*1610–1750, the majority of these are plain and unmarked. Many of the plain bowl forms from smaller context groups are similar to examples recovered from previous excavations in the town and so will not be dealt with here in any detail. In contrast, there are two large pit groups that, between them, produced nearly half of all the pipes from these excavations (474 fragments). One of the pits dates from *c.*1630–45 and is probably the best assemblage of this date to have been recovered from anywhere in Oxford – and good groups of this date are rare nationally. The second pit group dates from soon after the first, around 1650–70 and, taken together, they provide a regionally significant benchmark for pipe assemblages of *c.*1630–70 from this region. These two groups are presented in detail below. In addition, selected other pieces from the excavations, such as the marked pipes, have been illustrated and described.

Pit 1475 (c.1630–45)

This feature was a very large pit that lay partially within the excavated area towards the SW corner of the site (the exposed portion extending to about 6 x 4 m in plan). It contained more than 50 contexts, seven of which produced pipes (Table 10). In total, the excavated portion of this pit produced 249 fragments of pipe, comprising 61 bowl, 170 stem and 18 mouthpiece fragments. Several of these contexts produced pipes made in the same mould, or with the

[72] D.A. Higgins and P.J Davey, 'Appendix 4: Draft Guidelines for using the Clay Tobacco Pipe Record Sheets', in S.D. White, *The Dynamics of Regionalisation and Trade: Yorkshire Clay Tobacco Pipes c.1600–1800*, BAR BS **374** (2004), pp. 487–90; D.A. Higgins, *Guidelines for the Recovery and Processing of Clay Tobacco Pipes from Archaeological Projects (Version 1.2)* (2017), http://www.pipearchive.co.uk/pdfs/howto/How%20to%20guidelines%20(ver%201_2)%203-9-17.pdf

same maker's mark on them, suggesting that they were all produced at or very near the same time. This indicates that the pit was essentially filled in a single phase of activity and that it contains a contemporary group of artefacts.

*Table 10. Summary of the pipes from pit 1475 (*c*.1630–45), including details of the makers' marks and the numbers of heel and spur forms recovered from each context (where these could be determined)*

Context	Bowl	Stem	Mouthpiece	Total	Marks	Heel	Spur
1143	6	8	1	**15**		2	4
1144		1		**1**			
1151	27	91	14	**132**	MH x 7	21	5
1153	18	45	2	**65**	?? x 1	7	10
1155	4	20	1	**25**	MH x 2	4	
1156	3	3		**6**		3	
1474	3	2		**5**			3
Total	**61**	**170**	**18**	**249**	**10**	**37**	**22**

The exact dating of the pit fill proved a little problematic since each of the context groups includes bowls with a range of different forms and sizes present, even though all the pipes themselves are likely to have been in contemporary production. Several of the pipes straddle forms of 1610–40 and 1640–60 in the London typology[73], giving a rather broad overall range. More closely defined dating is provided by parallels from the Kitto Institute in Plymouth, where a well group was dated to *c.*1625–35, with the material most likely having been dumped as a result of a change in ownership of the property in either 1625 or 1631.[74] Some of the Plymouth forms are a little smaller or with earlier features than the Oxford pieces, suggesting that this is the very earliest (or even a little earlier) that the Oxford fill dates from. At the other end of the range, good parallels can be found amongst Civil War groups of the 1640s from Sandal and Pontefract castles in Yorkshire[75] although, in this instance, some of the Yorkshire pieces show slightly later looking characteristics. Nine of the pipes from the pit are marked MH for Miles Higges, the Oxford maker who married in 1630 and died in 1643, although it seems likely that his widow would have carried on using his mark until she remarried, and her new husband took his freedom in 1649.[76] This suggests an overall range of somewhere between 1625 and 1650 for the deposition of the fills within this pit, with a date of *c.*1630–45 being most likely, taking everything into consideration. For ease of reference *c.*1630–45 will be taken as the date when discussing this group.

The recovery of such a large contemporary group from a discreet deposit provided the potential for complete pipes to be reassembled, particularly since most of the bowls were complete and the fragments were generally quite large and unabraded. Despite this, only a very low level of joins could be found between the fragments, either within or between the

[73] D.R. Atkinson and A. Oswald, 'London Clay Tobacco Pipes', *Journal of the British Archaeological Association*, **32** (1969), pp. 171–227.
[74] D.A. Higgins, 'The Clay Tobacco Pipes', in J. Allan and J. Barber 'A Seventeenth-Century Pottery Group from the Kitto Institute, Plymouth', in D. Gaimster and M. Redknap (eds), *Everyday and Exotic Pottery from Europe* (Oxford, 1992), p. 241.
[75] S.D. White, *The Dynamics of Regionalisation and Trade: Yorkshire Clay Tobacco Pipes* c.*1600–1800*, BAR BS **374** (2004), figs 163–6 and 168–73.
[76] R. Price, 'John Taylor of Oxford', *Society for Clay Pipe Research Newsletter*, **72** (2007), pp. 18–21.

different contexts. There were also quite a number of stems opening into bowls that could not be matched with recovered bowls, showing that the excavated sample only represents a fraction of the pipes that were in use on the site at this time. The most complete example had 126 mm of surviving stem (Item 10) and the stem taper makes it clear that it would have been significantly longer than this originally, most likely in the region of 170–270 mm.[77]

Bowl Forms. The 249 pipe fragments from this pit provide a large enough sample to be able to characterise the products that were being produced or used in Oxford at this period. Around 60 pipe bowls were represented, of which 50 were complete enough to be compared in detail. Although the individual forms were quite variable, it was clear that these 50 fell into a limited number of distinct types. Usually it is possible to identify specific mould types using small surface flaws from the mould to determine exactly how many individual moulds are represented. On this occasion most of these pipes are either too well finished for this to be possible or from moulds without discernible flaws. Closely similar forms could, however, be grouped together into types that either represent individual moulds anyway, or such similar moulds that were intended to produce the same style of pipe. In total, the 50 comparable bowls could be allocated to 11 different mould types, which were designated types A–K (Table 11; Items 3–14).

Table 11. Numbers of each different bowl form (A–K) recovered from the various contexts in pit 1475 (c.1630–45), showing whether these are heel or spur forms (H/S), the fabric from which they are made (Fab), and including details of the numbers of burnished pieces (Bur) and makers' marks. The unclassified fragments are given as 'U'. The total number of bowl fragments from 1151 is only 26 because two of the fragments join and so have been counted as one piece here

Form	H/S	Fab	Fig	1143	1151	1153	1155	1156	1474	Total	Bur	Mark(s)
A	S	F3	3, 4		3	3			3	**9**	**0**	
B	S	F1	5		1	1				**2**	**1**	
C	S	F3	6	2	1	5				**8**	**0**	
D	S	F3	7	2						**2**	**0**	
E	H	F2	8		2	3		2		**7**	**7**	
F	H	F1	9	1						**1**	**0**	
G	H	F1	10		4	1	2	1		**8**	**1**	
H	H	F3	11	1						**1**	**0**	
I	H	F3	12		3	1				**4**	**0**	
J	H	F3	13		4		1			**5**	**0**	MH x 5
K	H	F3	14		3					**3**	**0**	MH x 2
U					5	4	1			**10**	**0**	MH x 2; ?? x 1
Total				**6**	**26**	**18**	**4**	**3**	**3**	**60**	**9**	**10**

The first point to note is that it is the overall size of the bowl that is the common factor linking most of these forms, and which is the key to dating other material being compared with them. Earlier seventeenth-century pipes (e.g. Items 1–2) share similar forms but are

[77] D.A. Higgins, 'The Interpretation and Regional Study of Clay Tobacco Pipes: A Case Study of the Broseley District', Liverpool University PhD thesis (1987) (https://www.academia.edu/34528546/Higgins_1987_-_The_Interpretation_and_Regional_Study_of_Clay_Tobacco_Pipes).

slightly smaller in bulk, while slightly later ones are a little larger (e.g. Items 17–26). This is why it is essential to have accurate life-size illustrations of bowl forms to use as reference points when dating pipes or comparing them with other examples. As might be expected, there are some exceptions where slightly smaller (e.g. Item 8) or larger (e.g. Items 12 and 14) bowl forms occur within the *c.*1630–45 group, but the broad uniformity of size within the group is clear.

The forms themselves can be divided into two basic types; those with spurs and those with heels. The proportions of each from individual contexts were quite variable. For example, context 1151 contained far more heel types than spur types, whereas 1153 was the other way around (Table 10). The larger sample provided by the pit group as a whole is probably more representative, especially if the unclassified pieces, which include parts of a further eight heel bowls and one spur bowl, are added (there is also one unclassified body sherd, which cannot be allocated to either type). This gives a total of 59 pipes represented in the pit that can be allocated to broad type, made up of 22 spur forms (37%) and 37 heel forms (63%). Within each basic type the two styles could then be further sub-divided into individual forms as follows.

Spur Bowls. There are four individual spur bowl forms represented, which have been designated types A–D (Table 11; Items 3–7). Sometimes two bowls initially looked rather different, because of the way they had been finished. Item 4, for example, has had its spur trimmed very short making it look very stumpy and broad but the underlying form is simply another example of style A (Item 3). The four styles are described below:

A (Items 3–4): This is the most numerous spur type, with nine examples. The examples cannot be mould matched from flaws, and there is some slight variation in exact profile, so probably more than one actual mould type is represented.

B (Item 5): This is a very bulbous bowl form distinguished by a pronounced curve in the back profile, facing the smoker (two examples). The illustrated example from 1151 is burnished, that from 1153 is not. The two examples are similar shapes, but probably from different moulds.

C (Item 6): Distinctive form with a forward pointing spur (eight examples). There is some variation in exact profile suggesting that more than one individual mould is represented, for example, one of the bowls from 1143 is of this general type but almost certainly from a different mould to the illustrated example.

D (Item 7): Two examples, characterised by a rather more elongated bowl than the previous types, heralding later styles. The second example is not a very close match to the illustrated one, and it also has a slightly forward-pointing spur, suggesting that it comes from a different (but broadly similar) mould.

The most common spur forms are clearly types A and C, which comprise 17 of the 21 examples that have been classified. Both of these forms have compact bowls with a slightly globular feel to them, which appears to be the principal characteristic of the local pipemaking industry at this period. The forward pointing spur on type C is also distinctive, and not a feature that is found in many other places. This too can be taken as a local characteristic. In contrast, the hump-backed form B is not so typical of the local pipes and the illustrated

example stands out in having a burnished surface and a finer fabric (see below), both of which may indicate that it is an import from elsewhere. The more elongated form D is slightly taller and can be seen as an early example of the evolution towards the slenderer forms that are typical of the following decades.

Heel Bowls. The more numerous heel forms can be divided into seven styles (E–K; Items 18–14), the last two of which have MH stamps on the base of the heel.

E (Item 8): Seven examples of a distinctive 'west country' style, characterised by a strongly curved bowl and narrow 'waist'. The heart-shaped heel is trimmed flush with the stem. One example from 1156 appears to have a rounded heel but this is only because the 'tail' has been trimmed off during the finishing process. All seven examples have very similar forms and finish (all rims bottered but not milled; all examples nicely burnished), but it is not certain whether one or more moulds are represented. Two examples have very occasional unidentified red inclusions visible in the broken surface of the fabric.

F (Item 9): A single example of a bowl form different from any others in the group. The heel base has been trimmed at a very uneven angle.

G (Item 10): This form can be mould matched from flaws, showing that all eight examples are from the same mould. One damaged example from 1151 appears to have a poorly formed bowl that has been crudely burnished, probably in an attempt to make a sub-standard pipe marketable. None of the others are burnished and so this does not appear to have been a normal finish for this type of pipe. The rim milling is always placed very close to the rim.

H (Item 11): This form has a particularly small heel and slender stem. Only one example was present in the pit.

I (Item 12): Rather a large bowl form for the period, with a small heel and slender stem (four examples; that from 1153 is very fragmentary, but probably of this type). All examples have the milling placed very close to the rim.

J (Item 13): These five examples are all stamped with the same MH mark (Die 1120) and all have a very similar profile, which tends to be slightly smaller and more compact than the other MH marked pipes from the pit (Form K). Flaws on some of these examples, however, suggest that several different moulds could be represented and only two (from 1151) can definitely be shown to be from the same mould. There are also two partial MH marks stamped using the same die that may well have belonged to this group originally, but the bowls are missing (unclassified pieces from contexts 1151 and 1153).

K (Item 14): Two examples of this form (definitely from the same mould) are stamped with the same MH mark (Die 339) and a third (the same shape and possibly from the same mould) is unmarked. The front profile of this form has a slightly awkward angle change two thirds of the way down, so that it does not have the sinuous curves of other contemporary forms. All three examples are a similar shape but only the two marked examples can be positively mould matched. Excavations at the Ashmolean Museum showed that Higges did not always stamp

his products from the same mould[78] and so all three examples could still be from the same mould in his workshop, even though only two are marked.

While the individual heel bowls are quite variable in profile, the majority conform to the expected 'barrel shape' found on seventeenth-century pipes of this date. They are typically neatly finished (but not burnished) and with fully milled rims. Two of the types have the milling set very close to the rim (Items 10 and 12), which may indicate some sort of connection between them. The notable exception is the West Country form (Item 8), all the examples of which have a finely burnished surface but no rim milling at all. This type was certainly imported to Oxford and was one of the most common types in the pit, showing that traded pipes, most likely from Wiltshire, made up a significant element of those in use. There were nine pipes stamped MH from the pit, probably representing a number of different moulds, which show the importance of the local maker Miles Higges at this time as well. The application of a mark was partially related to the style of a pipe (marks on spur pipes being much rarer than those on heel forms) and so Higges may also have been producing some of the spur forms described above as part of his production range. The larger bowl forms represented by I and K (Items 12 and 14; the latter marked MH) may represent different types of pipe (perhaps with longer stems) as well as providing a reminder that a range of both forms and sizes was available at any given period. The heel bases are small to medium in size, which contrasts markedly with the relatively large bases found amongst those from the pit group of *c*.1650–70 described below (Items 22–28).

Finishing Techniques. As noted above, rim milling in the pit group appears to have been very consistently applied to almost all the bowl forms, both spur and heel, the only exception being the West Country form (Item 8), which was never milled. The other forms all had fully milled rims, with just one exception, which was only three-quarters milled (excluding the West Country form, there are 34 complete rims from the pit, all fully milled except for a single example of Form A, which is three-quarters milled). On two of the types (Items 10 and 12), the rim milling was always placed right at the rim of the bowl, rather than a short way below it. This shows that either these examples came from the same workshop, which had its own particular style of milling, or that the placing of the milling was a particular characteristic of these specific styles of pipe.

Burnishing was similarly associated with specific bowl forms, with all seven of the West Country bowl forms being nicely burnished (Item 8). In contrast, only other two bowls with burnishing were present in the pit; one unillustrated example of type G (cf. Item 10; but this may have been an attempt to repair a poorly moulded bowl) and a single example of the spur form with a particularly bulbous back (Item 5). This spur form is not typical of the other (presumably local) types, which shows that burnishing was almost exclusively confined to imported or unusual types at this period. Four of the 14 mouthpieces in 1151 were burnished (29%), and these most likely belong to the West Country forms, showing that this finish almost certainly extended the full length of the stem. Thirteen of the 91 stem fragments (14%) in this context were burnished as were nine of the 26 bowls (35%). Overall this gives 26 of the 132

[78] D.A. Higgins, 'Clay Tobacco Pipes', in S. Teague and B. Ford, 'Medieval and Post-Medieval Tenements at the Ashmolean Museum Extension Site', in A. Dodd, S. Mileson and L. Webley (eds) *The Archaeology of Oxford in the Twenty-first Century* (Woodbridge, 2020), pp. 325–400.

pieces from this group being burnished (20%). The stem bores in the pit group as a whole are typically large, normally 8/64" to 9/64", with some examples even reaching 10/64".

Fabrics. The final point to note is that three different fabrics could be identified within the early pit group. Pipe clays are normally so clean and devoid of any distinguishing characteristics that detailed scientific analysis is required to identify any differences between them and, even if they can be distinguished, they cannot be sourced with any accuracy. Amongst this pit group of *c.*1630–45, however, three different fabrics (fabrics 1–3) could be identified using a hand lens and there is a fourth represented by slightly later pipes dating from around 1670 onwards, which is discussed below (fabric 4). These four fabrics are as follows:

Fabric 1: An extremely fine, dense, white fabric with no visible inclusions under a 10x lens. This typically has a clean, sharp fracture when well fired and a slight natural gloss to the finished surface of the pipe. This is assumed to be an imported clay from the high-quality ball clay deposits of central southern or south-west England.

Fabric 2: As fabric 1, but with very occasional red inclusions visible in the broken fabric. It is not certain what these are, or whether they occur naturally or have been added, but they seem to be associated with West Country forms that may well have been made using local clay sources available in Wiltshire, for example at Chitterne. Where none of these reddish inclusions are exposed, this body cannot be visually distinguished from fabric 1. This fabric also has a slight natural gloss to the surface of the finished pipe.

Fabric 3: A very slightly off-white ('dirty white') fabric with a distinctive granular fracture resulting from numerous extremely fine sandy inclusions in the fabric. These are barely visible with a 10x lens in the broken section and even harder to discern in the finished surface. There are also less frequent very fine mica particles present. Very occasionally slightly larger rounded quartz particles (sand grains) occur. The finished surface tends to have rather a dull matt finish and is not as naturally glossy as fabrics 1 and 2.

Fabric 4: This is identical to fabric 3 except that numerous sandy inclusions are a little larger and can readily be seen with a 10x lens in both the broken section and in the surface of the finished pipes. This fabric was not noted at all from pit 1475 of *c.*1650–70 but occurs quite widely on later pipes from the site ranging from around 1670–1750 in date.

The first of these fabrics is what might be regarded as a 'normal' pipe clay, devoid of any obvious inclusions. This is the fabric used to make the earlier pipes of *c.*1610–40 from the site (Items 1–2), and it is likely that either these pipes were imported to the town or that the earliest pipemakers were importing the clay used to make them. The *c.*1630–45 pit group, however, produced pipes made of three different fabrics. These do not occur randomly but appear to be associated with particular bowl forms. Only three of the forms (B, F and G; Items 5, 9 and 10) were made of this fine clay (fabric 1) and one of these forms is quite unusual and with a burnished surface, perhaps suggesting that it was imported from elsewhere (Item 5). Likewise, the closely related fabric 2 was only found with bowl form E (Item 8), which has already been identified as an imported West Country form (see above). A useful topic for future research would be to see whether local white-firing clays from Wiltshire include small red inclusions as a diagnostic feature. The remaining eight bowl forms are all made of a clay with very fine sandy inclusions (fabric 3), making this the dominant fabric type represented in the pit. An early use of similar sandy fabrics was noted at Abingdon where pipes of *c.*1610–

40 were made of this type of clay, but there then appeared to be a gap until it reappeared for pipes made from around 1660–80 onwards.[79]

A very similar body to fabric 3, but with slightly larger sandy inclusions (fabric 4), was used for many of the later pipes from this site, which range from *c.*1670–1750 in date. The author has previously noted a number of assemblages from the Thames Valley where the majority of pipes dating from the seventeenth and eighteenth centuries were made from this type of fine sandy fabric. At Abingdon there is seventeenth-century production waste made using a fine sandy fabric and pipes made from this type of clay are found right across the Oxford/Abingdon/Reading area.[80] Hair curlers made of the same sandy fabric have also been found at Oxford Castle.[81] It seems likely that both of these sandy fabrics (3 and 4) derive from the same geological formation, but with the earlier pipes (*c.*1630–50) being made from a fine seam and the later ones (*c.*1670+) being made from a slightly coarser seam. Interestingly, none of the pipes from pit 1085, dating from *c.*1650–70 (see below), were made of a visibly sandy fabric, suggesting that there was a complete change of clay source during this period.

The likely source of the sandy clay is identified by Plot[82], who says, "at *Shotover-hill* there is *white clay*, the fourth fold of earth in the way to the *Ochre*, which during the late wars, in the siege of Oxford, was wholly used for making *Tobacco-pipes* there; and is still in part put to that service, mixed with another they have from *Northampton-shire*. It is also of excellent use to *Statuaries*, for making *Moddels*, *Gargills*, or *Anticks*; and containing a hard, but very small grit; in *polishing* silver, it comes near to *Tripela*." This not only provides a first-hand account of pipe clay being sourced from Shotover Hill, 5 km east of the centre of Oxford (and where there is also a 'Kiln Lane'), but also that it was exclusively used for making pipes during the Civil War sieges of 1644–6. He specifically mentions the grit within the clay, so fine that it could be used for polishing silver, and states that the clay was still being used in the 1670s, as part of a mixture with Northamptonshire clay.

Plot's 1677 description perfectly matches both the observed appearance of the fine sandy fabric and the chronological and geographical spread over which pipes made from it occur. The excavated evidence further refines this to suggest that the Shotover Hill clay was being used prior to the Civil War (as represented by the *c.*1610–40 pipes from Abingdon and the *c.*1630–45 pit group here), but that after the war another clay source or sources became available, as evidenced by the fine, inclusion free clays in a pit group of *c.*1650–70 (see below). Perhaps clay from Northamptonshire (as mentioned by Plot) became available after the Civil War had ended, although a couple of examples of naturally very glossy fabrics (that cannot otherwise be visually distinguished from inclusions) suggest that at least one other source may have been exploited during this period as well. Later pipes from the 1670s onwards exhibit slightly coarser sandy inclusions, most likely indicating a return to the Shotover Hill clays, but perhaps now mixed with other clays, as described by Plot. This sandy clay then continued to be used for locally made pipes right through to the middle of the eighteenth century.

[79] D.A. Higgins, 'Clay Tobacco Pipes', in K. Brady, A. Smith, G. Laws, *et al*, 'Excavations at Abingdon West Central Redevelopment: Iron Age, Roman, Medieval, and Post-Medieval Activity in Abingdon', *Oxoniensia*, **72** (2007), p. 172.
[80] Ibid., pp. 172–3.
[81] D.A. Higgins, 'Clay Tobacco Pipe', in J. Munby, A. Norton, D. Poore and A. Dodd *Excavations at Oxford Castle 1999–2009*, Thames Valley Landscapes Monograph 44 (Oxford, 2019).
[82] R. Plot, *The Natural History of Oxfordshire* (1677), pp. 65–6.

Pipe clays are very hard to distinguish from simple visual examination alone, even with a 10x lens. Despite this, the evidence from these excavations demonstrates that that a range of clays was being used in the Oxford area from the early seventeenth century through to the mid-eighteenth century and that some differentiation of these fabrics can be achieved from careful observation. A more detailed programme of microscopic and/or scientific examination is clearly needed to provide a proper analysis/description of these clays, and to determine the locations from which they are likely to have been extracted. This initial description of these fine sandy fabrics provides a useful means of identifying pipes likely to have been produced in the middle Thames region from Shotover Hill clay and highlights the potential for further work in this area.

Pit 1046

Pit 1046 should briefly be mentioned here since one of its fills (1044) included a group of pipes, including an MH stamp (Item 15), that appears contemporary with the material of *c.*1630–45 from Pit 1475. There are at least five early bowl forms from context 1044, all of which can be matched with types from pit 1475. In this instance, however, the material must have been redeposited since there is one later bowl form from this context that, together with finds from the other pipe-bearing fills of this pit, all point to a late seventeenth or early eighteenth-century date for this feature (most likely *c.*1690–1730).

Pit 1085 (c.1650–70)

Pit 1085 lay partially within the excavated area, towards the south-east corner of the site. There were two pipe-bearing deposits within this pit (1013 and 1084) that, between them, produced 225 fragments of pipe (40 bowl, 183 stem and two mouthpieces). This is a large and very chronologically uniform looking group of pipes, despite the fact that they are fairly well broken up (most of the stems are 30–50 mm in length, although some bowls have up to 80 mm of surviving stem). The stems are all consistent with a seventeenth-century date and all the bowl forms are all of *c.*1650–70 types. This date is supported by a single IOHN/TAY/LER stamp, John Taylor being an Oxford pipemaker (formerly apprenticed to Miles Higges) who took his freedom in 1649 and died in 1684.[83]

The pit also produced a farthing token of Humphrey Bodicott that is concreted to one of the pipe stems in context 1013. Such tokens would have been in circulation from *c.*1652–72 (See Coins and tokens, below). This example provides important dating evidence for the deposit in which it was found and supports a date of *c.*1650–70 for the pit fill.

As with the earlier pit (see above), it was not possible to find many joins between the fragments and so complete pipes could not be recovered. The bowls themselves can be divided into those with spurs and those with heels, and then sub-divided into form types. It was not possible to find mould flaws to distinguish specific moulds and so these form types could represent either individual moulds or groups of nearly similar moulds that were designed so as to produce almost identical looking pipes. The eight forms represented have been designated types AA–AH, details of which are given in Table 12, with the bowl types themselves being described below.

[83] Price, 'John Taylor of Oxford'.

Table 12: Numbers of each different bowl form (AA–AH) recovered from pit 1085 (c.1650–70; contexts 1013 and 1084), showing whether these are heel or spur forms (H/S) and the occurrence of any makers' marks. Where measurement could be made, the subsequent columns show the number of examples with rim milling (to the nearest quarter) ranging from none (M0) to four quarters milled (M4); the number of examples of each stem bore ranging from 6/64" to 8/64" and, finally, the number of burnished examples of each type. The unclassified bowl fragments are all from heel types and are given as 'U'. The total bowl count for 1013 is only 28 (the context contained 30 pieces) because two bowl fragments join to make one piece (type AG) and another body sherd cannot be classified to even a broad heel or spur type

Form	H/S	Fig	1013	1084	Total	Mark(s)	M0	M1	M2	M3	M4	6/64	7/64	8/64	Bur
AA	S	18	2		**2**					2			2		0
AB	S	19	1		**1**						1			1	0
AC	S	20, 21	8	1	**9**	IOHN TAYLER x 1				5	4	1	5	3	6
AD	H	22		1	**1**					1				1	0
AE	H	23	5	2	**7**					1	4		2	4	0
AF	H	24	2	2	**4**						2		2	1	0
AG	H	25	4	1	**5**				3	4			3	1	0
AH	H	26	1	1	**2**	TR x 1					2		2		0
U	H		5	2	**7**								7	1	0
Total			**28**	**10**	**38**	**2**	**0**	**0**	**3**	**13**	**13**	**1**	**23**	**12**	**6**

Spur bowls. There are three basic styles of spur bowl represented, which have been designated types AA–AC (Table 12; Items 18–21). The three styles were represented by 12 examples, which is just under one-third of the 38 pipes represented in the pit as a whole (32%). These are:

AA (Item 18): Two bowls from the same mould, identified by a mould flaw (a small lump) on the left-hand side, just below the rim. The fabric has a slightly granular looking fracture, but no obvious inclusions under a 10x lens. Both examples have a three-quarters milled rim but a very plain, 'average' looking finish.

AB (Item 19): A single very neat, well-finished bowl. The surface is very glossy, but this appears to be a natural characteristic of the clay rather than a burnished surface.

AC (Items 20–21): The most common spur form with nine examples represented, six of which have a burnished surface. The burnish is often very lightly applied, making the individual lines hard to see but giving an 'eggshell' finish to the pipes. One of the bowls has a naturally very glossy fabric, the same as form AH, leaving just two bowls with a plain, 'ordinary' surface. This form is generally well made and has a nicely curved profile with a narrow 'waist' to the bowl. This form appears to be typical of Oxford spur pipe production at this period and to represent a good quality product. One of the examples has a IOHN TAYLER stem stamp on top of the stem a little way behind the bowl (Item 21). The bowl of the Tayler example is burnished, but not the stem.

Heel bowls. The more numerous heel forms are represented by 26 examples in total, which represent just over two-thirds of the bowls from this pit (68%). Nineteen of these are complete enough to be divided into five specific forms (AD–AH; Items 22–26). The only form notably absent from this pit is one with a tailed heel. The earlier pit had included examples with tailed heels as West Country imports and finds from elsewhere in Oxford show that locally produced versions with tailed heels were occurring by the mid seventeenth century.

They were, however, never a particularly common form and so their absence from this pit may be more chance than design. An example is provided from elsewhere on the site (Item 17). The five heel bowl forms that could be identified from this pit are as follows:

AD (Item 22): A single example of rather an upright heel bowl with a slightly lop-sided form and heavy-handed finish. While perfectly functional, this has the appearance of being a cheaply produced and finished product.

AE (Item 23): This is the most common heel form represented in the pit (seven examples), but there is some slight variation between the forms suggesting that a number of individual moulds are represented. They all share a strongly curved front profile and are generally neatly made and finished, several with a noticeably glossy surface to the fabric (natural). The form is similar to types AG and AH.

AF (Item 24): A slightly dumpier and less elegant form than type AF, but still competently made and some of the four examples have a naturally glossy surface to the fabric (four examples).

AG (Item 25): This form has a neat, well-formed bowl that is very similar to type AE, but a little smaller and slimmer (five examples). These examples also have slightly less milling around the rims. The fabric often has a naturally glossy surface. One of the bowls from 1013 comprises two joining fragments, which have just been counted as one example here.

AH (Item 26): Two examples with similar bowl forms but almost certainly made in different moulds. The bowl shape is very similar to type AE, but a little more forward leaning and with a more pronounced and slightly flaring heel – particularly the illustrated example, which is the only one to have a TR maker's stamp on the heel. This was probably made by Thomas Reeve, who is listed as an Oxford pipemaker from 1667–1700,[84] although he appears to have actually died in 1699, since his will was proved on 29 May of that year. The 1667 date probably refers to the marriage of Thomas Reeve and Agnes Woodward at St Giles, Oxford, on 26 January 1667 (Internet IGI, accessed 19.5.10) and so Thomas could have been pipemaking before this date. The rest of the pipe assemblage indicates a date of before *c.*1670 for this group and so the stamped pipe is likely to be an early product from Reeve's career. The marked example is made of a fabric with a particularly glossy surface, which looks the same as that used for one of the type AC spur bowls.

Bowl forms and finishing techniques. The bowl forms from Pit 1085 provide a good sample of the forms being used in Oxford *c.*1650–70 and make an interesting comparison with the similar sized group from Pit 1475, which is around 20 years earlier in date (see above). While the forms are broadly similar, as is the proportion of spur bowls to heel types (around one third spur; two thirds heel), the average size of the bowls has increased slightly and there is a clear difference in the size of the heels between the two groups (the later group generally having significantly larger heels). The spur bowls are less 'dumpy' and rounded, having developed a more elegant form, and with a more clearly defined 'waist'. These spur types appear to have been good quality products and were probably more expensive than the heel pipes, given the frequency with which they were burnished. There were only six burnished pipes from the pit, all of which were spur types (six of the twelve examples). More specifically, these were six of the nine type AC bowls (Items 20–21) showing that this particular form was often given a high-quality finish. Overall the burnished fragments represent 15% of all the bowls (comparable with the 20% from the earlier pit), but the earlier burnishing occurred on

[84] A. Oswald, 'Clay Pipes' in Hassall *et al.*, 'Excavations in St Ebbe's', p. 262.

imported or unusual forms. In this pit, the burnished pipes can be shown to be local, since one has a Tayler stamp on it. So, while the overall percentage of burnished pipes remains broadly the same, there is a shift from burnished heel forms to burnished spur forms, and from imported pipes being those that were predominantly burnished to their being made locally.

A difference in milling can also be observed between the two groups. In the earlier pit, both spur and heel bowl rims were almost all fully milled, with the exception of the West Country forms, that were never milled. Unmilled West Country forms had disappeared by the time of the later pit, and the other bowls had much more variable amounts of milling, which has been quantified in Table 12. By this date there were equal numbers of bowls with fully milled and three-quarters milled rims, and three examples with only half milled rims. This shows that, overall, less attention was being paid to the milling and that this slackening of standards was general, regardless of bowl form or quality (as represented by heel or spur forms and burnished surfaces).

Another clear change between the two groups was with regard to stem bore size, which had become notably smaller. In the earlier pit, most stem bores were 8/64" or 9/64" (and occasionally larger), whereas those in the later pit ranged from 6/64" to 8/64", with 7/64" being the dominant size (Table 12). As with the bowl sizes, there is some overlap with individual examples, but the general trend is clear, with a move towards larger bowls and smaller stem bores. The most dramatic change is perhaps with regard to fabric type, whereby the locally sourced fine sandy fabric that was the most common type in the earlier pit has been completely replaced by a virtually inclusion-free white clay in this one (see above for discussion). These differences between the two groups, while sometimes subtle, combine to provide clear trends that translate into chronological differences, which can in turn be used to assess and date other assemblages from elsewhere.

Decorated pipe. The final piece of note from the pit is a single fragment with 'barley twist' decoration to the stem (Item 27). This is the only decorated pipe from the whole site, showing how rare decoration was in Oxford during the seventeenth and eighteenth centuries. The barley twist decoration was formed by the pipemaker pinching the stem in alternate directions after the pipe had been moulded, but while still soft (and presumably with a wire still in place within the bore to prevent this from being squashed flat). This was clearly intended to be a good quality pipe since the stem has also been burnished. Barley twist decoration was occasionally employed during the seventeenth and early eighteenth centuries but was not specific to any one production centre or pipe style, since odd examples occur quite widely across England. This is a useful example, since it not only documents this style of decoration from Oxford, but it also comes from a closely dated pit group, which provides a date of *c.*1650–70 for this piece.

Other Pipes

Apart from the two large pit groups discussed above, the remaining pipes from the site can be regarded as typical of those found in Oxford between about 1610 and 1750. Early forms include two spur bowls (Items 1–2) one of which has a very finely finished surface and diminutive spur. This would have been a good quality pipe. The later seventeenth-century bowls include a number of spur forms with strong local characteristics, similar to those previously documented from sites such as Abingdon West Central, Rewley Abbey and Oxford

Castle.[85] As is typical of these forms, none is marked or decorated. The heel bowls follow a similar progression, with styles already recognised as local types dominating the types being used on this site from the 1670s onwards. Around the turn of the century there was a marked shift in favour of heel forms over spur forms, with the heel bowls also adopting a more cylindrical, upright form as shown in Items 28–32. From the end of the seventeenth century these upright forms occasionally had makers' marks relief moulded on the sides of the heel (e.g. Items 31–32).

Although the most significant pipes from this site are those recovered as part of the two large pit groups discussed above, there are a few other individual pieces of note. There is, for example, one stem fragment from a context dating from *c.*1640–60 (1067) that has had a carefully cut notch made in the stem, so at to reach the stem bore, but without breaking the pipe (Item 16). This has been done after the pipe has been fired, presumably using a knife to scrape into the clay. Fragments like this are occasionally encountered both in this country and abroad and are thought to arise from the pipe have been converted into some sort of a whistle. Sometimes there is evidence for a number of such notches, presumably so that a number of different notes could have been made.

Maker's Marks

The excavations produced 16 pipes with makers' marks on them; 13 with stamped marks and three with moulded marks. The stamped marks all date from between about 1630 and 1670 and most were recovered from the pit groups discussed above. The marked pipes recovered are described below, the stamped marks being listed before the moulded ones.

MH. The excavations produced ten pipes with the maker's initials MH stamped on the heel, which can be attributed to Miles Higges (or Hickes), who is the earliest known Oxford pipemaker. Details of this individual have been published by Price, and the following biography is taken from his account.[86] Higges probably worked in the Oxford parish of St Mary Magdalen and he married Jane Berriman, the sister of a well-known Bristol pipemaker, on 29 January 1629/30 at St. Michaels', Oxford. They baptised a son, John, in August 1630 and it is likely that they also had a daughter, Deborah, who went on to marry the Aylesbury pipemaker, George Weaver, which shows how widespread the connections between pipemakers were from the earliest days of the industry. Miles died and was buried at St Mary Magdalen 1643, with the business presumably being carried on by his widow with the help of John Taylor, an apprentice that Miles appears to have taken on during the late 1630s. Widow Jane went on to marry John Taylor at some point before August 1649, when they baptised a son, Lawrence, at St Mary Magdalen. John Taylor himself was made free as a pipemaker by order of Oxford Council on 31 July 1649 and so probably only started using his own mark after this date, an example of which has also been found on these excavations (see below). Although Miles Higges died in 1643, his widow is likely to have carried on using his MH mark until Taylor took his freedom and would have been in a position to trade in the town himself. Nothing is known of Miles Higges' early life, and it is possible that he started his pipemaking

[85] Higgins, 'Excavations at Abingdon', pp. 107–202; D. A. Higgins, 'Clay Tobacco Pipes', in J. Munby, A. Simmonds, R. Tyler and D. R. P. Wilkinson, *From Stadium to Station, Rewley Abbey and Rewley Road Station, Oxford* (Oxford, 2007), pp. 43–52; Higgins in Munby *et al., Oxford Castle*.
[86] Price, 'John Taylor of Oxford'.

business during the 1620s. The first firm reference to him, however, dates from the 1630 marriage and so, in broad terms, pipes stamped MH can be dated to *c.*1630–50.

The workshop that Higges established appears to have been very successful, since his marks are the most numerous of any from Oxford and occur in at least four different varieties, two of which were recovered from these excavations. The first type recovered has the initials MH ligatured together and contained within a beaded border, accompanied by five radiating 'dashes' above and below (Item 13; Die 1120). This die type is crisply cut and both the border and decoration accompanying the initials are clearly executed. There are seven examples of this type from the excavations, five from 1151 and two from 1155. Two other examples of this die type have previously been recorded by the author from Parks Road, Oxford (one in Woodstock Museum and the other in Liverpool Museum).

The second stamp type is represented by three examples and is very similar to the first, except that the design is much less sharply executed, and the surrounding border is either absent or reduced to some very slight dots that are barely visible (Item 14; Die 339). There is one example of this type from 1044 and two from 1151. Eleven examples of this type have been previously recorded, also from Parks Road (nine in Woodstock Museum and two in Liverpool Museum; those in the latter collection specifically being labelled as having been found on the site of the laboratories west of the School of Rural Economics in 1913). This second die type, however, appears to be directly derived from the first, since the form and spacing of the letters is identical and both types share a distinctive flaw, comprising a bulge in the background field that occurs within and above the upper part of the letter H. It seems that this second type is a direct copy from the first die, but that it has lost some of the clarity and detail in copying, as well as some of the surrounding border. Very few surviving examples of seventeenth-century pipemakers stamps are known but, of those that have been found, most are made of fired pipe clay and some of these have clearly been made by taking an impression from a pre-existing design. This would make sense, since paying a skilled engraver to produce a unique die would have been relatively expensive compared with making a simple clay impression of an existing mark that could be cheaply fired in the pipemaker's own kiln.

More than one die was needed if more than one press was being employed to make pipes at any given time. This appears to have been the case in Higges' workshop, as can be seen from the seven pipes marked MH from context 1151. Five of these have the first, more crisply cut die used on them and all occur on pipes with relatively small, compact, bowls (Die 1120; Item 13). In contrast, the same context produced two examples of the second die type, both of which occurred on bowls with a slightly larger, more elongated, form (Die 339; Item 14). Another example of a slightly larger bowl form associated with this second type of stamp was found from elsewhere on the site (context 1044; Item 15). While it has not been possible to positively identify all the individual mould or stamp types, what is clear is that there seems to be a positive correlation between the different mould and stamp types, as would be the case if they were in contemporary use within the workshop but coming from different work stations.

Many of the impressions made from the second stamp type (Die 339) recorded here and elsewhere are poorly struck, making it very hard to be sure if one of more copies of the original die type were is use. But the indications are that several very slightly different copies exist, suggesting that a number of presses may have been in use at any one time. This suggestion is supported by the first stamp type (Die 1120) that seems to occur on pipes produced in more than one mould, even when they occur together in the same deposit (cf. context 1151). This would still be quite possible if the pipes from a number of moulders using

near identical moulds were being passed on to a different group of workers for finishing. It is detail like this that sheds light on the scale and nature of this early Oxford workshop. It is also worth noting that both types (Dies 339 and 1120) occur together on this site as well as amongst the Parks Road finds in Woodstock and Liverpool Museums. This supports the suggestion that these two die types were in contemporary use and it may be that the other MH die types (see below) will prove to be characteristic of other periods of production.

The other die types used by Higges are very distinctly different and were not found on this site. Excavations at the Ashmolean Museum produced a version with the separate letters MH without any border (Die 2125), but with a small star above and below them. This may be the same form as an example described (but not illustrated) by Cannon from excavations at 1–12 Magdalen Street in Oxford, although that example is only described as having a single star below the letters (perhaps the mark had been partially impressed).[87] The final die type had a plain border and a scroll above and below the letters (Die 340). This type is known from a single example from Parks Road, now in Woodstock Museum.[88] Cannon notes that "several different MH marks are known to exist", citing 17 examples in the Ashmolean Museum (Department of Antiquities), but without saying exactly what forms these take.[89] In total, 43 examples of MH pipes from Oxford have now been recorded (Table 13). This is by far the largest number of seventeenth-century marked pipes recorded for any Oxford maker and show how significant Higges was during the formative years of the Oxford pipemaking industry.

Table 13. MH pipes of c.*1630–50 recorded from sites in Oxford*

Die	No.	Findspot	Collection
339	1	The Queen's College, Provost's Garden, Oxford (context 1044)	Oxford Archaeology
339	2	The Queen's College, Provost's Garden, Oxford (context 1151)	Oxford Archaeology
339	2	Parks Road, Oxford (Labs W of School of Rural Economics)	Liverpool Museum
339	9	Parks Road, Oxford	Woodstock Museum
340	1	Parks Road, Oxford	Woodstock Museum
1120	5	The Queen's College, Provost's Garden, Oxford (context 1151)	Oxford Archaeology
1120	2	The Queen's College, Provost's Garden, Oxford (context 1155)	Oxford Archaeology
1120	1	Parks Road, Oxford	Woodstock Museum
1120	1	Parks Road, Oxford (Labs W of School of Rural Economics)	Liverpool Museum
2125	1	Ashmolean Museum Extension, Oxford (excavation)	Oxford Archaeology
2125	1	1-12 Magdalen Street, Oxford	Cotswold Archaeology
-	17	Not referenced (Cannon 2000)	Ashmolean Museum
Total	**43**		

[87] P. Cannon, 'Clay Tobacco Pipes', in C. Bateman, D. Enright, N. Oakley *et al*., 'Medieval Oxford's Northern Suburb: Evidence from Recent Work at 1–12 Magdalen Street', Cotswold Archaeology unpublished report (2000) (http://reports.cotswoldarchaeology.co.uk/report/debenhams-1-2-magdalen-street).
[88] Higgins, *The Interpretation and Regional Study of Clay Tobacco Pipes*, fig 19.20.
[89] Cannon, 'Clay Tobacco Pipes'.

TR. One example of a pipe stamped TR was recovered from context 1084, one of the fills of a pit dating from *c.*1650–70 (see above; Item 26). This is a previously unrecorded mark, but it can be attributed to Thomas Reeve of Oxford, who is recorded working from at least 1667 onwards.[90] The 1667 date given by Oswald probably refers to the marriage of Thomas Reeve and Agnes Woodward at St Giles, Oxford on 26 January 1667 (Internet IGI, accessed 19.5.10). Reeve died in 1699 (his will was proved on 29 May) and by this time he was clearly a wealthy man, leaving an extensive estate, including £3 to Thomas Cox, his former apprentice. Excavations at the Ashmolean Museum produced a miniature pipe of *c.*1670–90 stamped with the incuse initials TR, which can also be attributed to this maker, and shows that he used more than one style of mark.[91] The mark from Queen's College comes from a well-dated deposit of *c.*1650–70, and so it must belong to the earlier part of Reeve's career. It is made from a fine clay, without any visible inclusions, which has an unusually glossy surface. In contrast, the miniature pipe of *c.*1670–90 was made of a fine sandy fabric, providing further evidence that the local pipemakers changed clay sources around 1670 (see above).

IOHN/TAY/LER. A single clay tobacco with a full name relief stem stamp reading IOHN/TAY/LER (Item 21) was recovered from context 1013, part of a closely datable pit fill of *c.*1650–70 (see above). The mark clearly shows that this pipe was made by John Taylor of Oxford, a pipemaker whose life has been extensively documented by Price, on whose work the following summary is based.[92] John Taylor was probably baptised in Oxford in 1622 and was apprenticed to the early Oxford pipemaker Miles Higges or Hickes, most likely at some point during the 1630s. Higges died in 1643 before Taylor had completed his apprenticeship, although it must have been nearly complete, since Taylor would have been about 21 at the time. Taylor was not held back by his master's untimely death, since he not only appears to have taken over Higges' business, but he also married his widow, Jane. Jane also happened to be the sister of Richard Berryman, a prominent and successful Bristol pipemaker who probably originated from Oxford himself and so may have already known Taylor. With the marriage to Jane, John Taylor became Richard Berryman's brother-in-law, giving him an influential contact in the pipe making trade. They clearly had a good relationship since when Richard Berryman's widow Anne died in 1660, Taylor was one of the beneficiaries of the will. Jane had previously had at least two children with Miles Higges, one of whom went on to marry the Aylesbury pipe maker George Weaver, which shows how complex and extensive the connections between pipe making families could be.

Taylor finally took his freedom in 1649 and went on to become a prominent figure in Oxford. He was probably a councillor by 1663 and was certainly one by February 1676/7. Unfortunately, there appear to have been several individuals called John Taylor living in Oxford at this period, which makes identification of the individual who was a pipemaker rather problematic. One prominent and wealthy family of painters and poets named Taylor included several members named John, one of whom was mayor of Oxford in 1695/6 and again in 1708/9.[93] This same website giving details of the mayor's family also notes that:

[90] Oswald, in 'Excavations in St Ebbe's', p. 262.
[91] Higgins, in *Ashmolean Museum Extension*.
[92] Price, 'John Taylor of Oxford'; R. Price, *Bristol Pipemaking Families of the 17th to 20th Centuries* (2013), working draft held at the National Pipe Archive, currently housed at the University of Liverpool.
[93] http://www.headington.org.uk/oxon/mayors/1603_1714/taylor_john_1695_1708.htm (accessed 10.1.11).

> *Taylor's family moved to St Mary Magdalen parish . . ., probably to the house on the site of Balliol College mentioned below. In 1665 two people in that parish called John Taylor paid tax, one on six hearths and another on three. The former may have been Taylor's father, and the latter the tobacco-pipe maker of the same name who lived in the parish. Similarly in March 1667 one John Taylor in that parish paid 5/– poll tax for himself, his wife, and his three children, and the other 3/– for himself, his wife, and his child.*

Price also concludes that the pipemaker John Taylor probably lived in the parish of St. Mary Magdalen, most likely in Magdalen Street.[94] His wife Jane was buried at St. Mary Magdalen on 22 September 1670 and John himself was buried there on 29 June 1684. Taylor had certainly been successful as a pipemaker since he left three properties in the city and another in the county in his will.

The documentary evidence clearly shows that Taylor had good connections within the early pipe making trade and that he had a successful career in Oxford. The historical record shows that he was apprenticed as a pipemaker at some point prior to 1643 (and most likely during the 1630s); that he took over a well-established business during the 1640s; became a freeman in 1649 and served as a councillor during the 1660s and/or 1670s before his death in 1684. Despite Taylor having been identified as an Oxford maker with a working life of some 40 years, Oswald only notes one other example of pipe stamped with his mark (from St Ebbe's), and that example lacks its bowl, with the result that it was incorrectly dated.[95] Since the St Ebbe's example was found, only one other example of a IOHN/TAY/LER mark has been noted, and that is on the stem of a spur bowl of *c.*1660–80 from Corpus Christi College, Oxford. What is significant about the Corpus Christi pipe is that the rest of the stem is also ornately decorated with a series of other stem stamps, making it an exceptionally elaborate and unusual piece.[96] The St Ebbe's stem fragment also had accompanying decoration and, like the new example from these excavations, it was only the bowl of the Corpus Christi bowl that was burnished. Given the rarity of these marks, the fact that they seem to be associated with high quality burnished and/or decorated pipes and the fact that Taylor is documented as a pipemaker for some 40 years, it seems clear that Taylor must only have marked his best quality pipes.

Although all three documented Taylor marks superficially appear to be the same, there are, in fact, at least two different dies represented, which can most readily be distinguished by small details of the lettering. The example from these excavations (Item 21) has been allocated die number 2285 in the National Pipe Stamp Catalogue and has the maker's name in three lines of relief script within a plain raised border. The distinguishing features of this mark are that there is a cross bar in the middle of the 'I' and that the serifs on the top bar of the 'T' project both above and below the horizontal. This mark appears to be the same as the (rather poor quality) photo of the St Ebbe's example published by Oswald. In contrast, the Corpus Christi example (Die 2127) does not have a central cross bar to the 'I' and the serifs at the top of the 'T' only project below the horizontal. The Corpus Christi bowl is slightly larger than the new example and has been dated around a decade later (*c.*1660–80 as opposed to *c.*1650–70). While the two examples could still have been contemporary products, the bowl form suggests that the Corpus

[94] Price, 'John Taylor of Oxford'.
[95] A. Oswald, 1975, *Clay Pipes for the Archaeologist*, BAR BS **14**, (1975), p. 80 and plate V, D.
[96] D.A. Higgins, 'A Clay Tobacco Pipe from Excavations at Corpus Christi College, Oxford, 2008 (OXCRIS 08), and the 'Oxford Style' of Stem Marking' (2011), unpublished report prepared for Oxford Archaeology.

Christi example is more likely to be slightly later in date and so Die 2271 may likewise be a little later in date than Die 2285.

??. One very fragmentary heel stamp was recovered from context 1153, part of the closely dated pit fill of *c.*1630–45. Only a tiny section of the border survives, and this may have been double-stamped. It does not, however, seem to match the border of the MH pipes, nine of which were also found in the pit. This fragment may provide evidence of another maker supplying marked pipes to the site at this time.

RG / GR. There are three later moulded marks, all of which date from the very end of the seventeenth century or first half of the eighteenth century and occur on tall rather cylindrical bowl forms. The letters are relief moulded on either side of the heel and the versions reading either RG or GR are considered together since occasionally the mould maker placed the initials the wrong way around from usual, so all three could represent the same maker. There is one bowl marked RG from context 1664 (Item 31) and one with the initials GR from context 1044 (Item 32). The third example has very faintly moulded initials that could possibly read GR and was found in context 1043 (not illustrated). Several other examples of both RG and GR pipes of this date have been recorded from Oxford previously and the initials are typically rather small and tend to be faintly cut. There are two pipemakers called Robert Gadney (father and son), who appear to have been prominent pipemakers and who are known to have worked in the town for at least 55 years from 1667–1722.[97] There are no known makers with the initials GR and so it is presumed that both arrangements of initials belong to these makers, especially since moulded marks were only just being introduced to southern Britain at the end of the seventeenth century and so the convention for placing them may not yet have been well established.

Conclusion

Quite apart from their value as dating tools for the excavated contexts, and as a benchmark for the future study of early pipe groups from the region, the pipes also provide an interesting reflection of early smoking habits in Oxford. Smoking was introduced to England towards the end of the sixteenth century but was initially confined to the wealthy because of the very high cost of tobacco at this date. Students at the Oxford colleges would have come from the right social background to be indulging in this new habit but, at the same time, may have been constrained by college rules and the well-known loathing of smoking expressed by James I. None of the very earliest pipes (*c.*1580–1610) were found on these excavations, although these are always very rare and dependant on deposits of the right nature and date surviving.

There are, however, pipes of *c.*1610–40 from the site, including good quality examples. This not only shows that smoking was becoming established in the colleges but also that well-made pipes would have been in demand. This would have encouraged pipemakers to set up business in the town and, by the 1630s, large numbers of pipes were being consumed on this site, as evidenced by what is only a partial sample from pit 1475. The majority of these appear to have been locally made, with the marked pipes of the well-connected pipemaker Miles Higges making up a significant proportion of them. Alongside the local products it is clear that high-quality pipes imported from the West Country were in use,

[97] Oswald, in 'Excavations in St Ebbe's', pp. 255 and 262.

showing that the market was sufficiently developed and nuanced for this to happen. The quantity of pipes present also suggests that the students were regularly smoking, whatever the social constraints on this may have been.

Plot specifically mentions the manufacture of tobacco pipes in Oxford using local clays during the Civil Wars of the 1640s, and so presumably demand was maintained despite the disruption to normal life caused by the fighting. Pit 1085 produced another large assemblage of pipes, this time straddling the Commonwealth and Restoration periods. Smoking seems to have remained as popular as ever in Oxford throughout this period, despite the rapidly changing and diametrically opposed social values that were sweeping the country.

Smoking had clearly become a well-established part of college life by the end of the seventeenth century, as is shown by a story relating to Henry Aldrich (1648–1710), who was the Dean of Christ Church. One undergraduate wagered a friend that he would find the Dean smoking at ten o'clock in the morning, but lost his bet because the Dean was only filling his pipe at the time.[98] This shows that it was not only the students, but also the tutors that had embraced this habit, thus sustaining the demand for pipes and their acceptance as a part of college life.

The pipes produced in Oxford are generally well made and finished and broadly follow London fashions. Pipemakers in the town appear to have been particularly well-connected and able to accumulate significant wealth, which is unusual. They also seem to have engaged with civic affairs and played a more active role within the town's administration than is typical (pipemakers were more normally relegated to the poorer margins of towns and to have been towards the bottom of the social scale).

One of the most significant findings of this study, however, has been the recognition of different fabric types that can be recognised using a hand lens. These are not only related to the changing clay sources used by the local pipemakers but also to the different origins of traded goods, as represented by the imported pipes. Most pipe production centres do not have this diversity of recognisable fabric types, while the information provided by Plot indicates two likely sources that can now be tested against the archaeological evidence. The seventeenth-century pipes from Oxford provide an unparalleled opportunity for an analytical scientific study to examine the exploitation and movement of pipe clays during this period.

Illustrations (Figs 14–16)

The illustrated fragments are shown at 1:1 with the die details of the stamped marks shown at twice life size. All the marks are in relief. The die numbers given for the stamped marks relate to the as yet unpublished national catalogue that is being compiled by the author. Burnished surfaces are indicated with light broken lines.

1. Pipe bowl of *c.*1610–30 with a bottered and milled rim and a very diminutive spur. The surface has a fine burnish and the stem bore measures 8/64". A very early spur form made of a fine fabric but with one large rounded inclusion of white quartz (*c.*0.75 mm) in the broken section. The broken sections have a grey core, suggesting reducing conditions in the kiln during firing – a characteristic often noted on other early pipes, including another early spur form from Oxford Castle.[99] Context 2019.

[98] E.F.A. Suttle, 'Henry Aldrich, Dean of Christ Church', *Oxoniensia*, **5** (1940), p. 135.
[99] Higgins, in Munby *et al*., *Oxford Castle*, fig. 7.34.1.

2. Spur bowl with a bottered and half milled rim. The surface is not burnished, and the finishing is quite poor, with a lop-sided bowl form and heavy-handed trimming. Stem bore 8/64". Context 1002.

Items 3–14 are all from deposits within Pit 1475, which was filled *c.*1630–45.

3. Neatly formed and finished spur bowl with a bottered and fully milled rim. Not burnished; stem bore 8/64". Same basic mould type as Item 4. Context 1153.
4. Spur bowl of the same type as Item 3, but with the spur trimmed short and at an unusual angle. Otherwise neat bowl form and finish. Bottered and fully milled rim; stem bore 8/64". Context 1474.
5. Spur bowl with a bottered and fully milled rim. The back of the bowl has a pronounced hump in it and the surface has a fine burnish. Stem bore 9/64". Context 1151.
6. Spur bowl with a very similar form to Item 3, except that it has a distinctive forward pointing spur. Bottered and fully milled rim. Stem bore unusually large at just over 10/64". Context 1151.
7. Spur bowl with a bottered and fully milled rim; quite a heavy-handed finish. Stem bore 9/64". Context 1143.
8. Heel bowl with a bottered rim but no milling and a finely burnished surface. The style is typically 'West Country' and the fabric is extremely fine without any obvious sandy inclusions, even under a 10x lens. This fabric is in contrast with that used for other bowl forms from the pit and supports this being an imported pipe, most likely from Wiltshire. Stem bore just over 7/64". Context 1151.
9. Heel bowl with a bottered and fully milled rim. Heel trimmed at a slanting angle from side to side. Stem bore 9/64". Context 1143.
10. Heel bowl with a bottered and fully milled rim. Joining stem giving 126 mm surviving. The fabric is very hard fired and so this pipe may have shrunk a little more than others in the group. Stem bore 9/64". Context 1153.
11. Heel bowl with a bottered and fully milled rim; quite a slender form. Stem bore 7/64". Context 1143.
12. Heel bowl with a bottered and fully milled rim. Unexpectedly large form for the period, but the bowl quite narrow when viewed 'end on'. Stem bore 8/64". Context 1151.
13 Heel bowl with a bottered and fully milled rim. Heel stamped with a ligatured MH mark (Die 1120) for Miles Higges of Oxford (married 1630; d. 1643). See also Item 15. Stem bore 9/64". Context 1151.
14. Heel bowl with a bottered and fully milled rim. Heel stamped with a ligatured MH mark (Die 339) for Miles Higges. Fabric has a granular fracture and contains very fine sand grains, visible under a 10x lens. Stem bore 9/64". Context 1151.
15. Heel bowl of *c.*1630–50 with a bottered and fully milled rim. Heel stamped with a ligatured MH mark (Die 339) for Miles Higges. A poorly designed heel with clear mould flaws on its right-hand side show that this pipe was made in a different mould to that used for Item 13, despite the similar profile. Stem bore just over 8/64". Context 1044.
16. bore are A stem fragment from a deposit of *c.*1640–60 with a neatly scraped cut into the stem made after firing, perhaps to make the pipe into a whistle. Both ends of this fragment broken and it has a stem bore of just over 8/64". Context 1067.

17. Heel bowl of *c.*1660–80 with a heart-shaped heel, which has been trimmed at a slanting angle when the pipe is viewed end on. The rim is bottered and fully milled. There is 86 mm of surviving stem (freshly broken), with a bore 8/64". Context 1197.

Items 18–27 are all from deposits within pit 1085, which was filled *c.*1650–70.

18. Spur bowl with a bottered and three-quarters milled rim. Stem bore 8/64". Context 1013.
19. Spur bowl with a bottered and fully milled rim. Stem bore 8/64". Context 1013.
20. Spur bowl with a bottered and fully milled rim. Stem bore 7/64". Context 1013.
21. Spur bowl with a bottered and three-quarters milled rim. The bowl has a fine burnish, but the stem is unburnished. There is a previously unrecorded variant of a relief IOHN/TAY/LER stamp for John Tayler of Oxford (d. 1684) across the top of the stem. Stem bore 8/64". Context 1013.
22. Heel bowl with a bottered and fully milled rim. Stem bore just over 8/64". Context 1084.
23. Heel bowl with a bottered and fully milled rim. Stem bore 8/64". Context 1013.
24. Heel bowl with a bottered and fully milled rim. Stem bore 7/64". Context 1013.
25. Heel bowl with a bottered and fully milled rim. There is an accidental cut into one side of the stem surface (pre-firing) at about 62 mm form the bowl, where the stem has later broken. Stem bore just under 8/64". Context 1084.
26. Heel bowl with a bottered and fully milled rim. The pipe has a reduced grey core, just being oxidised on the very outer surface, and it has a good, well-made form with a previously unrecorded TR stamp (Die 2227) on the heel. The mark is boldly cut and can be attributed to Thomas Reeve of Oxford, who is recorded as a pipemaker from at least 1667–1700 (Oswald 1984, 262). Stem bore 8/64". Context 1084.
27. A stem fragment that has been alternately pinched by the pipemaker while still in a plastic state to create a 'barley twist' effect. The stem has also been given an average-quality burnish. The stem bore is distorted from squeezing but would have been about 8/64". Context 1013.
28. Heel bowl of *c.*1680–1720 with a bottered and one-quarter milled rim. The surface has a good-quality burnish; there is no internal bowl cross. The fabric has fine sandy inclusions, visible with a lens. Stem bore 7/64". Context 1044.
29. Heel bowl of *c.*1690–1730 with an internally trimmed and bottered rim but no milling. The surface has a poor-quality burnish; there is no internal bowl cross. The stem survives to 102 mm in length and warps slightly to the smoker's right. The fabric has fine sandy inclusions, visible with a lens. Stem bore just over 7/64". Context 1036.
30. Heel bowl of *c.*1690–1730 with an internally trimmed and bottered rim but no milling. The has a good-quality burnish; there is no internal bowl cross. The fabric has very fine sandy inclusions, visible with a lens. Stem bore just over 6/64". Context 1272.
31. Heel bowl of *c.*1690–1750 with an internally trimmed and bottered rim but no milling. The surface has a fine-quality burnish; there is no internal bowl cross. There are a few very fine sandy inclusions in the fabric, visible with a lens. The maker's initials RG for one of the Robert Gadneys of Oxford are relief moulded on the sides of the heel. Stem bore just over 6/64". Context 1664.
32. Heel bowl of *c.*1690–1750 with an internally trimmed and bottered rim but no milling. The surface has a fine quality burnish; there is no internal bowl cross. The pipe has fine sandy inclusions in the fabric, visible with a lens. The maker's initials GR are relief

moulded on the sides of the heel, probably having been cut the wrong way round from usual for one of the Robert Gadneys. Stem bore just over 6/64”. Context 1672.

5 METALWORK *BY LEIGH ALLEN*

A total of 1315 identifiable metal objects were recovered, comprising 389 copper alloy objects, 911 iron objects and 15 lead objects. The ironwork is in poor condition, many of the objects are fragmentary and highly corroded, and the assemblage has been x-rayed to aid identification. The objects have been recorded onto an Access database. Items from the following functional categories have been identified: dress accessories (including 110 pins and 188 lace tags), objects associated with books and writing, household items, horse gear, lock furniture, tools, fixtures and fittings and structural objects (including 816 nails). The notable finds are discussed below by phase. The coins, tokens and jetons have been reported on separately (see below).

Only a small number of metal finds came from the pre-college phases and these comprise items of horse gear, lock furniture and knives. The bulk of the assemblage was recovered from Phases 2b to 4a, from contexts dating from the late medieval to the later post-medieval periods, predominantly from quarries and pits used for rubbish disposal. Notable categories include the hooked clasps (10) associated with books and learning at the college; knives (38) and spoons (3) for kitchen use or college dining, and horse gear including spurs (6), harness fittings (7) and horseshoes (6) associated with stabling within the college or nearby.

Phase 1 (Late Ninth to Eleventh Century)

The earliest metal finds from the site include lock furniture, horse gear and knives. The very corroded remains of a hollow iron key stem came from context 1453 (pit 1451). The bit is missing and only part of the simple ring bow survives; the ends of the bow have been inserted into the end of the stem. This type of key, for use with a mounted lock, dates from the ninth–fourteenth century.[100] A pivoting fin from a barrel padlock case came from context 1526 (pit 1527); it would have been set between the end plates as additional strengthening.[101] Barrel padlocks were used for securing items such as chests, caskets, doors and shutters. They are known from pre-Conquest contexts and probably did not continue in use much after the twelfth century.[102] Pit 1657 produced the arm from a horseshoe, a fragment from a strap-hinge and a knife. The horseshoe arm (context 2090) has two circular holes set in rectangular countersinking's, a broad web and a smooth outside edge there is no calkin at the heel. This form of shoe dates from the pre-conquest period but continues in use into the twelfth century.[103] The strap-hinge fragment (2090) is curved at one end and would have fitted over the hinge pivot on a door or shutter. The knife fragment (1687) is a short length of tang and blade from a whittle tang knife. A more complete whittle tang knife was recovered from context 1697 (pit 1694). It has a centrally placed tang and a blade back that rises slightly before it angles down to the tip. Knives of this form (Goodall type A)[104] date from the tenth–

[100] I.H. Goodall, 'Locks and Keys', in M. Biddle, *Object and Economy in Medieval Winchester* (1990), p. 1007, type 3.
[101] I.H. Goodall, *Ironwork in Medieval Britain: An Archaeological Study* (London, 2011), type A2.
[102] Ibid., p. 231.
[103] J. Clarke, *The Medieval Horse and its Equipment c.1150–c.1450*, Excavations in London **5** (1995), type 1, pp. 93–5.
[104] I.H. Goodall, 'Knives', in Biddle, *Object and Economy in Medieval Winchester*, pp. 835–60.

thirteenth centuries. Pit 1894 produced an undiagnostic blade fragment and a small rectangular staple.

Phase 2a (Twelfth to Thirteenth Century)

Phase 2a contexts mainly produced items of horse gear, lock furniture and knives, recovered from pits 1413, 1499, 1557, 1708 and 2208. The horseshoe arm (context 1404) from pit 1413 is the same type as the one recovered from Phase 1 although this fragment is larger with three nail holes and an estimated width of 105 mm. Part of a padlock bolt and a U-shaped staple came from context 1510 (pit 1499) The lock bolt has a circular closing plate for use with a barrel padlock (see above), and the remains of four spines are attached to the plate. A small fragment from a horseshoe arm came from context 1568 (pit 1557); this has two circular holes with rectangular countersinkings. A 'fiddle key' horseshoe nail with a semi-circular head the same width as the shank came from context 1709 (pit 1708). This type of nail was designed for use on horseshoes with rectangular countersinkings. The corroded remains of a possible knife, identified by the presence of a copper alloy shoulder plate, was recovered from context 2212 (pit 2208).

Phase 2b (Fourteenth to Mid Fifteenth Century)

A large assemblage of metalwork (347 objects) was recovered from late medieval contexts. This is mostly due to an increased number of iron nails (195) and dress accessories (including 65 lace tags and 16 pins) from this phase. Horse gear, lock furniture, knives and fixtures and fittings are again present in this phase, with most of the metalwork coming from pits 1538, 1772, 1920 and 2105.

The horse gear from pit 1538 comprises a horseshoe fragment and a spur buckle. The horseshoe arm has a plain outline and two rectangular nail holes through it. It is a characteristic 'late medieval' type.[105] The spur buckle has a trapezoidal frame with a central bar (an identical example can be seen attached to the spur from context 1067, Phase 3b). Fragments from four scale-tang knives were recovered from pit 1538, all very corroded, but each with the back of the tang and the blade in line and the cutting edge rising very gently to the tip. They all have small rivet holes through the tang, some with copper alloy rivets still *in situ*. One knife also has a copper alloy shoulder plate still in place and another has a nib at the butt end for a now lost end cap. This form of knife dates from the thirteenth to the sixteenth century.[106] A hinge-strap curved at one end and with four perforations (one with a rivet still through it for attachment) was recovered from context 2335. Dress accessories are dominated by the large number of lace tags and pins with wire wound heads. Commonly found in large quantities in late medieval and post-medieval contexts they were used to secure light clothing and head dress. Other dress accessories from pit 1538 include two small iron buckle frames, one oval and the other circular, and a near-complete purse frame. The purse frame has an oval frame with a bar at the top and the corroded remains of a swivel ring so that the purse could be suspended from a belt. Purses of this type date to the fifteenth–sixteenth century.[107]

[105] Clarke, *The Medieval Horse and its Equipment*, type 4.
[106] Goodall, *Ironwork in Medieval Britain*, type Q.
[107] S. Margeson, *Norwich Households: The Medieval and Post Medieval Finds from Norwich Survey Excavations 1971–1978*, East Anglian Archaeological Report **58** (1993), pp. 40–3, fig. 23, no. 292.

Dress accessories, a key and a knife were recovered from pit 1772. The dress accessories comprise three lace tags, a very small D-shaped lead buckle frame (context 1833) and a cast copper alloy rectangular buckle frame (context 1805) with a wrap-around pin that has a simple moulding at the shoulder. The key (context 1805) is for a mounted lock; it has a D-shaped bow and a solid stem which extends beyond the simple bit. A fragment from a scale tang knife handle was recovered from context 1776. It has a moulded copper alloy end plate and rivet through the tang.

A decorative hooked plate and a strap end were recovered from pit 1920 (context 1917). The circular hooked plate has a lobate edge and a central perforation for attachment. The strap end is a simple folded type with a single rivet hole through it.

Pit 1939 produced a cross-pane hammer head with a rectangular section, a flat underside and cheeks either side of the eye. This type of hammer was used in the for the working of iron by blacksmiths and farriers.[108]

Pit 2003 produced part of a strap-hinge and a very corroded arm from an iron spur. The arm has a D-shaped section with part of the perforated terminal surviving.

Pit 2105 produced a buckle, a key, two knives and a spur fitting. The composite buckle has rigid plates and forked spacer; the plates have slightly concave ends with a round, grooved aperture on the front. This type of buckle dates to the mid-fourteenth–early fifteenth century.[109] The key fragment is just a sliver from the stem and bit of a key for a mounted lock. The two knives are in reasonable condition. One is a whittle tang knife, the other a scale tang knife. The whittle tang knife has a centrally placed tang and a blade back and cutting edge that run parallel; the blade back dips slightly to the tip and the blade edge rises to meet it. This form of knife is found throughout the medieval period but is particularly common in the twelfth and thirteenth centuries.[110] The scale tang knife has a damaged blade, but the handle is intact (Fig. 17, no. 5). It has a moulded shoulder-plate and end-cap with a pointed terminal (copper alloy). There are four rivets through the tang to attach the scales and around one rivet the x-ray shows tiny copper alloy pins decorating the scales. This type of knife dates from the late fourteenth century onwards.[111] The spur fitting is a small hooked plate for attaching leathers to a spur. It is a circular disc with a backward-facing hook at the top to attach to the spur and a forward-facing hook at the bottom to hold the leathers in place.[112] Pit 2105 also produced 28 fragments of copper alloy waste in the form of very small fragments of scrap sheet metal and off-cuts, ranging in size from 6–17 mm. These fragments may indicate small-scale domestic metalworking although no evidence of any associated material such as slag or crucible fragments was recovered from this feature.

Pit 2109 produced a small whittle tang knife (context 2115) with a centrally placed tang and a very worn blade.

Pit 2114 also produced a whittle tang knife (context 2114). The tang appears complete but very little of the blade survives.

[108] Goodall, *Ironwork in Medieval Britain*, p. 14, fig. 2.5, A29
[109] G. Egan and E. Pritchard, *Dress Accessories c.1150–c.1450*, Medieval finds from Excavations in London, 3 (1991), pp. 78–82, fig. 49.
[110] Goodall, *Ironwork in Medieval Britain*, type D, 106.
[111] J. Cowgill, M. de Neergaard and N. Griffiths, *Knives and Scabbards*, Excavations in London, 1 (1987), pp. 86–100, fig. 63.
[112] Clarke, *The Medieval Horse and its Equipment*, pp. 149–50, fig. 106, nos 369–71.

Layer 1294 produced a whittle tang knife, a key and a catch plate from a book clasp. The knife has a near-complete blade with a blade back that steps up from the tang then runs straight and parallel with the cutting edge. The cutting edge rises at the tip.[113] The key is also complete although very corroded. It has a ring bow, a solid stem and a simple bit. The catch plate is for use with a hooked clasp on the cover of a book. It is shield shaped with a rectangular slot at the top (to receive the hook) and three rivets for attachment. A similar catch plate was recovered from excavations at St Aldates.[114]

Phase 3a (Late Fifteenth to Sixteenth Century)

Phase 3a contexts produced the greatest number of metalwork finds from the site (385 objects) and a greater variety of objects compared to previous phases. Book clasps and items associated with writing appear for the first time, there are more items associated with horse harness amongst the horse gear and the tools include shears as well as a large number of knives. The numbers of lace tags, pins and nails are also greatly increased. The majority of the finds came from the fills of pits 1053 and 1353 and layers 1025, 1032, 1295 and 1345.

Pit 1053 produced a copper alloy catch plate, an iron purse or bag frame and the arm from a pair of shears. The tongue-shaped catch plate has a rectangular slot at the top to receive the hook of the book clasp and two rivets to secure it to the book cover. The bag frame consists of an L-shaped strip with a loop at the end and a line of small rivet holes running along the inside edge to attach the fabric of the bag. The shears have a looped bow and plain blade top. Shears come in a variety of sizes to suit the differing functions for which they were used; small shears for cutting thread and hair and larger examples (such as these) for shearing or cutting cloth. Shears were in common use throughout the medieval period.

Pit 1057 contained two items of lock furniture: a box padlock with hinged shackle of late medieval date[115] and a cylindrical barrel padlock case with an L–shaped arm.[116]

Pit 1072 produced a hinge pivot and the cast frame from a composite mount. The circular mount has two integral rivets and would originally have had a central decorative roundel possibly bearing a coat of arms. The mount could have been for decorating a horse harness or possibly a sword belt.[117]

Pit 1099 yielded a horse harness buckle and an arm from a small pair of shears. The buckle is rectangular and has a sheet metal roller around the outside edge, enabling easier and tighter fastening of the leather straps of the harness. The shear arm is small with a simple loop at the top. Shears of this size would probably have had a domestic function such as cutting thread or hair.

Pits 1215 and 1319 produced a buckle and a book clasp respectively. The buckle has an elongated D-shaped frame and a folded plate around the central bar. The book clasp fragment is the upper hooked plate from a fan-tailed book clasp with a scalloped edge where it would have been riveted to a strap and fine incised grooves decorating the upper face.

[113] Goodall, *Ironwork in Medieval Britain*, type C.
[114] A.R. Goodall and I.H. Goodall 'Copper alloy objects' in B. Durham, 'Archaeological Investigations in St Aldates, Oxford', *Oxoniensia*, 42 (1977), pp. 148–9, fig. 30, no. 31.
[115] I.H. Goodall, 1993, 'Lock Furniture, hasps and keys' in S. Margeson, *Norwich Households*, p. 157, fig. 115, no. 1240.
[116] Goodall, 'Locks and Keys', in Biddle, 'Object and Economy in Medieval Winchester', pp. 1002–3, fig. 313, no. 3667.
[117] Egan and Pritchard, *Dress Accessories c.1150–c.1450*, pp. 181–4.

Hooked clasps would have been attached to leather straps on the covers of books and would have hooked over a catch plate on the opposite cover to keep the book closed.

Pit 1353 produced two book clasps and a lead writing stylus, buckles, a rowel spur and a number of knife fragments. Fixtures and fittings including chain links and a hooked plate and numerous fragments of lead window came were also recovered from the fills of the pit.

The two large and highly decorated hooked clasps from pit 1353 were recovered from contexts 1365 and 1385. They are both complete and have an upper hooked plate and a lower rectangular back plate attached by rivets. The attachment ends of the two clasps differ slightly in that SF 111 (Fig. 18, no. 6) has a cinquefoil open-work design at the end and SF 116 (Fig. 18, no. 7) has a simple V-shaped notched design. SF 116 also has a protruding loop at the hooked end with a perforation through it for holding a leather thong (an additional means of keeping the book closed). The decoration on the upper face of the two clasps is, however, identical. Small V-shaped notches run along the edges with a band of circular indentations below. The central decoration comprises very fine incised concentric grooves with circular indentations inside encircling five larger indentations in a cross shape. It is possible that the two clasps come from the same book cover. Interestingly a folded strap-end from context 1022 (Phase 3b) has the same decoration on the upper face and a hooked clasp with identical decoration was recovered from the recent excavations at the Westgate Centre, Oxford.[118] We are perhaps seeing the hand of a local metalworker producing items with a trademark decoration. Book clasps have a wide distribution on both secular and ecclesiastical sites and are found throughout the late medieval and post-medieval periods. A lead writing stylus was also recovered from pit 1353. It has a circular section and a rounded point and would have been used for writing on wax tablets.

The four dress accessories from pit 1353 comprise a double oval iron buckle frame, a double oval lead buckle frame, a copper alloy buckle plate with two rivets for attachment and a rectangular mount with a circular hole at the centre, possibly for a decorative rivet, and four small rivets in the corners for attachment.

A rowel spur (Fig. 17, no. 1) from pit 1353 has a twelve-pointed rowel still *in situ*. The spur has a short, slightly angled down neck and arms that curve slightly to fit under the wearers ankle. The arms have figure-of-eight shaped terminals at the end and at the heel there is small flange. Rowel spurs with multi-pointed rowels became popular in the later fourteenth century.[119]

The three knives from pit 1353 are a scale tang knife with three rivets through the tang, a very corroded folding pocket knife and a blade tip fragment. Pocket knives have folding blades in sprung handles, closed along the back with metal side plates. In this example the blade is extended. Pocket knives which evolved into the modern penknife are a post-medieval development.[120]

Pit 1388 produced an arm from a small set of shears (context 1012). They are of simple design with a looped top and plain blade top.

Pit 1358 produced a simple folded strap-end with a single rivet (context 1573).

Layer 1025 produced two very corroded knife fragments and two strap fragments from pinned hinges. The knife fragments are from a scale tang knife (with two rivet holes

[118] L. Allen (forthcoming).
[119] B. Ellis, 'Spurs', in Biddle, *Object and Economy in Medieval Winchester*, p. 1038.
[120] Goodall, 'Locks and Keys', p. 839.

through the handle) and a whittle tang knife. The hinge plates each have a single looped projection at the end to fit over the hinge pin and perforations through the plate to attach it to the door, cupboard or chests.

Layer 1032 produced a book clasp, dress accessories, a harness mount, a key and two knives. The book clasp is small and rectangular with two deep V-shaped notches at the strap end and a single rivet for attachment. The upper face has a loop projecting from it but is otherwise undecorated. The dress accessories comprise a triangular belt stiffener and a D-shaped buckle frame. The large circular harness mount or bridle boss has a domed centre with a perforation through it for a rivet. The large key has a kidney-shaped bow, a hollow stem and a simple bit. The x-ray plate shows the ends of the bow inside the stem. The two knives are very corroded. One is a complete whittle tang with a blade back that steps up from the tang then runs straight and parallel with the cutting edge. The cutting edge rises at the tip.[121] The second knife is from the tang of a scale tang knife with a bolster at the shoulder. This thickening of the tang was first introduced in the sixteenth century.[122]

Layer 1295 produced a number of fixtures and fittings and a scale tang knife. The fixtures and fittings comprise a hinged and stapled hasp, a U-shaped staple and a wall hook. The knife has three rivet holes through the handle, one with a rivet still *in situ*; the blade is damaged and incomplete.

Layer 1345 produced a buckle, parts of a bridle bit and a fragment of decorative lead openwork. The buckle has a double oval frame with part of the folded plate corroded around the central bar. Two links from a single jointed snaffle bit were recovered. Each link has a loop at either end and a sheet metal cover around the central section. The decorative openwork fragment is a corner piece. It has a flat back and could have decorated a chest or casket, or even used to cover a vent or aperture.[123]

Other finds recovered from layers include the front plate from a hooked book clasp with a gently scalloped fantail-end and concentric circle decoration (Fig. 18, no. 8); a double oval belt fitting with an integral suspension loop (context 1182) that may have been used to suspend a dagger from a belt;[124] two horseshoes and two knives. The horseshoes are of two different types. The fragment from context 1078 has a narrow web, lobate profile and large lozenge-shaped holes; the fragment from context 1174 has a wide web and rectangular holes. The knife fragment from 1174 is just a piece of a scale tang with two rivets still *in situ*. The knife from context 1202 is a near-complete whittle tang knife with a blade back that rises from the tang then angles down from the shoulder to meet the cutting edge.[125] This type of knife dates from the twelfth–fifteenth century.

Phase 3b (Seventeenth Century)

The large assemblage of metalwork (276 objects) from Phase 3b contexts is again dominated by iron nails (277), pins and lace tags. The remaining identifiable objects comprise book clasps, dress accessories, fixtures and fittings, horse gear and knives as seen in previous phases, but

[121] Goodall, *Ironwork in Medieval Britain*, type C.
[122] Goodall, 'Locks and Keys', p. 839.
[123] J. Geddes, 'The small finds', in J.N. Hare, *Battle Abbey. The Eastern Range and the Excavations of 1978–80*, HMBC Archaeological Report 2 (1985), pp. 154–5, fig. 48, 1A and 1B.
[124] Margeson, *Norwich Households*, p. 28, fig. 17, no. 78.
[125] Goodall, *Ironwork in Medieval Britain*, type F.

in addition there were three slip spoons recovered. The majority of the material came from pits 1069, 1085, 1106, 1386, 1475 and layer 1003.

A spur and a length of decorative copper alloy wire mesh came from pit 1069. The rowel spur (Fig. 17, no. 2), although heavily corroded, is nearly complete with only the rowel itself missing. The short neck is bifurcated to receive the rowel and angles downwards, the arms are straight and taper towards the figure-of-eight shape terminals. Both terminals have attachments for leathers, one has a trapezoidal shaped buckle through it. This type of spur dates to the sixteenth–seventeenth century.[126] The decorative mesh (SF 8) is made of fine wire that has been looped, coiled and twisted to form a foliage pattern. It is very light and could have been used to decorate head dress, clothing (such as a decorative braid) or possibly a book cover.[127]

Pit 1085 produced a spur, a key and two spoons. The rowel spur (SF 12) has a short slightly drooping neck with the rowel still in place. The arms curve deeply to fit under the wearers ankle and there is a slight flange at the heel. This type of spur was in use from fourteenth century onwards. The small copper alloy key from fill 1013 has a kidney-shaped bow, a solid stem and a corroded bit. It would have been designed for use on a cupboard or small chest. The two spoons (Fig. 17, nos 3–4) have simple slip top ends to the handles and fig-shaped bowls. The longer handled spoon (SF 26) has a maker's mark 'iI' on the back. Slip top spoons are listed in a grant of college plate to the king in 1642–3 to help fund the fortification of Oxford. The college parted with '36 tankers, 14 two-eared potts, 3 white large bowles, 20 lesser bowles, many saltes, large and small tunnes, guilt bowles, goblets and spoons apostle, slip and guilt'.[128]

Pit 1106 produced two knives. The fragmentary remains of a scale tang knife recognisable by a rivet hole through the surviving length of tang came from fill 1108, and a whittle tang knife with a bolster at the shoulder came from context 1112.

Pit 1386 produced a stirrup, a stylus and a spoon bowl. The stirrup (SF 50) has an asymmetrical bow broadening out towards the lozenge-shaped foot plate. At the top part of the box survives with a perforation through the side. This would have had a rod through it to attach the leathers to. A stirrup of this design was recovered from Winchester from a mid-sixteenth–late seventeenth century context.[129] The lead stylus is pointed at one end and flattened at the other. The pointed end was for writing and the flattened possibly for marking out lines or erasing mistakes.[130] Only the figleaf-shaped bowl of the lead spoon from fill 1387 survives.

Pit 1475 produced a book clasp, a belt fitting, a drape ring and a hinge strap. The book clasp (Fig. 18, no. 9) is a two-part hinged clasp with a decorated hooked plate and a plain tongue-shaped plate perforated for attachment to the book cover. The decoration comprises ring and dot design and bands of small circular indentations. A similar clasp was recovered from excavations at Hinxey Hall, Queen Street, Oxford.[131] The belt mount or stiffener has two

[126] Ellis, 'Spurs', p. 1038, fig. 331, no. 3872.
[127] Egan and Pritchard, *Dress Accessories c.1150–c.1450*, p. 294.
[128] J.R. Magrath, *The Queens College*, Volume 1 (1921), p. 260.
[129] I.H. Goodall, 'Stirrups', in Biddle, *Object and Economy in Medieval Winchester*, pp. 1042–3, fig. 332, no. 3879.
[130] Biddle and Brown, in Biddle, *Object and Economy in Medieval Winchester*, pp. 735–8
[131] I.H. Goodall, 'Copper and lead objects', in C. Halpin, 'Late Saxon Evidence and Excavations of Hinxey Hall, Queen Street, Oxford', *Oxoniensia,* 48 (1983), p. 63, fig.14, no.8.

symmetrical lobes with a raised ridge in between and two spikes on the back for attachment to the belt or harness.[132] The iron key (SF 87) has a kidney-shaped bow with two internal prongs, a stem with moulded collars and a simple bit. The last two objects are fixtures and fittings; a drape ring and the looped end from a strap hinge with three perforations in the strap to attach it to the door or window.

Pit 1484 produced a three-way (possibly four-way) strap distributor for harness. It has a central ring with three riveted plates attached to it, which would have held the ends of the straps.

Pit 1870 produced an ornate hooked tag for securing light clothing. It has a rectangular slot at the top and is decorated with an openwork spray of roses in a corded border. The hook is missing. An almost identical example was recovered from London in a fifteenth–sixteenth century context.[133]

Objects recovered from Phase 3b layers include a knife and a knife finial from context 1003, and two strap-ends from contexts 1022 and 1024. The knife is incomplete and only a corroded section of the blade survives. The cast horse's hoof finial is from a scale tang knife; it is so called because one end is horseshoe shaped with four circular indentations to signify nails. Finials such as these became popular in the late fifteenth and early sixteenth century and the hoof design was one of the more popular.[134] The strap end from context 1024 is a simple square folded type with two rivets for attachment and two circular holes for decoration. The other strap end from context 1022 (Fig. 18, no. 10) is another simple folded sheet metal strap end with two rivets for attachment. However, the upper face of this example is highly decorated with V-shaped notches along the edges and fine incised concentric circles with circular indentations in between, identical to the decoration seen on the book clasps from pit 1353.

Phase 4a (Early to Mid Eighteenth Century)

A large number of nails (156) were once again recovered from this phase, dominating the ironwork assemblage (248 objects). The number of lace tags has decreased from previous phases, but the number of pins has increased. Other than nails, lace tags and pins there are only 18 other identifiable objects comprising book clasps, dress accessories, fixtures and fittings, horse gear, lock furniture and household items. These were mainly recovered from pits 1046, 1187, 1258 and 1665 and layer 1272.

A buckle frame, two tacks and a knife were recovered from the fills of pit 1046. The oval buckle frame has an ornate moulded outside edge.[135] The tacks both have round flat heads decorated with a row of raised bobbles around the edge. They would have been used as upholstery tacks or as decorative tacks on a chest as part of a larger design. The pocket knife from context 1043 has a folding blade set in a sprung handle, closed along the back. It has metal side plates that would originally have had organic scales attached.

Pit 1187 produced a book clasp, a tack, a spoon handle and two knives. The book clasp is a small rectangular clasp with a hooked end, a sprung back plate and a scalloped attachment end. There are two rivets for attachment and two further circular perforations that are

[132] Margeson 1993, fig. 23, No. 287.
[133] G. Egan, 2005, *Material Culture in London in the Age of Transition. Tudor and Stuart Period Finds c.1450–c.1700 from excavations at riverside sites in Southwark*, MoLAS Monograph 19, pp. 42–4, fig. 25, no. 155.
[134] S. Moore, *Cutlery for the Table: A History of British Table and Pocket Cutlery*, (Sheffield, 1999), p. 71.
[135] Egan and Pritchard, *Dress Accessories c.1150–c.1450*, pp. 72–3, fig. 44, no. 294.

decorative. The decorative tack is identical to the two from pit 1046 with a row of raised bobbles around the head. The possible spoon handle has a rounded hexagonal section, but it is broken at both ends. The two knife fragments are from scale tang knives.

Pit 1213 produced an open-ended tailor's thimble with a slightly tapering profile and plain bands at the top and bottom enclosing a panel of indentations. Thimbles with open ends allow pins and needles to be picked up more easily.[136]

A very small D-shaped buckle with a pin was recovered from pit 1258 (fill 1188). It would probably have been used to secure light clothing. A fragment from a blade also came from this context.

Pit 1665 produced the flared circular base from a candlestick holder.[137]

Pit 1845 produced a fan-tail book clasp. This is rather damaged, but has a hooked end, a sprung back plate and two rivets for attachment to a strap. It is decorated with fine incised lines running the length of the plate and a circular perforation.

Objects recovered from layers include a thimble and a key from context 1272, a bell from context 1001, a tack from context 1129 and a rowel spur from context 1223. The thimble is straight sided but very damaged. The key is also very damaged and has a ring bow with internal mouldings and a solid shank; the bit is missing. The sheet metal bell is incomplete, and all that remains is the lower hemisphere with its dumbbell-shaped aperture. The small tack is plain with a slightly domed head and could have used for decorating a belt or strap.[138] The rowel spur has a short drooping neck with the corroded rowel still in place. The arms angle slightly downwards and the one surviving terminal is figure-of-eight shaped and has part of a spur buckle still attached.

Illustration Catalogue (Figs 17–18)

1. **Rowel spur**, iron, incomplete, L:120 mm. SF 121, Ctx 1377, Phase 3a
2. **Rowel spur**, iron, near complete, L:95 mm. SF 9, Ctx 1067, Phase 3b
3. **Spoon**, copper alloy, incomplete, L:115 mm. SF 27, Ctx 1083, Phase 3b
4. **Spoon**, copper alloy, complete, L:175 mm. SF 26, Ctx 1084, Phase 3b
5. **Scale tang knife**, iron and copper alloy, incomplete, L: 152 mm. SF 199, Ctx 2063, Phase 2b
6. **Decorated book clasp**, copper alloy, complete, L:46 mm. SF 111, Ctx 1365, Phase 3a
7. **Decorated book clasp**, copper alloy, complete, L:40 mm. SF 116, Ctx 1385, Phase 3a
8. **Decorated book clasp**, copper alloy, incomplete, L:56 mm. SF 24, Ctx 1171, Phase 3a
9. **Decorated, hinged book clasp**, copper alloy, complete, L: 35 mm. SF 25, Ctx 1151, Phase 3b
10. **Decorated strap-end**, copper alloy, complete, L:31 mm. SF 3, Ctx 1022, Phase 3b

[136] M. Biddle and L. Elmhurst, 'Sewing Equipment' in Biddle 'Object and Economy in Medieval Winchester', pp. 804–5, fig. 235, 2502.
[137] Egan, 'Material Culture in London in the Age of Transition', pp. 127–8, fig. 122, no. 609.
[138] Egan and Pritchard, *Dress Accessories c.1150–c.1450*, p. 171, no. 824.

6 WORKED BONE OBJECTS *BY LEIGH ALLEN*

Sixteen worked bone or antler objects were recovered. The assemblage comprises personal objects, domestic items, components from musical instruments, handles from knives and a writing implement. A number of off-cuts of both bone and antler were also recovered and indicate possible small-scale bone working on the site.

Phase 1 (Late Ninth to Eleventh Century)

A fragment of the connecting plate from a composite bone comb was recovered from context 1406, fill of pit 1411. The plate has two perforations through it, one with an iron rivet still *in situ*. The top edge of the plate is very slightly curved, the bottom edge is straight and has widely spaced V-shaped notches running along it which probably correspond to the cutting or recutting of the teeth. The fragment is undecorated but is highly polished and could be from a double- or single-sided comb.

An awl fashioned from a deer antler tine came from context 1743, fill of cellar pit 1657. The point is smooth and rounded through use; the upper end or handle is incomplete. Awls are used for making holes in soft material such as leather.

Two miscellaneous fragments of worked bone and one of antler were recovered from the fills of pit 1525. They comprise a small conical fragment from the end of an antler with a straight cut end and cut marks on the body, a flat polished fragment from a large mammal long bone and a cut fragment from a horse metapodial.

Phase 2b (Fourteenth to Mid Fifteenth Century)

Three bone objects were recovered from Phase 2b contexts. Two are bone scales from scale tang knives and the third is a fragment from a spectacle frame. The bone scales are from ctx 2336, fill of pit 2168 and ctx 2337, fill of pit 1538. The first is a plain flat scale tapering towards one end where it is chamfered to fit under the shoulder plate. It has three small rivet holes spaced out along its length, one still with an iron rivet *in situ*. Towards the butt end there is a large circular perforation, possibly so that the knife could be suspended from a belt. The second scale is rectangular and is simply decorated with a central raised ridge running the length of the scale with a groove running along the centre. There are four small copper alloy rivets in the scale to attach it to the tang. The third object is from ctx 2063, fill of pit 2105. This is a curved fragment with an internal groove, possibly a fragment from the rim of a bone spectacle frame. The groove would have held the lens in place. A more complete set of spectacle frames was recovered from Trig Lane, London, dated to the mid fifteenth century.[139]

Phase 3a (Late Fifteenth to Sixteenth Century)

Eight bone items were recovered from Phase 3a contexts, comprising a stylus, two musical instrument pegs, two whittle tang handles, a needle and two miscellaneous fragments. The neatly turned bone stylus (Fig. 19, no. 3) has a spherical head and a sharp pointed tip. The object has been broken in antiquity and resharpened. It would originally have terminated in a rounded end with a metal point in it. These objects are common finds on scholastic and ecclesiastical sites and were used for writing on wax tablets.

[139] A. MacGregor, *Bone, Antler, Ivory and Horn. The Technology of Skeletal Materials since the Roman Period*, (1985), p. 122, fig. 65.

The tuning pegs are of two different forms. The first (Fig. 19, no. 2) has a square head, a cylindrical shaft and a perforation for the string at the end of the shaft indicating that this a type of peg was used on an open-framed instrument such as a harp, lyre, lute or fiddle. The second peg (Fig. 19, no. 1) also has a square head and cylindrical shaft but the perforation for the string is just below the head indicating that it is from a closed box-like instrument such as a psaltery (a member of the zither family). Large numbers of instrument pegs were recovered from excavations at 79–80 St Aldates, Oxford, where it is believed there was a small production site in the fourteenth and fifteenth century.[140]

The whittle tang handle fragments came from pit 1388 (fill 1012) and layer 1239. The first has a square section and is decorated on the one surviving face with large incised crosses and grooves. A handle with a similar decoration was recovered from Norwich from a late twelfth–late thirteenth century context.[141] The second handle fragment has an oval section and is highly polished but otherwise undecorated.

An incomplete needle came from fill 1300 of pit 1319. It has a square, flat section, a rounded head and a long oval eye. The eye has an opening at the side which appears deliberate. The incomplete shaft has a small circular perforation through it. It may have been used for threading ribbons or laces.

Two fragments were recovered from fill 1987 of ditch 1988 and fill 2034 of pit 2031. One is a crudely cut conical fragment of antler and the other is a flat cut fragment with two chamfered edges.

Phase 3b (Seventeenth Century)

Two whittle-tang handles and three miscellaneous fragments of worked bone were recovered from Phase 3b contexts, all from fills of pit 1085. The two handles are both cylindrical, expanding slightly towards the butt end. One is highly polished with a separate plug inserted into the butt end. The other is decorated with deep V-shaped notches at the butt end and transverse grooves randomly spaced over the body of the handle. The miscellaneous fragments comprise a wedge-shaped fragment with a polished upper surface, a thin slightly curved strip with incised grooves decorating the inside surface and a thin fragment of bone inlay incised with the faint outline of a face. The face has prominent nose and lips and bouffant curled hair reminiscent of the hair styles and wigs of the seventeenth–eighteenth century.

Phase 4a (Early to Mid Eighteenth Century)

An apple corer, a needle case and a miscellaneous worked fragment were recovered from Phase 4a contexts. The corer came from fill 1646 of pit 1648. It is made from a sheep metapodial with the proximal end and much of the posterior surface cut away to form a gouge. It could also have been used to test the ripeness of cheese.[142] The handle is decorated with a large incised cross with two grooves below. These objects date to the seventeenth–eighteenth century. The needle case from fill 1043 of pit 1046 is lathe turned with bands of incised grooves at the top and bottom. A plug would have been inserted to form the bottom, and there is an external screw thread at the top for a lid. This is almost identical to an example

[140] Henig, in Durham, 'Archaeological Investigations in St Aldates, Oxford, pp. 163–6, fig. 39.
[141] Margeson, *Norwich Households*, pp. 122–3, fig. 87, no. 764.
[142] MacGregor, *Bone, Antler, Ivory and Horn*, p. 180, fig. 97.

dated to the nineteenth–twentieth century recovered from Winchester.[143] The miscellaneous fragment is wedge shaped and was recovered from fill 1214 of pit 1213.

Unstratified

A highly ornate cosmetic implement combining a tooth-pick or nail-cleaner and an ear scoop was recovered from an unstratified context (Fig. 19, no. 4). The object might have been modelled on a hand-thrown harpoon and line with its elongated leaf-shaped point and twisted cable decoration carved into the shank. Cosmetic tools have been used in Britain from at least the late Iron Age. They are generally made from metal or wire; bone examples are less common. This example probably dates to the nineteenth century.

Illustration Catalogue (Fig. 19)

1. **Tuning peg**, complete, L:43 mm. SF 51, Ctx 1246 (fill of pit 1251), Phase 3a.
2. **Tuning peg**, complete, L:49 mm. SF 152, Ctx 1032, Phase 3a.
3. **Stylus**, complete/modified, L:61 mm. SF 182, Ctx 1907 (fill of pit 1905), Phase 3a.
4. **Nail cleaner/scoop**, complete, L:97 mm. Unstratified.

[143] Biddle and Elmhirst, 'Sewing Equipment' in Biddle, *Object and Economy in Medieval Winchester*, pp. 816–7, fig. 238, no. 2532.

7 COINS, TOKENS AND JETONS *BY IAN R. SCOTT*

1. **Irish farthing, Edward I**. Dublin mint, minted 1282–5. Silver. King's head within a triangular beaded frame. Legend: ERA NG LIE // Long cross with pellets in the angles. Legend: CIVI TAS DVB LINIE. D: 9.5 mm. Layer 1032, SF 178, Phase 3a.
2. **Counterfeit of base shilling, Edward VI**. Copper alloy or brass, probably originally washed with silver. Worn, the legends on both faces are largely illegible, although the bust of the king although worn is quite clear as is garnished shield with royal arms on the reverse. D: 31 mm. Cf. hoard of counterfeit shillings from the Isles of Scilly (PAS: CORN-9A1215). Context 1387, pit 1386, SF 141, Phase 3b.
3. **Sixpence, Elizabeth I**, dated 1569. Silver. Bust facing L with rose behind. Bust very worn. Legend: ELIZABETH:D:G ANG:FR:ET:HIB:REGINA // Shield with Royal Arms on cross fourchée, date 1569 above. Legend: POSVI:DEV:ADIVTOREM:MEV. Mint mark worn, possibly crown. D: 26mm. Context 1012, wall cut 1388, SF 233, Phase 3a. Fig. 6.20, no. 3
4. **Counterfeit farthing, James I.** Crudely engraved version of a Lennox 1–4 farthing. Cu alloy. Sceptres through crown; Legend: IACO: DG MAG:BRI. Cross saltire mint mark before IACO. // Crown over harp; Legend: FRA: ET: HIB:REX. D: 16.5mm. Context 1143, pit 1475, SF 15, Phase 3b.
5. **Farthing, Charles I, Richmond Type 2**, stamped off centre. Cu alloy. Sceptres through crown with nine jewels. Legend: C[ARO:D:]G:MAG:BRI: Mint mark cross saltire // Crown with nine jewels over harp with eagle head; Legend: FRA:ET[HIB:REX]. Layer 1003, SF 7, Phase 3b.
6. **Farthing, Charles I, Rose type 3**. Cu alloy. Crossed sceptres through double arched crown; Legend: CAROLVS D.G. MAG BRI, mullet mint mark after BRI // Double arched crown over Rose; Legend: FRAN:ET:HIB:REX, mint mark mullet after REX. 1637–44. D: 14 x 13 mm. Context 1182, pit 2196, SF 38, Phase 3b. Fig. 6.20, no. 6
7. **Farthing token** issued by Thomas Dennis, mercer. Cu alloy. Legend: (mullet) THOMAS.DENNIS.AT.THE around three kings standing facing. // Legend: (mullet) .3.KINGS.IN.OXON.1652 , around cable twist inner circle containing .D. over T (rosette) A. D: 15mm. Context 1188, pit 1187, SF 32, Phase 4a. Thomas Dennis (*c.*1602–*c.*1663) served as mayor of Oxford in 1642–3 and again in 1657–8. Fig. 6.20, no. 7
8. **Farthing token** issued by Humphry Bodicott, vintner. Concreted to pipe stem (see clay tobacco pipe report). Cu alloy. Legend: HVMPHRY.BODICOTT. around a vintner's bush // Legend: VINTENER.IN.OXON. around a cable twist circle containing three tuns. It is uncertain whether the token has mullet or anchor privy marks. D: 15 mm; Context 1013, pit 1085, Phase 3b. Humphrey Bodicott (1600–55) was senior bailiff in 1636–44, and briefly mayor in 1647, but excluded by Parliament. He ran the tavern opposite All Souls College which became the Three Tuns. Following Humphrey's death, his second wife Judith ran the tavern until 1664, when her wine licence was transferred to Anthony Hall. The tokens issued by Bodicott are undated but were probably issued from *c.*1652 onwards when it seems that Oxford City Council agreed to issue farthing tokens and could have circulated as late as 1672.[144] Fig. 6.20, no. 8

[144] E.T. Leeds, 'Oxford Tradesmen's Tokens', in H.E. Salter (ed), *Surveys and Tokens*, Oxford Historical Society, Vol 75 (1923), p. 359.

9. **English medieval jeton Edward I**. Cu alloy. 'Stirling' head very worn, border of strokes and pellets // surface largely obscured by corrosion build up, border of annulets. D: 19 mm. Context 2207, pit 2182, SF 169, Phase 2a.
10. **Jeton,** probably made in Tournai. Later fourteenth century or fifteenth century. Cu alloy. Shield with beaded edge and three lis within a beaded circle; Legend: TOVRNAI TOVRNAI TOVRN . . // Triple strand cross fleury with lis in the quarters within a crudely executed quatrilobe. Letters A and V in alternate spandrels. D: 28 mm. Context 1242, pit 1386, SF 49, Phase 3b. Fig. 6.20, no. 10
11. **French or Tournai jeton**. Later fourteenth century or fifteenth century. Cu alloy. Crown with lis and with pellets on band, a five-pointed star between lis; + flanked by stars AVE MARIA : GRACI[A : – – // Triple strand cross fleury with V or E in the quarters, within quatrilobe with five point stars flanked by annulets in sprandrels. D: 27 mm. Context 1547, pit 1538, SF 131, Phase 2b.
12. **French or Tournai jeton**. Later fourteenth century or fifteenth century. Cu alloy. Crown with lis, and annulets on band. Legend: appears illiterate. // Triple strand cross fleury with triple annulets in quarters, within quatrilobe with letters flanked by annulets in sprandrels. D: 27 mm. Context 2063, pit 2105, SF 195, Phase 2b.
13. **French or Tournai jeton**. First quarter fifteenth-century. Cu alloy. Shield with three lis, flanked by pairs of annulets, with three annulets above; Legend: + AVE MARIA * GRACIA * // Triple strand cross fleury with quatrilobe, flowers in spandrels. D: 26 mm. Context 2337, pit 1538, SF 69, Phase 2b.
14. **Tournai 'Moor's head' jeton**, *c.*1350 to sixteenth century. Cu alloy. Bare head facing right. Legend: + AVE MARIA:GRACIA:PL[E? Double crosslet stops. // Bowed cross fleury with lis in centre. Lettering not legible, badly corroded. D: 21 mm. Layer 1003, SF 52, Phase 3b. Fig. 6.20, no. 14
15. **Nuremberg 'rose and orb' jeton**. Sixteenth century. Cu alloy. Three annulated crowns and lis around a rosette. Legend: BOBVE . VBOBE. – – – OB stops (?)lilies.// Large orb (D; 7mm) within a trilobe. Legend: d, VBOEVB . BVEV – – – stops (?)lilies. D: 23mm. Layer 1001, SF 1, Phase 4a.
16. **Nuremberg 'rose and orb' jeton**. Sixteenth century. Cu alloy. Three annulated crowns and lis around a rosette. No legend, but border of triangles. // Orb within a trilobe, annulets in spandrels. No legend, but border of triangles. D: 21mm. Layer 1003, SF 2, Phase 3b
17. **Nuremberg 'rose and orb' jeton**. Sixteenth century. Cu alloy. Three annulated crowns and lis around a rosette. Illiterate, E OVE . LEVEO – – / LVE. Double pellet stops. Part of legend displaced. // Orb within trilobe with pellets in the spandrels. Illiterate, LEOE – –/E.EOL.OE – –. Double pellet stops. Part of legend displaced. D: 24 x 23 mm. Layer 1003, SF 54, Phase 3b.
18. **Nuremberg 'rose and orb' jeton**. Sixteenth century. Cu alloy. Three crowns and lis around a rosette, with groups of three annulets between lis. Illiterate –V O – – V E N B V E:V E N . . . // orb within a trilobe, pellets in the spandrels. Illiterate, – V O L E N – O L E I : V O L E N – – – . D: 24 x 25 mm. Context 1195, wall robbing, foundation trench 1244, SF 5, Phase 3a.
19. **Nuremberg 'rose and orb' jeton.** Sixteenth century. Cu alloy. Three crowns and three lis around a rosette, illegible // Orb with a trilobe three-petal flowers in spandrels; illiterate. D: 24 x 25 mm. Context 1377, pit 1353, SF 120, Phase 3a

20. **Nuremberg 'rose and orb' jeton** of Hans Schultes II (1586–1603) or Hans Schultes III, (1608–12). Cu alloy. Three crowns and lis around a rosette. GLICK.IST.WALCZET.VND. 'Fortune is changeable and ...'. Crosslet stops. // Orb within a trilobe, crosslets in spandrels. HANS.SCHVLTES.ZV.NVRE. Crosslet stops. D: 26 x 25 mm. Layer 1032, SF 33, Phase 3a
21. **Nuremberg 'rose and orb' jeton,** Hans Schultes. Late Sixteenth -century. Cu alloy. Three crowns and lis around a rosette, with groups of three annulets between lis. Legend: HANS[SCH]VLTES.NOR. Triangle stop. // Orb with a trilobe, pellets in spandrels. The orb has been partly overstamped with an R. Illiterate legend: A V O B A V O . . B O V . A O L B. D: 25.5 mm. Layer 1078, SF 10, Phase 3a. Fig. 6.20, no. 21
22. **Coin or jeton?**, probable coin or jeton, heavily encrusted and illegible. Cu alloy D: c 20 mm. Context 1197, pit 1187, SF 47, Phase 4a.
23. **Jeton?**, probable worn jeton with no visible markings or legends. D: 28 mm. Context 1215, pit 1213, SF 36, Phase 4a.
24. **Lead token?**, possible token with no clear lettering or symbols. D: 22 mm x 21.5 mm. Context 2158, Phase 3a.

8 IRON SLAG AND RELATED HIGH-TEMPERATURE DEBRIS *BY LYNNE KEYS*

Almost 13.6 kg of slag and related debris was recovered by hand during excavation and from soil samples. For this report the assemblage was examined by eye and categorised on the basis of morphology and magnetic properties. Each slag type in each context was weighed; smithing hearth bottoms were individually weighed and measured to obtain statistical information. Quantifications are given in Tables 14–16, and statistical data for the smithing hearth bottoms are provided by Table 17.

Smelting slag – in small quantities – is present in deposits (mainly in pits) from Phase 1 into the medieval period, as is a small amount of smithing slag. The smelting slag is that produced by tapping slag from the furnace to enable easier extraction of the rough bloom of iron. The largest groups of material came from Phase 1 pits 1131 and 1657. Pit 1131 contained 1.02 kg of slag, most of this weight from one smithing hearth bottom. Although the slag group may be the product of smithing, containing as it does some very occasional smithing flakes, there is one fragment of tap slag (from smelting) and some vitrified hearth lining. Deposits in cellar pit 1657 (1.03 kg) consist of undiagnostic slag and small amounts of tap slag and slag dribbles. One smithing hearth bottom (representing smithing) was recovered, along with hammerscale flake and large spheres.

The assemblage is significant because it indicates both smelting and smithing took place in this part of Oxford in the late Saxon/early Saxo-Norman period (Phase 1). The same can be said of Phase 2a (the early medieval period) and possibly 2b. This activity, however, does not seem to have taken place on the site.

Table 14. Quantification of the slag assemblage

Context	Sample no.	Slag type	Weight (g)	Length (mm)	Breadth (mm)	Depth (mm)	Comment
1003		iron-rich undiagnostic	5				
1003		undiagnostic	74				
1011		burnt coal	0.5				
1011		cinder	4				
1011		tap slag	24				
1016	1	fired clay	25				>10 mm. Slagged, with flake adhering to outer surface. Tuyere?
1016	1	magnetic residue	11				4-2 mm. Stones & grit
1016	1	magnetic residue	26				10-4 mm. Stones & tiny undiagnostic
1016	1	magnetic residue	26				2-0.5mm. Some flake hammerscale, the rest is grit
1032		furnace slag	63				
1032		undiagnostic	38				
1062		furnace slag	22				

1062		slag dribbles	6				
1067		undiagnostic	59				
1071	5	slag dribbles	1				10-4 mm
1116		dense slag	16				
1116		tap slag	10				
1116		undiagnostic	16				
1130		smithing hearth bottom	264	100	65	40	incomplete
1130		tap slag	11				
1130		undiagnostic	9				
1130		undiagnostic	107				with vitrified hearth lining adhering
1141		cinder	12				
1190		undiagnostic	55				
1197	6	slag dribbles	3				10-4 mm.
1232		iron-rich undiagnostic	40				
1298	7	glass	0.5				potash glass
1298		tap slag	9				
1335	10	iron-rich undiagnostic	11				>10 mm. Iron lump?
1335		iron-rich undiagnostic	158				
1335		run slag	32				
1335		stone	6				ore?
1335		tap slag	133				
1335		undiagnostic	151			40	part of smithing hearth bottom?
1341		furnace slag	6				
1341		tap slag	19				
1341		undiagnostic	0.5				
1347		hammerscale	0				very, very occasional broken flake in soil
1347		iron-rich undiagnostic	152				
1347		smithing hearth bottom	246	110	100	30	
1347		undiagnostic	26				run: yellowish-white-greenish
1347		vitrified hearth lining	41				
1347		vitrified hearth lining	172				very thick-walled
1354	11	magnetic residue	53				2-0.5 mm. Mostly crushed fired clay with tiny heat-magnetised natural material

1354	11	slag dribbles	10				10-4 mm. Plus ferruginous concretion
1374	16	magnetic residue	3				4-2 mm. Iron flakes and grit
1382	14	undiagnostic	54				10-4 mm and tiny fired clay fragments
1382	14	undiagnostic	60				
1396		iron-rich undiagnostic	6				
1396		run slag	10				
1396		run slag	23				probably smelting
1396		stones	6				
1396		tap slag	45				
1396		undiagnostic	73				
1396		vitrified hearth lining	7				or furnace lining
1435	15	slag dribbles	1				10-4 mm. Smelting?
1450		vitrified hearth lining	16				
1453		cinder	2				
1453		iron-rich undiagnostic	46				
1453		lava quern	56				fragments
1453		undiagnostic	47				
1455		fuel ash slag	100				
1455		undiagnostic	82				
1478		tap slag	22				
1480		undiagnostic	10				
1525		cinder	47				
1525		iron-rich undiagnostic	260				
1525		slag runs	26				
1525		undiagnostic	186				three pieces
1526		cinder	3				
1526		iron-rich undiagnostic	107				furnace slag?
1526		slag run	21				run
1526		smithing hearth bottom	513	110	100	45	
1526		tap slag	55				
1526		undiagnostic	170				
1526		vitrified hearth lining	6				
1526		vitrified hearth lining	95				
1532		iron-rich undiagnostic	18				
1532		tap slag	14				
1546		run slag	60				smelting

1546		tap slag	36				
1547	18	iron-rich undiagnostic	8				>10 mm. Smelting?
1547	18	undiagnostic	1				>10 mm.
1550		tap slag	105				
1554		iron-rich undiagnostic	60				
1554		tap slag	412				
1554		undiagnostic	52				
1558		tap slag	7				
1602	26	undiagnostic	1				>10 mm.
1607		iron	39				
1607		slag runs	20				yellow-green run
1607		undiagnostic	53				
1607		vitrified hearth lining	10				
1656		slag runs	9				furnace slag
1656		undiagnostic	10				
1658		ferruginous concretion	347				and stones
1658		undiagnostic	203				three pieces
1687	19	magnetic residue	7				10-4 mm. Undiagnostic, slag dribbles and tiny iron pieces
1687	19	magnetic residue	18				lots hammerscale flake and smithing spheres, fired clay and natural grit etc.
1687	19	slag dribbles	2				>10 mm.
1687	45	magnetic residue	0.5				4-2 mm. One hammerscale flake, one smithing sphere, two pieces of microslags
1687	45	magnetic residue	7				2-0.5 mm. Hammerscale flake, some microslags, grit
1689	20	hammerscale	0.5				flake and one sphere
1689	20	magnetic residue	10				2-0.5 mm. Moderate quantity of broken flake hammerscale, no spheres
1689	20	undiagnostic	6				>10 mm.
1692	49	undiagnostic	0.5				10-4 mm.
1692		undiagnostic	6				furnace slag?
1695		iron-rich undiagnostic	141				furnace slag?
1695		undiagnostic	100				runny but like fuel ash slag

1696		iron	28				
1696		slag dribbles	6				
1696		slag runs	28				furnace slag?
1696		undiagnostic	37				
1696		undiagnostic	67				runny surface
1699		undiagnostic	152			40	fragment of smithing hearth bottom?
1700		dense slag	13				
1700		undiagnostic	256				4 pieces; furnace slag?
1701		cinder	30				
1701		furnace lining	22				
1701		iron-rich cinder	12				
1701		iron-rich undiagnostic	132				
1701		slag runs	19				
1701		tap slag	77				
1701		undiagnostic	47				
1704		furnace slag	6				
1711	56	magnetic residue	4				4-2 mm. Heat magnetised natural material (grit, etc.)
1711	56	magnetic residue	8				heat-magnetised stones
1716	48	magnetic residue	5				2-0.5 mm. Occasional broken flake hammerscale & iron flakes, the rest is grit
1717	22	magnetic residue	2				2-0.5mm. Grit, & very, very occasional broken flake hammerscale
1729		tap slag	8				
1729		undiagnostic	4				
1736		iron	105				bloom fragment?
1743	50	magnetic residue	10				4-2 mm. Heat magnetised natural material (grit, etc.) and very occasional microslag fragments
1743	50	undiagnostic	10				>10 mm. with voids from burnt-out charcoal
1743		furnace slag	36				
1743		slag dribbles	7				
1743		stone	12				ferruginous; ore?
1745	24	iron-rich undiagnostic	1				

1745	24	magnetic residue	2				4-2 mm. Microslags including large spheres
1745	24	magnetic residue	3				2-0.5 mm. Moderate quantity broken flake hammerscale + grit & sand
1745	24	slag dribbles	2				10-4 mm. Smelting slag?
1745	24	undiagnostic	4				>10 mm.
1745	51	magnetic residue	7				2-0.5 mm. Heat magnetised natural material (grit, etc.) & very occasional microslag fragments
1750	28	magnetic residue	2				2-0.5 mm. Grit, & very, very occasional broken flake hammerscale
1750	28	undiagnostic	7				>10mm.
1750		undiagnostic	14				
1757		cinder	25				
1757		iron	22				
1757		iron	24				smith's stock?
1757		iron-rich undiagnostic	82				
1757		slag runs	10				
1757		tap slag	25				
1757		undiagnostic	370				lots of pieces
1759		undiagnostic	10				possible furnace slag
1791	55	slag dribbles	2				>10 mm.
1791	55	undiagnostic	38				>10 mm.
1798		iron-rich undiagnostic	63				
1802		iron-rich undiagnostic	192				furnace slag?
1802		run slag	11				
1802		undiagnostic	45				
1803		furnace slag	16				
1803		iron-rich undiagnostic	117				
1803		tap slag	25				
1807	37	undiagnostic	0.5				
1814		tap slag	20				
1815		dense slag	30				
1815		iron-rich undiagnostic	128				fragments of smithing hearth bottom?
1815		undiagnostic	15				with burnt flint inclusions
1815		undiagnostic	38				
1824		tap slag	8				

1827	38	undiagnostic	6				10-4 mm.
1834		burnt flint	23				
1854		iron-rich undiagnostic	14				
1854		tap slag	16				
1854		undiagnostic	27				furnace slag?
1878	61	furnace slag	11				>10mm.
1878	61	iron-rich undiagnostic	2				10-4mm.
1878	61	magnetic residue	3				grit, tiny iron flakes, one smithing sphere
1878	61	undiagnostic	12				>10 mm.
1882		cinder	21				
1882		undiagnostic	36				
1899		dense slag	30				
1899		iron-rich undiagnostic	93			30	part of smithing hearth bottom?
1907		fuel ash slag	17				burnt cinder of flint
1917		iron	111				part of bloom?
1917		tap slag	694				
1918		furnace slag	98				with furnace lining adhering
1918		furnace slag	575				?includes broken tap slag
1919		cinder	11				
1919		iron-rich undiagnostic	8				
1919		tap slag	262				
1919		undiagnostic	27				
1958		tap slag	146				
1958		undiagnostic	11				flowed
1962		stone	57				ore?
1985		fuel ash slag	74				and undiagnostic slag
1985		furnace lining	105				with cinder
1985		smithing hearth bottom	339	105	75	40	
1985		tap slag	120				
1985		undiagnostic	13				
2007		run slag	7				tap slag?
2040	54	slag dribbles	2				>10 mm.
2060		undiagnostic	4				very weathered
2063	58	magnetic residue	2				2-0.5 mm. Grit & very occ. broken flake hammerscale
2066		fired clay	12				oxidised (furnace lining?)
2066		undiagnostic	20				ferruginous
2085		iron-rich undiagnostic	11				

2085		vitrified hearth lining	9				
2087		undiagnostic	24				furnace slag?
2088		tap slag	11				
2089		undiagnostic	2				fragments of run slag?
2090		undiagnostic	16				furnace slag?
2091		iron-rich undiagnostic	26				
2091		undiagnostic	5				yellow-green run on top.
2092		stone	82				ore?
2117		iron-rich undiagnostic	29				
2119		tap slag	71				
2119		undiagnostic	23				
2123		tap slag	463				
2140	64	iron flakes	3				10-4 mm.
2185	65	fuel ash slag	12				>10 mm.
2185	65	fuel ash slag	19				10-4 mm.
2200		dense slag	55				
2200		undiagnostic	24				furnace slag?
2205		vitrified hearth lining	43				
2207		vitrified hearth lining	30				could be furnace lining
2210		undiagnostic	342	115	115	25	Smithing hearth bottom? Shallow & weathered
2214		furnace lining	13				
2214		iron-rich undiagnostic	19				
2214		run slag	2				
2214		undiagnostic	34				furnace slag?
2216		ferruginous concretion	5				
2216		furnace slag	72				
2216		lava quern	20				
2217		undiagnostic	4				slag run
2220		undiagnostic	7				
2221		smithing hearth bottom	283	80	80	30	
2223		cinder	8				
2223		furnace slag	69				very iron-rich
2223		iron-rich undiagnostic	5				
2223		tap slag	20				
2232		cinder	2				
2234		fuel ash slag	4				
2234		tap slag	17				

2258		tap slag	100				
2352		tap slag	20				
		Total	13.6kg				

Table 15. Slag types in the assemblage and the processes they represent

Slag	**Weight (g)**	**Process**
dense slag	144	smelting
furnace slag	974	smelting
tap slag	3005	smelting
run slag	145	smelting
iron-rich undiagnostic	1934	smelting or smithing
undiagnostic	3260	smelting or smithing
slag dribbles	42	smelting or smithing
iron-rich cinder	12	smelting or smithing
smithing hearth bottom (x5)	1645	smithing
hammerscale	18+	smithing
coal	24	not diagnostic
cinder	165	not diagnostic
ferruginous concretion	352	not diagnostic
fuel ash slag	226	not diagnostic
furnace lining	140	not diagnostic
vitrified hearth lining	429	not diagnostic

Table 16. Statistics for the smithing hearth bottoms (five examples, weighing a total of 1.65kg)

	Range	**Median**	**Standard deviation**
weight (g)	246–513	28	109
length (mm)	80–110	105	12
breadth (mm)	65–100	80	16
depth (mm)	30–45	40	7

Table 17. Slag weights by phase

Phase	**Weight (g)**
1	6750
2a	2597
2b	3493

3a	264
3b	481
4a	6

9 STONE *BY RUTH SHAFFREY*

Structural Stone

A total of 17 fragments of stone roofing (5 kg) are made from a mixture of non-shelly and shelly limestone, grey sandstone and slate (Table 18). The earliest phase from which these were recovered is Phase 2b (late medieval) suggesting that some stone roofing was in use on the earliest college buildings, as do those recovered from Phase 3a (early post-medieval) features (six fragments, 2.6 kg). Fragments found in Phase 4a (later post-medieval) features (five fragments, 1.2 kg) probably relate to the eighteenth-century demolition of earlier buildings and the rebuilding of the college. There is no chronological pattern to the use of different materials. Limestone and sandstone were the roofing materials of choice in Oxford and these stones come from the Stonesfield Slate, Pusey flags, Forest Marble and Collyweston slate. Such roofing is a regular occurrence in archaeological assemblages and was certainly in use from the thirteenth century in Oxford although Arkell only found documentary evidence for the use of stone roofing from the fourteenth century.[145]

Worked Stone Objects

Four objects can be classified as hones or whetstones. One of these, a sandstone chunk with sharpening grooves and a worn face, is from a Saxon context (1607, fill of cellar pit 1535). A second example is an irregular fragment of an elongate slate whetstone, perhaps a broken sliver from an originally much larger example. This was found in a Phase 1 fill of ditch 1851 (1854). These tools are likely to represent domestic activity prior to the construction of the college. One hone was found in a post-medieval context: Phase 3a fill of pit 1065 (1066). This example is an unmodified quartzite pebble with some use wear. The fourth example is a neat, small, perforated slate whetstone that has broken lengthwise (Fig. 21, no. 2). This is from a Phase 2b context (1116) but is of a type that is likely to have been a personal belonging.

A fifth piece of worked stone is a slate with three cut edges (SF 59). This was found in the post-medieval (Phase 4a) fill of pit 1087 (1088). The shape of the edges is reminiscent of writing slates, but the third edge is cut at an angle and it seems more likely that this was intended as a piece of inlay. It has subsequently been used as a drawing slate and has a lightly incised pattern on both sides - the pattern on one side is smaller and simpler than that on the other side but otherwise very similar. The pattern fills an approximately square area and has a continuous cruciform pattern overlain by a square with heart-shaped projections in each corner (Fig. 21, no. 1). The pattern seems likely to have been a doodle and is reminiscent of the patterns seen on medieval floor tiles. An exact match could not be found on the Ashmolean database (of 2848 examples), but it has similarities to a tile pattern found at Great Bedwyn (Wiltshire), which also has a four-part overlapping line but angled to the corners. The central part of this design (the part seen inside the square on our tile) does appear, however, on a number of tiles from Oxford – at Queen's College (at the site of the ante chapel), in the Cathedral, at Oseney and at Rewley (Ashmolean reference numbers O063, O016, O168 and O170 respectively). The doodle on this tile may therefore be a copy of patterns seen on local floor tiles. Inscribed slates are uncommon and no parallel for this pattern could be found on

[145] W.J. Arkell, *Oxford Stone* (Oxford, 1947), pp. 129–30.

slate, but other graffiti items show that the ability to recognise slate as an easy material to draw on had been recognised long before this piece was deposited in Oxford. A piece inscribed with a cobweb design, for example, was found at the Coventry Free school in a context dated to a 1545–58.[146]

Fragments from two stone mortars suggest kitchen activity in the form of food preparation. One of these is a piece of a heavy-bottomed Purbeck marble mortar (SF 46, unstratified). The other is a piece of a heavily smoothed vertical-sided mortar of Purbeck limestone (pit fill 2996). The surviving fragment retains one simple rib with spout set into the rim. The surviving circumference suggests that this mortar had two ribs (rather than four). Mortars are not common finds in medieval or post-medieval Oxford. This example dates to AD 1650–1700 (Phase 3b), during which it was discarded, so that its use can be related to earlier periods. Other examples from Oxford are of comparable date and lithologies.[147] However, Purbeck marble mortars tend to be of medieval date (thirteenth–fourteenth centuries), as at Southampton and Winchester,[148] and it is therefore likely that these are residual.

Catalogue of Stone Objects

1. **Incised decorated slate** (Fig. 21, no. 1). Slate. Palette with three cut edges - all are straight rather than bevelled or chamfered. Fine scratch marks on both faces and incised patterns on both faces of a rolling cruciform shape. The fourth edge is broken. Surviving fragment 95 x 64 mm high x 5 mm. 35 g. SF 59. Ctx 1088, fill of pit 1087. Phase 4a.
2. **Half whetstone** (Fig. 21, no. 2). Slate or similar. Broken lengthwise with biconical perforation of 3 mm at narrowest point. 53 x 8 mm thick x >6 mm wide. 5 g. Ctx 1116. Phase 2b.
3. **Whetstone fragment.** Slate or similar. Slightly irregular elongate stone, used as a whetstone with two long flat faces and sharp arrises. 48 mm long x 13 x 9 mm. 8 g. Ctx 1854, fill of ditch 1851. Phase 1.
4. **Hone.** Very fine-grained grey sandstone. Chunk, unshaped but with some sharpening grooves on one side and one face very flat and worn smooth. 57 x 47 x 29 mm. 103 g. Ctx 1607, fill of cellar pit 1535. Phase 1.
5. **Processor pebble.** Quartzite. Unshaped but unusually smooth on one side and may have been used as a rubber/hone. 54 x 40 x 35 mm. 96 g. Ctx 1066, fill of pit 1065. Phase 3a.
6. **Mortar fragment.** Purbeck marble. Thick bottomed vessel with inside base and part of side remaining, worn completely smooth. The outside wall is chiselled neatly into

[146] C. Woodfield, 'Finds from the Free Grammar School at the Whitefriars, Coventry, *c.*1545–*c.*1557/58', *Post-medieval Archaeology*, 15 (1981), p. 106.
[147] M. Mellow and P. Powell, 'Stone Objects', in C. Halpin, 'Late Saxon Evidence and Excavations of Hinxey Hall, Queen Street, Oxford', *Oxoniensia,* 48 (1983), p. 67; R. Shaffrey, 'Worked Stone', in K. Moon and R. Bashford, 'St Cross College Western Quad, Oxford: Archaeological evaluation report', unpublished OA report (2013), http://library.thehumanjourney.net/3091/
[148] M. Biddle and D. Smith, 'Mortars', in Biddle, *Object and Economy in Medieval Winchester*, pp. 890–908; R. Shaffrey and C. Allum, 'Worked Stone', in R. Brown and A. Hardy, *Trade and Prosperity, War and Poverty. An Archaeological and Historical Investigation into Southampton's French Quarter*, OA Monograph **15** (2011), pp. 207–14.

vertical grooves, whilst the base is flat and has neat pecking. Not enough survives to determine the presence of any other features. Measures 180 mm external diameter at base. Base is 43 mm thick at thinnest point. The vessel walls are 28 mm thick where they meet the base. SF 46. Unstratified.

7. **Mortar fragment.** Purbeck limestone. Wall fragment of approximately circular vessel. All faces have been worked by pecking and then smoothed so that even the top is smooth (and flat). One rib survives, this has a straight vertical profile with a basin at the top (in front view), which forms a spout. Rib measures 32 mm wide, basin is roughly semi-circular and 51 mm wide x 27 mm high. It forms a spout 51 mm deep. Measures 200 mm internal diameter at rim x 31.5 mm thick at rim. Pit fill 2296. Phase 3b.

Table 18. Quantification of stone roofing

Context	No.	Notes	Complete dimensions	Weight (g)	Lithology	Phase
1095	1	Fragment of top of stone with neat circular drilled perforation of 8 mm	14 mm thick	115	typical shelly oolitic limestone	2b
1435	1	With neat circular slightly biconical perforation of 8mm diameter	22 mm thick	240	typical shelly oolitic limestone	2b
1011	2	Perforations of 7 mm and 9 mm diameter respectively. Both cylindrical	9 and 15 mm thick	112	Cream limestone	3a
1025	1	Hole at one end is offset from one side and is neat circle of 11mm diameter. Slightly burnt pink	>240 x 210 x 28 mm	2017	Shelly limestone	3a
1032	1	Possible roofing, small fragment, undiagnostic	Indeterminate	10	Slate	3a
1032	1	Undiagnostic	4 mm thick	398	Grey sandstone	3a
1071	1	With neat circular slightly biconical perforation of 7 mm	12 mm thick	23	typical shelly oolitic limestone	3a
1003	1	Fragment of small stone with slightly biconical circular perforation of 5–7 mm diameter	Indeterminate	84	Cream limestone	3b
1004	2	One has a perforation of 9 mm diameter. Other is undiagnostic	Indeterminate	635	Cream limestone	3b
1111	1	Flat stone with no surviving perforation. Groove on one face probably caused through use as a sharpening stone, triangular piece. Blackened through burning	Measures 100 x 75 x 18mm thick	170	fine grained grey sandstone	3b
1664	1	With neat circular slightly biconical perforation of 8 mm	13 mm thick	288	fine grained grey sandstone	4a
1038	1	Undiagnostic	10 mm thick	158	Slightly shelly oolitic limestone	4a
1043	1	Small fragment with neat circular perforation of 7 mm	3 mm thick	41	grey sandstone	4a
1043	1	Slightly tapered towards the top end broken across circular perforation of 7 mm	99 mm wide x 8–14 mm thick	325	Grey sandstone	4a
1089	1	Circular perforation of 7 mm	18 mm thick	442	Grey sandstone	4a

10 FLINT *BY GERALDINE CRANN*

A small assemblage comprising 20 pieces of struck flint was recovered (Table 19). All the flint is residual in early Saxo-Norman to late post-medieval contexts. Six pieces retain technologically diagnostic features that enable them to be assigned to the Mesolithic or early Neolithic periods. The rest of the worked flints retain no technologically diagnostic features that would enable them to be assigned to a specific period and as it is all residual in later contexts none of it can be directly related to specific sites or activities.

A total of 210 generally small fragments of burnt unworked flint weighing 502g was recovered by hand excavation and from environmental samples. The presence of burnt unworked flint in archaeological contexts reflects a variety of activities from the prehistoric period onwards, including the use of flint cobbles as pot boilers, to provide tempering in pottery production, forming the structure of burnt mounds or as a result of high-temperature fire events. As all of the material was recovered from Saxo-Norman to late post-medieval contexts it can be taken as being residual and no conclusions can therefore be reached regarding its origins.

Table 19. Worked flint

Context	Description	Date
1003	End scraper, hard hammer struck on thick irregular flake, 14g.	-
1008	Blade, heavily rolled and edge damaged, patinated, 10g	-
1122	Debitage flake, snapped, 5g	-
1132	Irregular blade, snapped, 4g	Mesolithic – early Neolithic
1188	Irregular flake, hard hammer struck, 4g	-
1280	Bipolar blade/bladelet core, 43g	Mesolithic – early Neolithic
1435	Irregular flake, 4g	-
1526	Rejuvenation flake from core edge, blade/bladelet removals, 28g	Mesolithic – early Neolithic
1574	Irregular flake, heavily rolled, 7g	-
1758	Heavily rolled end scraper on irregular flake, 14g	-
1821	Denticulate on rejuvenation flake, 7g	Mesolithic – early Neolithic
1896	Irregular blade core with large inclusion reducing quality of raw material, 34g	-
1898	Irregular flake with battered dorsal surface and step termination, 7g	-
1917	Thick irregular flake with notch, 12g	-
1917 <41>	Burnt and thermally fractured core fragment, 19g	-
1958	Irregular blade, hard hammer struck, 4g	Mesolithic – early Neolithic
1960	Cortical flake, step termination, 6g	-
2144	Scraper/point on snapped blade, abrupt and semi-abrupt retouch, fine dark raw material, 5g	Mesolithic – early Neolithic
2200	Irregular debitage flake, 6g	-
2237	Flake, hinge termination, facetted butt, 8g	-

11 MAMMAL AND BIRD BONE *BY LEE G. BRODERICK*

The medieval zooarchaeology of Oxford is relatively well studied[149] in comparison with other British cities but the Saxon and early post-Conquest periods are less well known. As such, this assemblage is of considerable local importance. This report focuses on the animal bone from the pre-college deposits of the Saxon and earlier medieval periods (Phases 1–2a; Table 20). The material from Phases 2b–4 has been studied by Thomas Fowler as part of a post-graduate research project at the University of Nottingham, and will be published separately.

The analysed assemblage was prioritised by focusing only on contexts containing less than 30% residual pottery, as a proxy for residual animal bone. The potential different taphonomic trajectories in ceramic and faunal material is acknowledged but attempts for establishing a robust method for identifying residual material using animal bone alone[150] have, so far, been equivocal. In all, 3909 specimens were recorded, mostly hand collected, although environmental samples were taken and sieved at 10 mm, 4 mm and 2 mm fractions, contributing a further 145 specimens to the assemblage. Identification was made with the aid of standard identification guides and the OA and author's reference collections, using a diagnostic zone system.[151] Material recovered from the sieved environmental samples was recorded using the same system only when the specimens were identifiable – i.e. small unidentifiable fragments were not entered into the database and do not contribute to the dataset.

Phase 1 Cellar pits (Late Ninth to Eleventh Century)

The greater part of this assemblage derived from three different cellar pits, which were deliberately backfilled. By far the most common species, by NISP (Number of Identified SPecimens), was caprine (sheep *Ovis aries* and/or goat *Capra hircus*). Among 260 caprine specimens it was possible to identify thirty-seven as being sheep, with no goat specimens identified (Table 20). Around half as many domestic cattle (*Bos taurus taurus*) specimens were present compared with caprine, and a little more than half as many pig (*Sus scrofa domesticus*) as domestic cattle. Domestic fowl (*Gallus gallus*) also made a substantial contribution to the assemblage. A small amount of Saxon material has been found in previous excavations at Queen's College and the interpretations made then are compatible with this larger dataset.[152]

[149] e.g. B. Wilson, 'Mortality Patterns, Animal Husbandry and Marketing in and Around Medieval and Post-Medieval Oxford', in A.R. Hall and H.K. Kenward, *Urban-Rural Connexions: Perspectives from Environmental Archaeology* (Oxford, 1994), pp. 103–16.

[150] e.g. K.M. Dobney, D.Jaques, and B.G. Irving, *Of Butchers and Breeds: Report on Vertebrate Remains from Various Sites in the City of Lincoln* (Lincoln, 1996).

[151] D. Serjeantson, 'Animal Bone', S. Needham and T. Spence (eds), *Runnymede Bridge Research Excavations, Volume 2: Refuse and Disposal at Area 16 East, Runnymede* (London, 1996), pp. 194–223.

[152] L. Strid, 'Animal Bone,' in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', pp. 203–10.

Table 20. NISP (Number of Identified SPecimens) and NSP (Number of SPecimens) figures for the hand collected and sieved components of the faunal assemblage

	1	2a	1 (sieved)	2a (sieved)
domestic cattle	185	179	1	
domestic cattle?	5	3		
caprine	339	240	13	
caprine?	4	2		
sheep	54	46		
goat		2		
pig	103	62	10	
pig?			1	
horse	25	17	1	
dog	1	2		
dog?		1		
cat	3	2	2	
red deer	1	1		
red deer?	1			
small rodent			3	
mouse			1	2
house mouse			1	3
micro mammal				1
small mammal	3	5	4	15
medium mammal	429	280	13	6
large mammal	534	471	10	
Total Mammal	1687	1313	60	27
bird	2	26	14	5
swan?		1		
greylag/domestic goose	8	25		2
domestic duck/mallard		4		
domestic fowl	50	35	3	2
domestic fowl?	1			
pigeon?		1		
woodcock	1	2		
small passerine			1	
European starling?		1		
starling/thrush				1
European robin			1	
house sparrow			4	
house sparrow?			1	
Total Bird	62	95	24	10
amphibian			16	
frog/toad			5	
common frog			3	
common toad	1			
Total Amphibian	1	0	24	0
Total NISP	1750	1408	108	37
Total NSP	2085	1679	108	37

Three foetal/neonatal caprine bones and one pig were identified amongst this material. The former is important, as it demonstrates that caprines were begin kept and bred on the site. The pig specimen demonstrates the same fact but is less significant as it is known that the keeping of pigs in urban areas continued through the medieval period.

Although not present in the cellar-pit assemblage, dogs (*Canis familiaris*) were present on the site at the time, with a total of 144 specimens having been gnawed by canids. At over 10% of NSP, this proportion is in keeping with the generally high proportion of canid gnawing of specimens on medieval urban sites. The canid gnawed bones included specimens of the three domestic mammals already mentioned as well as horse (*Equus caballus*) and goose (*Anser anser*). There were also two specimens from this period – a caprine femur and a domestic fowl coracoid – gnawed by rodents and one – a domestic fowl tibiotarsus – gnawed by a felid, suggesting that domestic cats (*Felis cattus*) were also present.

The frequency of observed butchery marks in the assemblage was even greater than for gnawing, with 147 specimens from this phase having butchery marks. Of six large mammal vertebrae with butchery marks, four are chopped through axially, suggesting that the animals were hung up and the carcass divided in two. An oblique chopmark on one other large mammal vertebra demonstrates, though, that this approach was far from ubiquitous and that some rough breaking of meat into on-the-bone ('pot-sized') portions also took place. The butchery of large mammal ribs, however, was far more consistent, with fifteen chop or cutmarks on the medial side of blades and just one on the lateral side. The pattern is similar with medium mammals, with twenty-five marks on the medial side and six on the lateral. Seven medium mammal vertebrae were split axially, with one of these also being split transversely. This suggests a general pattern for the butchery of all large and medium mammal torsos where the carcass is first split and then the ribcage is butchered from the inside (with the outside of the carcass lying on a surface).

Of nineteen domestic cattle specimens with butchery marks, thirteen were chopmarks, Of the six specimens with cutmarks, two were phalanges and one was a horncore – these three might suggest that some industrial activity was taking place in the vicinity of the site but each comes from a different part of the site (contexts 1959, 2214 and 1817). A pelvis, a tibia, a first phalanx and a calcaneum were all split axially with the other chop marks all being oblique. Although the axially split tibia may be evidence for marrow extraction the other butchery marks seem more consistent with an aim of reducing the size of meat portions. Among thirty-nine caprine specimens with butchery marks were four horncores chopped through at the base, further suggesting some craft activity in the vicinity, along with fourteen other bones with chop marks, mostly oblique chops through articular surfaces, suggesting rapid butchery. An axial chop through a metacarpal is an exception and may represent preparatory work for craft activities or marrow extraction, although this latter would indicate some level of dietary stress since it is quite an effortful job for comparatively little marrow. Twenty-three specimens with cutmarks mainly featured them around articular surfaces, probably associated with more careful, but unprofessional, butchery, with a few along shaft edges being more likely associated with filleting or table waste. Likewise, the cutmarks present on three domestic fowl and one goose bone were probably made at the table.

Among the fourteen horse specimens, none have butchery marks. Hippophagy was the subject of a papal edict in Saxon Britain and so began a taboo that continues to this day.

[153] Debate has long focused in British medieval zooarchaeology as to whether butchered horse bones are indicators of people eating horse meat or of processing food for dogs. Such a small assemblage as this is unlikely to shed much further light on the subject but it is worth mentioning that just one of the specimens had been gnawed, a proportion slightly lower than for the assemblage as a whole. It was possible to calculate the withers height for one of the bones, a metacarpal from pit 1451. This suggested a height of 1,402 mm, or 13.8 h, making it a pony (defined as being under 14.2 h) by today's standards. A horse tooth from this period had a cavity on the occlusal surface. Although often linked with high carbohydrate diets the condition can occur in wild populations and so cannot be linked confidently with dietary extremes.[154]

Amongst twenty-five specimens with pathology observed from this period, most were domestic cattle or caprine specimens with lesions consistent with osteochondrosis, a relatively benign condition that would likely have gone unobserved by both the animal and by people[155]. A left caprine radius from pit 1451, however, has an exostosis which might be evidence of penning elbow (and, therefore, evidence for the regular penning of sheep). Aside from this specimen and the horse tooth already described, the other pathologies recorded from this period were to bird bones. A domestic fowl right femur from cellar pit 1657 has a mild enthesophyte on the lateral/anterior side of the proximal end, probably as a result of repetitive movement,[156] suggesting a very free-range life. A domestic fowl tibiotarsus from the same cellar pit has a healed break, suggesting that some care and intervention by people was paid to the bird. A possible sparrow (cf. *Passer domesticus*) femur from cellar pit 1718, meanwhile, is an unusual find in showing possible bone necrosis.

In total, five specimens of house sparrow were present in the environmental sample from this pit, including the one with a pathology, as well as bones from two other commensal species, the European robin (*Erithacus rubelcula*) and the house mouse (*Mus musculus*). Bones from the common frog (*Rana temporaria*) in this sample and of the common toad (*Bufo bufo*) from cellar pit 1657 probably reflect the damp environment present in these features. Finally, a woodcock (*Scolopax rusticola*) bone from pit 1657, like the two red deer (*Cervus elaphus*) specimens from cellar pit 1527, demonstrate that the inhabitants had access to wild game, either through hunting or through trade. Previous excavations at Queen's College have also found roe deer (*Capreolus capreolus*) specimens from this period.[157]

Other Phase 1 Features (Late Ninth to Eleventh Century)

Aside from the cellar pits, the Phase 1 assemblage was derived from pits unassociated with other features, as is common at medieval urban edge sites.[158] Species proportions were broadly similar to those recovered from the cellar pits, however. A small assemblage from

[153] K. Poole, 'Horses for Courses? Religious Change and Dietary Shifts In Anglo-Saxon England', *Oxford Journal of Archaeology*, 32 (2013), pp. 319–33.

[154] L. Bartosiewicz and E. Gál, *Shuffling Nags, Lame Ducks: The Archaeology of Animal Disease* (Oxford, 2013), p. 173.

[155] L. Sewell, 'Osteochondrosis in Sheep and Cattle: Differential Diagnosis and Estimating Prevalence', York University MSc thesis (2010).

[156] T. Waldron, *Palaeopathology* (Cambridge, 2009), p. 72.

[157] L. Strid, in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', pp. 203–10.

[158] L.G. Broderick, 'Social Taphonomy: Agency, Biography and Chaîne Opératoire of Cattle Bones in a Mediaeval European City', York University PhD thesis (2017).

late Saxo-Norman Queen's College has been studied previously and this data is not inconsistent, although that assemblage has a more equal distribution of domestic cattle and caprine specimens.[159] Fewer pathologies were observed in this part of the assemblage, with three caprine and two domestic cattle specimens having lesions consistent with osteochondrosis and a domestic cattle femur having an exostosis on the lateral side. This specimen also had a helical fracture, suggesting deliberate breaking when fresh, in order to access the marrow.

Another possible helical fracture was observed on a caprine tibia from ditch 1851 and butchery evidence was relatively common, with a total of sixty-one specimens showing butchery marks. This included a large mammal vertebra which had been chopped though transversely and twelve large mammal ribs with an even split between chop or cutmarks on the lateral or medial side of the blade. In contrast, the pattern of butchery on ribs from medium-sized mammals was far more consistent, with all sixteen specimens with butchery marks having cutmarks (and one chopmark) on the medial side. Four medium mammal vertebra were chopped through axially, with one also being chopped transversely. This pattern is slightly different from the cellar pit assemblage, where both medium and large mammals had been treated in the same way, but the overall pattern for the period is still that described above.

Four domestic cattle bones from this phase have butchery marks – right ulnas from ditches 1846 and 1569 have oblique chops through the olecranon and on the articular surface, and on the trochlea notch, respectively, and scapulae (from pit 1894 and ditch 1654) had an oblique cutmark on the posterior edge and an axial chop through the glenoid. Of sixteen caprine specimens with butchery marks, ten were cutmarks near articulations, suggesting a more careful approach to primary butchery than with the large mammals. Of the chopmarks recorded, two were through the base of horncores and so suggest continued activity or trade with horners.

Four pig specimens from two different contexts (1854 and 1404) have oblique cutmarks or superficial chopmarks to the proximal end (an ulna and fourth metacarpal and a radius and fifth metacarpal) which likely result from disarticulation, supporting the evidence from the caprine bones that suggests a different approach to the butchery of medium mammals. A right humerus from cellar pit 1527 has oblique cutmarks on the medial side of the shaft which likely result from filleting. As with the cellar-pit assemblage, just one horse bone has butchery marks. A right mandible was chopped through the ramus; this also happens to be the only horse specimen from this period that was gnawed by canids.

In all, twenty-seven specimens showed evidence of having been gnawed, a far smaller proportion than in the earlier phase, all of them by canids. This number was fairly evenly split between ditch and pit contexts.

Phase 2a (Twelfth to Thirteenth Century)

The majority of the zooarchaeological assemblage derives from pits, as in the previous phases. The number of specimens studied from this phase was similar to that from the earliest phase and the proportions of species were again broadly similar to those in the earlier phases (Fig. 23). Nine domestic cattle specimens had lesions on articular surfaces, eight consistent with osteochondrosis, while a left pelvis from pit 1334 shows eburnation and has arthropathies

[159] A. Bates, 'Animal Bone', in Teague et al., 'Nun's Garden', pp. 177–8.

around the acetabulum and a second phalanx from pit 1397 has lipping around the proximal surface. Both of these pathologies suggest a long life of use as traction animals and indicate that some of the meat consumed on the site is from less than prime animals. Lesions are also present on ten caprine specimens, as is a 'thumbprint' on a sheep horncore (the cause of this pathology is still a subject of debate) [160] from pit 2182. A caprine metacarpal and metatarsal from pit 1397 have periostitis; in the case of the metacarpal this is quite extensive and involves osteitis additionally. Both of these conditions are the result of infection.[161] Another exostosis was present on the lateral edge of a caprine ilium from the same pit. A domestic fowl from pit 1334 also had exostoses, on the medial side of the distal end of a left tibia, and a pig tibia from the same pit had a lesion on the proximal surface consistent with osteochondrosis.

Two horse specimens from pit 1397 had extensive pathological damage – a second phalanx had periostitis and a left astragalus showed evidence for severe infection. This horse (or horses) is likely to have been lame for some time. In all, two of the seventeen horse specimens from this phase had been gnawed by canids and five had been butchered (one specimen suffering both taphonomic processes). The butchery marks, chops and cuts, are all likely to have been caused during primary butchery.

Large mammal vertebrae were all split axially and ribs were cut or chopped from the medial side (NSP=7) or from the lateral side (NSP=9), showing a pattern of mixed approach similar to that from the non-cellar deposits in Phase 1. Medium mammal vertebrae were also treated similarly to in the previous phase – seven being chopped through axially and one obliquely – whilst butchery to ribs shows that the mixed internal/external approach applied to large mammals in the non-cellar deposits in Phase 1 was beginning to be used for the smaller mammals as well (seven specimens chopped/cut from the medial side and three from the lateral).

Butchery to cattle specimens was again characterised by oblique chops through bones, often through articular surfaces (NSP=12), although two humeri and one scapula had cutmarks on their posteriors, probably from filleting. A metatarsal from layer 1190 had cutmarks around the proximal end, probably caused during skinning and suggesting processing for leather. Four caprine metapodials, including two from pit 1397, had the same marks and nine sheep horncores from this phase had been chopped through at the base, including five from pit 1397 and three from pit 1659 (which also included one of two goat horncores identified from this phase), showing increased evidence for horn-working activity in the area. Twenty-three other caprine specimens from this period had butchery marks, most commonly humeri (NSP=5) and pelvises (NSP=7). All of the pelvises were chopped through the acetabulum or ilium near the acetabulum, with other chops appearing near the articular surfaces of limb-bones or, in the case of two of the humeri, mid-shaft. Cutmarks, present on twelve specimens, had no clear patterning and are most likely due to secondary butchery carried out at the table.[162]

A pig humerus was also chopped through the shaft, whilst other butchery marks were cutmarks on or near articular ends (NSP=6) and a red deer radius had cutmarks on the anterior

[160] U. Albarella, 'Depressions on sheep horncores', *Journal of Archaeological Science*, 22 (1995), pp. 699–704.
[161] Bartosiewicz and Gál, *Shuffling Nags, Lame Ducks*.
[162] Broderick, Social Taphonomy.

side, probably from filleting. Two goose, a duck and a domestic fowl bone also had oblique cutmarks at the articular ends and a goose sternum had been chopped through axially.
The incidence of gnawing in the assemblage from this phase was greatly reduced, with just forty-nine specimens showing this type of damage. Of these two domestic fowl specimens, one from pit 1199 and one from layer 1190 had been gnawed by a cat and a rodent, respectively. The remaining forty-seven specimens had all been gnawed by canids and included domestic cattle, caprine, pig and horse.

The environmental samples from this period demonstrated that house mouse was still present on the site and another commensal species – European starling (cf. *Sturnus vulgaris*) – was also present.

Caprine Ages

The similar proportions of the different species present on the site through each phase discussed here suggest that the role the various animals played on the site was similar through that time. It therefore becomes justifiable to combine the caprine dataset into one group, spanning all three phases, to obtain a sample large enough to look at herd structure through epiphyseal fusion. Doing this suggests a kill off pattern that that very closely resembles Payne's[163] meat model (Fig. 24).

We might expect an urban site to display such a model, with the most common age being prime meat age (between 18 and 30 months). Ageing by toothwear is more difficult in the assemblage as complete mandibular tooth rows were not common (thirty-four across all three phases, including twenty-two sheep) but, although varied, these would appear to come principally from older animals. Although apparently telling a different story to the epiphyseal fusion data it is worth remembering the suggestions of horn-working activity in the area and that older animals would have larger horns.

Assessment of Assemblages from Phases 2b, 3 and 4

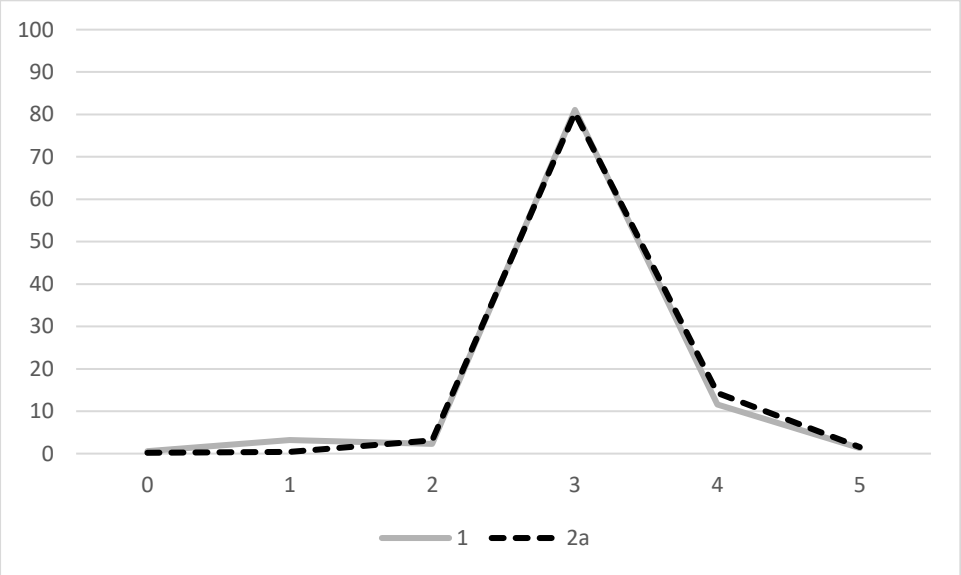
Initial assessment of the assemblages from Phases 2b–4[164] showed that a similar range of species was represented as in Phases 1 and 2a, with the addition of fallow deer, hare, rat, turkey, possible peafowl, teal, raven, rook and jackdaw. The material from Phases 2b–4 has been studied by Thomas Fowler as part of a post-graduate research project at the University of Nottingham, and will be published separately.

Conclusions

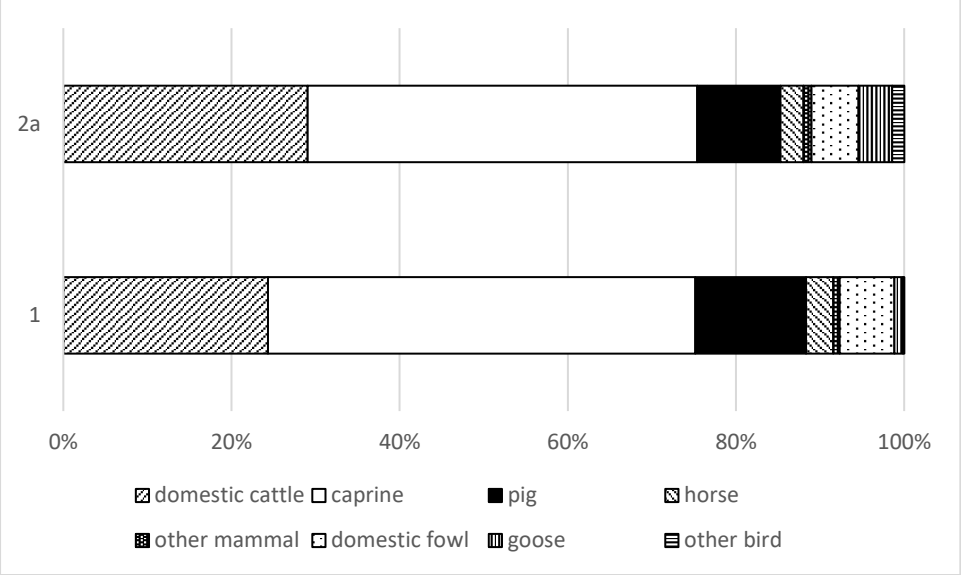
The assemblage provides a snapshot into urban-edge living in the early medieval period, which remains less understood than later periods in Oxford. The evidence points to sheep being kept on the site and managed to provide meat for the town's inhabitants. Although there was access on the site to game species, the other wild fauna points to the urban or semi-urban nature of the site from the earliest phases, with the only identified microfauna being commensal species.

[163] S. Payne, 'Kill-Off Patterns in Sheep and Goats: The Mandibles from Aşvan Kale', *Anatolian Studies*, 23 (1973), pp. 281–303.
[164] L. Strid, in 'Provost's Garden, The Queen's College Oxford, Post-Excavation Assessment and Updated Project Design', unpublished OA report (2016).

There is also some evidence for a slight shift in butchery practice during this time as well as a difference in approach between butchering large and medium mammals. The study of butchery as material culture can provide valuable insights to regional practices and is particularly valuable during the later medieval period, when guild structures ensure consistency within towns. By the high medieval period there also seems to be good evidence for horn-working, as well as possibly leatherworking, taking place in the vicinity of the site.

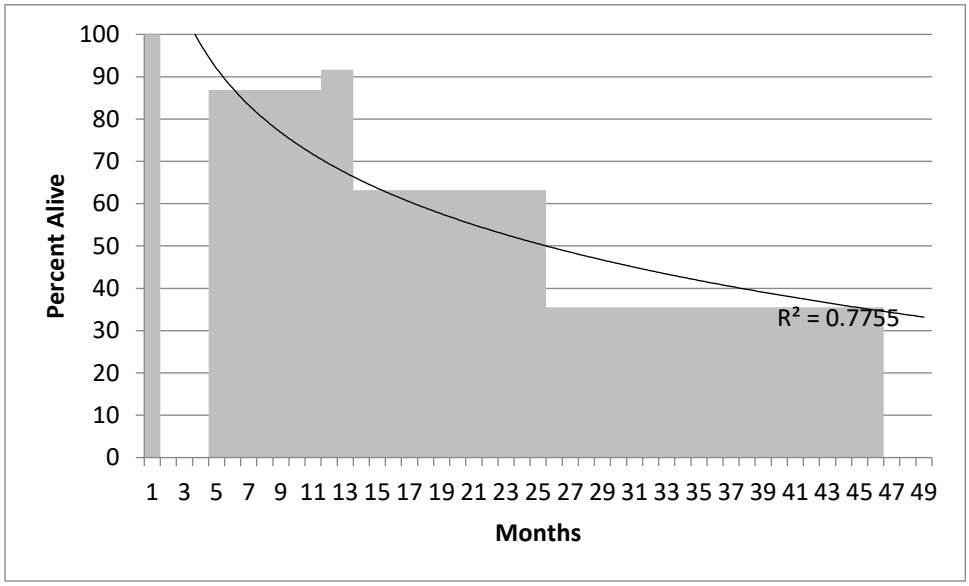


Graph 1. Weathering of identified specimens in the assemblage [165]



Graph 2. Proportions of taxa per period

[165] following A. K. Behrensmeyer, "Taphonomic and Ecologic Information from Bone Weathering," *Paleobiology* (1978), 4: 2, 150–62.



Graph 3. Age at death of caprine specimens in the assemblage, based on epiphyseal fusion

12 FISH BONE *BY REBECCA NICHOLSON*

Introduction

The fish assemblage considered for this study comprised over 5,000 identified fish bone elements, almost all recovered from bulk samples sieved to 0.5 mm as part of the flotation process and routinely sorted to 2 mm. Only eighty-two bones were collected by hand during the excavation and this small group was notably biased towards larger elements from larger species, particularly cod.

Due to the nature of the site, with large pits truncating earlier deposits, only fish remains from contexts considered to be secure were identified. The selection of material for further study was based on the apparent level of residuality within each context, with a cut-off point of 30% residual pottery used, although in practice most of the included contexts had much less, or no residual material. The only exception was for sample 38 from pit fill 1827 in pit 1772 which was recorded despite the context including a high level of residual pottery. The sample was rich in fish remains, mammal and bird bone and eggshell and as far as the fish remains are concerned was similar in composition to samples from other, securely phased, deposits within this feature. Based on this evidence it seems reasonable to assume that the fish remains are securely late medieval (Phase 2b).

Fish remains were recovered from each of the main phases, dating from the late Saxon period (Phase 1) to the modern period, but for this study only those bones dated from Phase 1 to 3a inclusive have been recorded, since later features generally contained large amounts of residual material. The richest assemblages came from deposits dated to the period of college construction and early use (Phase 2b), particularly from samples taken from the fills of pits 1558 and 1772 which seem to contain waste from college kitchens.

Methods

Identifications were made using the author's modern comparative osteological collections and with reference to established works.[166] Scales were identified where possible but only included in the quantifications as a single item/taxon/sample to avoid gross over-representation of taxa with robust and readily identifiable scales. Nevertheless, it is worth noting that fish with large numbers of vertebra, especially eels, are likely to be somewhat over-represented by NISP when compared with other taxa. The use of MNI (minimum numbers of individuals) has not been employed because many fish are likely to have been beheaded, which makes the use of this comparative method problematic.

Measurements (in mm) were taken on selected specimens using digital callipers (graduated 0.01 mm) following standard guides, which will allow the length of a few fish to be calculated using standard regression formulae.[167] Other size estimations are based on

[166] R. Gravendeel, W. Van Neer and D. Brinkhuisen, 'An Identification Key for Dermal Denticles of Rajidae from the North Sea', *International Journal of Osteoarchaeology*, 12, pp. 420–41; Libois and Hallet-Libois 'Elements pour l'identification des restes craniens des poissons dulcaquicoles de Belgique et du nord de la France 2: Cypriniformes', in J. Desse and N. Desse-Berset (eds), *Fiches d'Ostéologie animale pour l'Archéologie*, Sér. A, Poissons n° 4, Juanles- Pins: Centre de recherches archéologiques du CNRS (1988); J. Watt, G. J. Pierce and P. R. Boyle, *Guide to the Identification of North Sea Fish Using Premaxillae and Vertebrae*, Ices cooperative research report 220 (Copenhagen, 1997).

[167] A. Wheeler and A.K.G. Jones, *Fishes* (1991) for gadids; Libois and Hallet-Libois, 'Elements pour l'identification des restes craniens', for eel.

visual comparison with modern comparative material. All data will be available in the site archive.

The Assemblage

Table 21 provides a summary of the numbers of identified specimens present (NISP) for each species in each of the phases. From the identified bones and scales, at least thirty-six species of fish taxa were recorded (twenty-two marine/estuarine, two migratory and twelve freshwater species). Of the marine fish the most common were cod, whiting, haddock, herring, plaice, gurnards, sea bream(s) and thornback ray. Species identified from a small number of bones include pollack, hake, torsk, ling, conger eel, flounder, sole and john dory. The migratory taxa include eel and salmon. Exclusively freshwater fish include pike, perch and several cyprinids including roach, rudd, chub, dace, tench, gudgeon and minnow as well as nine-spined stickleback and, probably, barbel.

Preservation and Modification

The fish bones are generally well preserved, particularly so in a few samples where even tiny and very fragile elements survive. Very few bones are burnt and only occasional examples of chewed bones of the kind typically recovered from cesspits were observed. There was also little evidence of butchery, although this is typical for fish bone assemblages, especially those dominated by small bones. Two cod caudal vertebra had been both chopped through, in a manner typical of portioning a large fish. A small knife cut to one cod caudal vertebra may have resulted from filleting. A small cyprinid vertebra also exhibited a knife cut.

Descriptions of the Assemblages

Phase 1 (Late Ninth to Eleventh Century). The majority of fish remains came from samples taken from the backill of cellar pits 1657 and 1718. Typically for deposits of this date in Oxford,[168] the assemblage comprised bones from herring and eel as well as smaller flatfish including plaice and small and tiny cyprinids. As an oily fish, the herrings would have been preserved by salting, while both the eels and the cyprinids would have been available in the Rivers Thames and Cherwell, although it is possible that the eels were also imported as salted fish, which would extend their palatability. The plaice (only identified from pit fill 2182) may also have been preserved: only caudal vertebrae, a cleithrum and an anal pterygiophore were present.

Sample 22 from fill 1717 (cellar pit 1718) included over 100 tiny and fragile bones including a number of pharyngeals from small and tiny cyprinids such as gudgeon, roach and minnow. Although these fish are not now considered edible, they seem to have been widely eaten in the past (see below). The excellent condition of these bones makes it extremely unlikely that they derive from latrine waste, fish guts or bird pellets and as the site was not likely to have been inundated by river flooding this source of small fish can also be excluded. The tiny fish may, however, have been discarded as unsuitable for consumption, perhaps after cleaning out material accidentally caught in nets or traps, or collected for use as bait.

[168] E.g. the assemblage from Oxford Castle; R. Nicholson, Fish Bone, in J. Munby, A. Norton, D. Poore and A. Dodd *Excavations at Oxford Castle 1999–2009*, Thames Valley Landscapes Monograph 44 (Oxford, 2019).

Phase 2a (Twelfth to Thirteenth Century). The only fish remains from deposits securely dated to the early medieval period came from pit fill 1335 in pit 1334. Clupeids dominate the assemblage by number of bones, notably herring but including at least one vertebra from sardine, but smaller gadids including haddock and whiting, eel and gurnard are also common. Several bones from mature cod and plaice and small pike were also identified as well as a tiny spine from nine-spined stickleback and a gudgeon pharyngeal. It is likely that the herring and gadids and probably also the plaice were sold as preserved fish while the juvenile pike (picarel), gudgeon and stickleback would have been caught locally, the last probably as an unintended by-product of a freshwater fishery, caught in a fine net. Also present in the soil sample collected from this feature fill was a single fragment of mackerel vertebra, and a thornback ray dermal denticle was hand collected from the same deposit. Mackerel were typically sold fresh, but as an oily fish they spoil rapidly so it is possible that this fish was salted.

Phase 2b (Fourteenth to Mid Fifteenth Century). The majority of fish remains came from samples taken of pit fills likely to represent waste from the college kitchens and these are compositionally fairly similar, including a diverse assemblage numerically dominated by herring, smaller gadids (especially whiting and haddock), flatfish (particularly plaice), gurnards, small cyprinids and eel. Augmenting these fish were smaller quantities of sea bream, salmon and/or trout, skates/rays, perch, larger cyprinids, pike, mackerel, sea bass and john dory, the last of these identified from eleven vertebrae and fin bones from at least one large individual in pit fill 1105. Large red sea bream would have been an expensive fish; this species has been identified in several samples and together with large conger eel and john dory is an indicator of affluence relating to the early years of Queens College. A fragment of a large salmonid dentary is likely to be from salmon, again a luxury purchase. Freshwater fish include pike, perch and cyprinid, none of them especially large and some of the cyprinid bones including roach come from small individuals.

Gadids and related species include occasional hake, pollack and torsk as well as cod and whiting. The presence of several cranial bones from large cod indicates that not all large gadids were sold as dried stockfish or similar product, since the head would have been removed during the preparation of these widely traded fish. Of the small and medium-sized gadids, mainly whiting, both cranial and post-cranial bones were present again indicating the procurement of entire and probably fresh fish. Of the two hake bones, both caudal vertebrae, one was chopped through in a manner seen today when hake is cut into steaks. Torsk is a fish found in northern waters and is likely to have been dried. A large conger eel dentary also demonstrates that whole fish were purchased. Gurnards were common and included both grey gurnard, red gurnard and tub gurnard; again, both cranial and post-cranial bones indicate entire fish. Herring, eel and small flatfish bones were present but were not abundant.

Phase 3a (Late Fifteenth to Sixteenth Century). The fish identified from the early post-medieval period are generally of similar types to those from the preceding phase but some of the more expensive fish such as sea bream and salmon are absent or infrequent. Whether this is a true reflection of a change in circumstance is, however, uncertain since the total number of identified fish bones is significantly less. Eel are more frequent than in the preceding phases, but while this could indicate the consumption of cheaper fish, sourced locally, eel have large numbers of vertebrae so the presence of a relatively small number of additional fish could skew the pattern in favour of this species and in fact the majority of eel bones come from a single sample from pit fill 1374. There are also occasional bones from

more expensive fish[169] such as large salmonid (salmon or sea trout), as well as fairly large pike and cyprinids and conger eel in addition to the herrings, gadids, smaller flatfish, rays and gurnards.

Discussion

The fish remains reflect the development of the site from extra-mural settlement to college. The preponderance of eel, herring, flatfishes and small cyprinids in Phase 1 is typical of contemporary sites in Oxford[170] and indicates the consumption of preserved fish supplemented with small-scale fishing in the Thames and the Cherwell or their tributaries. The collection of tiny bones in possible sunken featured building structure 1718 is interesting and indicates that even tiny fish were brought home either intentionally (as food) or unintentionally (caught in the fine nets or traps and later removed when the nets were cleaned). Even tiny fish such as minnows were eaten: the term minnow – probably used for a variety of tiny freshwater fish – occurs relatively frequently in household accounts or records of banquets.[171] They could have been fried or made into a fritter or soup. The consumption of small freshwater fish clearly continued in the medieval period (Phase 2a). The identification of a sardine suggests some trade with the south-west where these fish formed an important fishery.

A much greater range of fish were evidently purchased and consumed in the fourteenth–fifteenth centuries and it is very likely that this relates to early college dining. Both stored fish (especially dried stockfish and salted herrings) were bought but the relative frequency of gurnards, sea bream and occasional larger salmon, conger eel, john dory and pike suggest meals for wealthy individuals, although the assemblage lacks the sturgeon identified from earlier excavations at Queens College[172] and from the Dominican Priory[173]. A variety of marine and freshwater seafood was a major component of the diet of fellows and scholars of fifteenth century Kings College, Cambridge[174] and the fish assemblage has many similarities to those recovered from other high and late medieval college deposits[175] although

[169] For the relative cost of different types of fish see C. Dyer, 'The Consumption of Fresh-water Fish in Medieval England', in M. Aston (ed), *Medieval Fish, Fisheries and Fishponds in England*, BAR BS, 182 (1988).
[170] E.g. R.A. Nicholson, 'Fish Bones', in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', pp. 210–14; B. Wilson and A. Locker, 'Animal bones from 7–8 Queen Street', in Dodd, *Oxford before the University*, pp 361–2; Nicholson, in Munby *et al*., *Oxford Castle*; C. Ingrem, 'Bird, fish and small mammals', in Z. Kamash, D.R.P. Wilkinson, B.M. Ford and J. Hillier, 'Late Saxon and Medieval Occupation: Evidence from Excavations at Lincoln College, Oxford 1997–2000', *Oxoniensia*, 67 (2002), pp. 252–5; M. Armour Chelu, 'The Faunal Remains from 56–60 St Aldate's, 30–31 St Aldate's (Land Adjoining the Police Station) and 24–26 St Aldate's (the Police Station)', in Dodd, *Oxford before the University*, pp. 347–58.
[171] E.g. as cited in R. Phillips and M. Rix, *Freshwater fish of Britain, Ireland and Europe* (1985), p. 46; M.W. Adamson, *Food in Medieval Times* (Westport, 2004), p. 105.
[172] Nicholson, in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', pp. 210–14.
[173] M.R. Wilkinson, 1985 The fish remains, in G. Lambrick, 'Further Excavations on the Site of the Second Dominican Priory, Oxford', *Oxoniensia*, 50, pp. 192–3.
[174] F. Soyer, 'Dining at King's in the Fifteenth Century' (2006) http://webcms.kings.cam.ac.uk/sites/default/files/archives/dining-fifteenth-century.
[175] As at Queen's College kitchen, Merton College and New College in Oxford: R.A Nicholson, 'Fish remains', in D. Poore, D. Score, and A. Dodd 'Excavations at No. 4A Merton St., Merton College, Oxford: The Evolution of a Medieval stone house and tenement and an early college property', Oxoniensia, 71 (2006), pp. 306–11; Nicholson, in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford';

the material from Queens College is more diverse. Records held by Magdalen College provide a useful indication of the kinds of fish regularly purchased by an aristocratic household in the fifteenth century, in this case the family of John Moulton,[176] and it would appear that a similar diet was followed at least for college dignitaries and fellows. According to a rare Magdalen College account from 1537, both river fish and salt fish were purchased (Magdalen College Archives MS 946, cited in Aylmer 2005) for college meals.

While it is likely that much of the fish was purchased from suppliers in London, hake and conger eel are more likely to have come from Southampton or Bristol and it may be significant that Queen's College held estates in and around Southampton from the time of Edward III.[177] Both torsk and ling are found in more northerly waters and are likely to have been traded as dried fish from Orkney, Shetland or Norway, perhaps together with cod. The rapid transport of fresh fish from the coastal ports as far inland as Oxford is attested by the consistent presence of seafish such as sea bream as well as shellfish which would almost certainly not have been salted. By around 1360 fishmongers in St Aldates were selling herrings, stockfish and "Winchelsea fish" from over 18 stalls,[178] so clearly fish was a fairly widely available food for those who could afford it.

Table 21. Fish bone identifications: number of identified bones (excludes most ribs, rays and scales)

Taxa		**1**	**2a**	**2b**	**3a**	**Total**
Elasmobranchii	Elasmobranch			1		1
Pleurotremata	Sharks		1			1
Rajidae	Rays			3	2	5
Raja clavata	thornback ray		4	1	12	17
Anguilla anguilla	Eel	10	27	303	520	890
Conger conger	Conger eel		3	33	2	38
Clupeidae	Herring family		12	135	1	148
Clupea harengus	Herring family	31	372	436	229	1068
Sardina pilchardus	Pilchard		1			1
Salmonidae	Salmon family		1	22	2	25
Salmo salar	Salmon family			4		4
Salmo trutta	Trout			1		1
Esox lucius	Pike	2	7	185	20	214
Cyprinidae	Cyprinid (carp family)	127	12	303	150	592
Rutilus rutilus	Roach		1	7	4	12
Scardinius erythrophthalmus	Rudd			3		3
Squalius cephalus	Chub			10		10

R.A. Nicholson, 'Fish Bone', in OA, 'New College, Oxford: Kitchen and Wine Cellar Link Tunnel Projects. Post-excavation Assessment', unpublished OA report (2018).

[176] C.M. Woolgar, 'The Development of Accounts for Private Households to *c.*1500 A.D.', Durham University thesis (1986), Magdalen College, Oxford Estate Paper 85/2, The Household Accounts of John Moulton, http://etheses.dur.ac.uk/1449/.

[177] http://www.queens.ox.ac.uk/history.

[178] *VCH Oxon*. 4 (1979), pp. 305–12.

Leuciscus leuciscus	Dace			1		1
Squalius/Leuciscus sp.		1				1
Phoxinus phoxinus	Minnow			1		1
Gobio gobio	Gudgeon		1			1
Tinca tinca	Tench			2	2	4
?*Barbus barbus*	Barbel			8		8
Gadidae	Gadid (Cod family)		112	210	37	359
Gadus morhua	Cod		11	63	26	100
Gadus/Pollachius			1	2		3
Pollachius pollachius	Pollack		3	2		5
Pollachius sp.	Pollack/Saithe		1			1
Merlangius merlangus	Whiting		22	315	66	403
Merlangius/Gadus morhua					1	1
Melanogrammus aeglefinus	Haddock		4	205	18	227
Molva molva	Ling			4	2	6
Brosme brosme	Torsk		1			1
Merluccius merluccius	Hake		2	19	2	23
Zeus faber	John Dory			11		11
Gasterostidae	Sticklebacks			2		2
Pungitius pungitius	3-spined stickleback		1			1
Triglidae	Gurnards		27	83	37	147
Eutrigla gurnardus	Grey Gurnard		1	9	4	14
Aspitrigla gurnardus	Red Gurnard		1	3		4
Trigla lucerna	Tub Gurnard			50	7	57
Trigla sp.				5	25	30
Percidae	Perch family			1		1
Perca fluviatilis	Perch	1	2	53	5	61
Dicentrarchas labrax	Bass			3		3
Sparidae	Sea Breams		2	9	1	12
Pagellus bogaraveo	Red Sea Bream		3	13		16
Pagellus/Sparus sp.				21		21
Scomber scombrus	Mackerel		1	13		14
Scomber sp.				1		1
flatfish indet			1	20	3	24
Scopthalmidae	Turbot/Brill/Megrim			1		1
Scopthalmidae/Bothidae	Left eyed flatfish			2		2
Pleuronectidae	Right eyed flatfish		1	373	20	394
Platychthys flesus	Flounder			9		9
Pleuronectes platessa	Plaice	3	1	27	1	32
Pleuronectes/Plathychthys				53		53
Solea solea	Sole			38	1	39
Unidentified		2	2	49	7	60
Total		**177**	**643**	**3129**	**1207**	**5156**

13 MARINE SHELL *BY REBECCA NICHOLSON*

Marine shell, mostly common/European oyster (*Ostrea edulis*) and mussel (mainly or entirely *Mytilus edulis*), was recovered largely from medieval and post-medieval pit fills (Phases 2b–4a). Typically, almost all of the shell collected by hand on site was oyster, with mussel common in the sieved material and whelks (*Buccinium undatum*) and cockles (*Cerastoderma edule*) also occasionally present. Although very large quantities of shell were hand recovered on site, much of it came from deposits which have proved to include over 33% of residual pottery. Consequently, a decision was taken not to process and record the majority of shell, although a small part of the assemblage, some 1300 shells, had previously been washed and recorded as part of the assessment, before the extent of residuality became apparent. Unfortunately, most of the material that was assessed proved to be from late medieval or post-medieval contexts (Phases 3a–4a) containing significant levels of residual pottery, and consequently these shells are not discussed further, although it is worth noting that sample 32, from pit fill 1664 (Phase 4a), included a very large quantity of oysters. This report therefore provides a summary of the securely phased and washed hand-collected shell and shell recovered from sieved flotation samples, from secure late Saxon or medieval deposits (Phases 1–2b). Detailed records of the recorded assemblage will be available as an Excel spreadsheet in the archive.

Methods

The shells were identified to species and quantified based on the number of umbones (bivalves) or apices (gastropods). For oysters, shells were identified to anatomical side (left or right valves), and general notes were made concerning preservation; completeness; shape; relative thickness and weight; the presence of chambering and chalky deposits; natural colour or post-burial staining; attachment of adult or spat oysters; man-made notches or cuts; and any visual evidence of encrustations or infestations, as described by Winder.[179] The shells were not measured since none of the sieved samples included sufficient shells to be statistically meaningful: even in contexts which included fairly large numbers of oysters, owing to fragmentation and the chalky/flaky nature of many of the shells there were too few measurable valves to warrant an investigation of shape and size.

The Assemblage

Apart from a single small fragment of cockle (*Cerastoderma* sp.) from cellar pit fill 1687, all of the thirteen shells identified from late Saxon deposits (Phase 1) were oyster. These included small and large examples as well as shells with chalky deposits, chambering and opening notches as described by Winder.[180]

No shells from early medieval contexts (Phase 2a) were available for study; the few contexts with more than one of two shells from this phase included significant quantities of residual material.

The recorded shellfish from Phase 2b came mainly from soil samples taken from fills within large pit cuts 1538 and 1772. Oysters were especially common in the fills of pit 1558

[179] J.M. Winder, *Oyster Shells from Archaeological Sites: A Brief Illustrated Guide to Basic Processing* (2011) https://oystersetcetera.files.wordpress.com/2011/03/oystershellmethodsmanualversion11.pdf.
[180] Ibid.

and again were of very variable size and shape, consistent with collection from wild beds. Some large/old specimens were present with some evidence for crowding within the beds indicated by the irregular shape of some valves, while a significant proportion of left valves appeared to have evidence of disturbed growth, possibly indicative of a sudden change in habit during the life of the oyster which could be linked to oyster management,[181] although more detailed study of a larger assemblage would be needed to test this hypothesis. Chalky deposits, which occurred in around in 30% of the recorded oyster valves from pit 1538, may indicate their development within a zone of fluctuating salinity.[182] Evidence of parasitic infestation by polychaete worms was generally limited to a few shells with distinctive worm burrows (mainly of *Polydora hoplura*) but a much greater proportion of valves were internally blistered (almost 50% of the left valves from the recorded shells in pit 1538), although no worm tunnels were evident. Gastropod boreholes occurred on a number of shells and several exhibited damage typically caused by the sponge *Cliona celata*.[183] Sample 18 from pit fill 1547 included fragments of "rottenback" oyster, and there are several other examples of heavily pockmarked shells. Unusually, the assemblages included tiny juvenile oysters (spat) as well as mature specimens; juveniles comprised almost half of the small oyster assemblage in the sample from fill 1547. Whelks, cockles and mussels were present in several samples, and were relatively frequent in fill 2337, with a minimum of 183 mussels and seventeen whelks (plus two juvenile whelks) as well as a minimum of sixty-three oysters and a single saddle oyster *Anomia ephippium* in a single 10 litre soil sample. Cockles were more common in fill 2335 but mussels were the numerically dominant shellfish in pit 1772; fill 1777 (sample 35 included a minimum of 143 individuals in a 20-litre soil sample and fill 1805 (sample 36 included 496 mussel valves in a 40-litre sample together with thirteen fairly small-sized oysters including juveniles and a single saddle oyster).

The few recorded hand-collected shells, from pit fills 1095, 1240 and 1295, were all oyster, of variable sizes and shapes and in fair to poor condition with a similar proportion of chalky, blistered and gastropod-bored shells to that found in the sieved assemblage.

Discussion

The presence of small quantities of marine shell in later Saxon deposits is significant in that it demonstrates the rapid movement of a perishable product inland from the coast to the late Saxon burh. Small numbers of oysters as well as periwinkle and possible scallop were identified in late Saxon deposits at Oxford Castle[184] and in both cases it seems unlikely that the shellfish had been preserved since that would render the transport of shells unnecessary.

Mussels become common in samples dating to the fourteenth–fifteenth centuries (Phase 2b) post-dating the college foundation and in fact the majority of all the shellfish come from the fills of large rubbish or quarry pits which seem likely to have been used to dispose

[181] G. Campbell, 'Oysters ancient and modern: potential shape variation with habitat in flat oysters (*Ostrea edulis* L>) and its possible use in archaeology', *Munibe* (suplemento-Gehigarria), 31 (2010), pp. 176–87.
[182] J.M. Winder, 'Oysters and Other Marine Shells', in M. Atkinson and S.J. Preston, 'Heybridge: A Late Iron Age and Roman Settlement, Excavations at Elms Farm 1993–5', *Internet Archaeology*, 40 (2015), http://dx.doi.org/10.11141/ia.40.1.winder.
[183] As illustrated in Winder, 'Oyster Shells from Archaeological Sites'.
[184] R.A. Nicholson, in J. Munby, A. Norton, D. Poore and A. Dodd *Excavations at Oxford Castle 1999–2009*, Thames Valley Landscapes Monograph 44 (Oxford, 2019).

of waste from the college kitchens. Since the composition of each fill within pit cut 1772 varied in terms of faunal composition it is possible that they represent kitchen waste from short-lived events, perhaps large meals.

Considered together, it is clear that a variety of shellfish was enjoyed during the earlier centuries of college occupation, including not only the ubiquitous oysters, likely to have been served in the shell, but also mussels, whelks and cockles. Mussels are likely to have been collected from rocks at low tide, but whelks are found in the lower intertidal zone and deeper water. Whelks are usually harvested using baited traps hauled in from boats, but baited lines have also been used in east coast estuaries by 'trotting', where lines are laid across the tide for about six hours and then hauled in.[185]

The oysters are likely to have been harvested from natural beds, as evidenced by the irregular shapes and sizes of shells as well as occasional examples of adhering spat or shells attached to each other. Although the shellfish could have been harvested by hand, from rocks in the intertidal zone, the presence of juvenile oysters and whelks as well as inedible saddle oysters (Anomiidae) in some samples probably indicates the dredging of inshore shallow waters as well as fairly unselective hand collection. It also suggests the bulk purchase of unsorted shellfish.

There is no good evidence to indicate where, geographically, the shellfish were collected from, but the presence of chalky deposits and chambers within a fairly high proportion of the oysters may indicate collection from shallower, estuarine waters or creeks with changing salinity[186]. Given the need to transport the perishable shellfish inland to Oxford, a source along the south coast, perhaps in the Solent, or along the Thames estuary seems likely. The shellfish would have been packed in sacks or barrels and transported probably by barge up the Thames (which was probably not navigable above Henley in the fourteenth century due to the number of fishweirs[187]) and by road, using waggons and specialist carriers known as ripiers.

Notches cut into the edges of some oysters suggest that they were opened and eaten fresh, although oysters can be opened more easily when heated and occasional blackened examples may attest to this method.

Shellfish have not previously been reported from excavations at Queen's College, but shellfish, particularly oyster and mussel but also occasionally periwinkles (*Littorina litorea*) were fairly abundant in predominantly late fourteenth and fifteenth century pit fills at New College[188] and oysters and mussels were also recovered in deposits associated with the kitchens at Greyfriars[189]. The more mixed shellfish assemblage from the Provost's Garden may indicate a wealthier consumer, able to afford a more diverse range of foodstuffs. This would be consistent with college dining, since even scholars are likely to have been used to fine dining as indicated by the fifteenth-century records from Kings College, Cambridge which

[185] Winder, in Atkinson and Preston, 'Heybridge'.
[186] Ibid.
[187] R.H.C. Davis, 'The Ford, the River and the City', *Oxoniensia*, 38 (1973), p. 264.
[188] R.N. Nicholson, 'Marine Shell', in OA, 'New College, Oxford: Kitchen and Wine Cellar Link Tunnel Projects. Post-excavation Assessment', unpublished OA report (2018).
[189] R.N. Nicholson, 'Marine Shell', in OA, 'Westgate Centre, Oxford: Post-Excavation Assessment', unpublished OA report.

document the purchase of fish and shellfish, the latter particularly oysters but also mussels and whelks.[190]

[190] F. Soyer, 'Dining at King's in the Fifteenth Century', (2006), http://www.medievalists.net/2012/10/dining-at-kings-college-in-the-15th-century/.

14 AVIAN EGGSHELL *BY REBECCA NICHOLSON*

Avian eggshell weighing c.130 g was recovered from twenty-nine bulk samples and hand collected from one context. Almost all came from the fills of Phase 2b pits 1538 and 1772, with small quantities coming from Phase 3a contexts (especially pit 1353). Most of the shell is likely to be from domestic chicken eggs. The collected eggshell constitutes a representative sample rather than the entirety of eggshell, since many samples includes highly fragmented shell in the finer residues which would have been extremely time-consuming to extract.

15 WOOD CHARCOAL AND CHARRED PLANT REMAINS *BY SHEILA BOARDMAN*

Introduction

Sixty-six soil samples (0.5–40 litres) from early Saxo-Norman through to later post medieval deposits, were previously assessed for wood charcoal and charred and mineralised plant remains[191]. Of these, twenty-one samples were selected for wood charcoal analysis and eight for the analysis of charred plant remains (and any mineralised material present). The wood charcoal samples all came from pit or cellar pit fills, and they represent the following phases: Phase 1, the Saxo-Norman period (three samples), Phase 2a, the early medieval period (twelfth to thirteenth centuries) (two samples), Phase 2b, the late medieval period (fourteenth to mid fifteenth centuries*)* (eight samples) and Phase 3a, the earlier post-medieval period (late fifteenth to sixteenth centuries) (seven samples). A single Phase 4a deposit, from the later post medieval period (*c.*1700–70), was also included for comparison. The wood charcoal investigation was undertaken in order to ascertain the preferred fuels in the various phases, to provide evidence for how different features were used and for the supply of fuelwood to this part of the town.

Six samples investigated for charred plant remains came from different Phase 1 cellar pit fills. One sample came from a Phase 1 ditch fill and one was from a Phase 2a pit fill. None of the samples were rich in charred material, so the main aims were to identify the range of crops and other species present, and the evidence, if any, these provide for the use(s) of the features and areas.

Methods

The bulk samples were processed by flotation using a modified Siraf tank with mesh sizes of 250 µm and 500 µm for the collection of the flots and residues respectively. Once dried, the residues were sorted for all artefactual and ecofactual remains, in the standard OA manner. Flots of samples investigated for wood charcoal were dry-sieved at 4 mm and 2 mm.

Charcoal fragments were then extracted from the greater than 4 mm and 2–4 mm flot fractions, plus any greater than 10 mm, 4–10 mm and 2–4 mm sorted residue charcoal fractions. Ten charcoal samples were 'fully analysed' and eleven were 'rapidly analysed'. For the fully analysed samples, 100 plus charcoal fragments were identified. Up to 154 fragments were examined (e.g. for sample 40), in order to obtain sufficient beech roundwood. In the rapidly analysed samples, 66–80 charcoal fragments were identified.

Individual fragments were fractured by hand and sorted into groups based on features observed in transverse section, at magnifications of x10–40. These were then fractured longitudinally, along their radial and tangential planes and examined at magnifications of up

[191] S. Boardman, 'Appendix 26: Charred and mineralised plant remains'; and 'Appendix 27: Wood charcoal', in 'Provost's Garden, The Queen's College Oxford, Post-Excavation Assessment and Updated Project Design', unpublished OA report (2016).

to x400, using a Biolam Metam P1 metallurgical microscope. Identifications were made using keys in Hather[192], Gale and Cutler[193] and Schweingruber[194].

For the charred plant remains, the greater than 250 µm flots were completely sorted for cereal grains, other seeds and fruits, straw nodes, chaff fragments, nutshells and any other charred remains. Identifications took place using modern seed reference material and standard reference manuals.[195] Low-power Leica and Brunel microscopes with magnifications of x10–x45 were used. Nomenclature follows Zohary and Hopf[196] for the cultivated plants and Stace[197] for other species.

Wood charcoal

The results for individual samples are listed as fragment counts in Tables 22–4. The charcoal was generally well preserved and was often present in large quantities. A quick scan of Tables 21–3 reveals a remarkably consistent range of taxa across all the phases, although the numbers of taxa present varied, from four to 10 per sample. Most common overall were beech (*Fagus sylvatica*) and oak (*Quercus*). These two taxa dominate or co-dominate all the samples, and together account for 80% of all the charcoal fragments examined. Tables 25–6 provides a summary of the various oak and beech elements. For oak, these included heartwood, sapwood, roundwood and indeterminate fragments. Beech charcoal was recorded as either from timber or roundwood. Where beech roundwood fragments were sufficiently complete with remaining pith and some bark, the growth rings were counted, and diameters measured. This information is presented in Figures 25–7 and is discussed further below.

Elm (*Ulmus*) co-dominated (with oak and beech) in one Phase 2b sample (41), and this was the third most frequent taxon overall. Hawthorn group (Pomoideae) charcoal was present in similar quantities to elm but in more samples. Pomoideae charcoal may include hawthorn (*Crataegus*), crab-apple (*Malus*), pear (*Pyrus*) and rowan/whitebeam/service (*Sorbus*) species. The other taxa present in the samples were ash (*Fraxinus excelsior*), hazel (*Corylus avellana*), field maple (*Acer campestre*), willow/poplar (*Salix/Populus*), blackthorn/cherry (*Prunus* sp.), blackthorn/plum (*Prunus spinosa/domestica*) type, birch (*Betula*) and holly (*Ilex aquifolium*). Notable absences compared to other sites in Oxford (see

[192] J.G. Hather, *The Identification of Northern European Woods: A Guide for Archaeologists and Conservators* (London, 2000).
[193] R. Gale and D. Cutler, *Plants in Archaeology: Identification Manual of Vegetative Plant Materials used in Europe and the Southern Mediterranean to c.1500* (Otley, 2000).
[194] F.H. Schweingruber, *Microscopic Wood Anatomy* (3rd edn), (1990).
[195] W. Beijerinck, *Zaden Atlas der Nederlandsche Flora.* Wageningen, Biol. Stat Wijster **30** (1947); G. Berggren, *Atlas of seeds and Small Fruits of Northwest-European Plant Species with Morphological Descriptions. Part 3, Salicaceae- Cruciferae* (1981 Berlings); R.T.J. Cappers, R.M. Bekker and J.E.A. Jans, *Digital Seed Atlas of the Netherlands*, Groningen Archaeological Studies **4**, (2006); S. Jacomet, *Identification of Cereal Remains from Archaeological Sites*, (2nd edn trans. by James Greig), (2006) Basel, Archaeobotany Laboratory, IPAS, Basel University.
[196] D. Zohary and M. Hopf, *Domestication of Plants in the Old World: The Origin and Spread of Cultivated Plants in West Asia, Europe and the Nile Valley*, 3rd edn (2000)
[197] C. Stace, *New Flora of the British Isles*, 3rd edn (Cambridge, 2010).

below) include alder (*Alnus glutinosa*), legume (e.g. *Ulex*/*Cytisus*) wood, buckthorn (*Rhamnus cathartica*), alder buckthorn (*Frangula alnus*) and dogwood (*Cornus*).[198]

Phase 1 (Late Ninth to Eleventh Century). All three samples were dominated by oak charcoal (Table 22). In samples 22 and 24, there was a fairly even mix of oak heartwood and sapwood, while oak heartwood dominated sample 63. In contrast to most samples from the later phases, there was little or no beech charcoal. Additional taxa present in the Phase 1 samples include hazel (*Corylus avellana*), Pomoideae (see above), blackthorn/cherry (*Prunus*), willow/poplar (*Salix/Populus*), field maple (*Acer campestre*), elm (*Ulmus*) and birch (*Betula*). Many of these were represented by roundwood fragments with 3–10 growth rings.

Phases 2a (Twelfth to Thirteenth Century) and 2b (Fourteenth to Mid Fifteenth Century). All the Phase 2a and 2b samples analysed for wood charcoal came from pit fills (Tables 23 and 25). One Phase 2a sample (10, context 1335) was dominated by oak with very little beech. The other sample (35, context 1777) produced about 100 beech fragments, 39% of which were roundwood fragments (Tables 23 and 25). Most roundwood fragments from sample 35 were incomplete so could not be measured but twelve more complete fragments had 6–27 growth rings, suggesting a high degree of variability in the ages of this material. By Phase 2b, all the samples were dominated or co-dominated by beech (Table 23), between 32% and 67% of which was from roundwood (Table 25). Sample 41 (context 1927) had similar quantities of oak, elm and beech. The beech timber and roundwood in the Phase 2b samples is discussed further below.

The oak charcoal in all the Phase 2a and 2b samples was dominated by heartwood. Oak sapwood was widely present and occasional, incomplete oak roundwood fragments were present in two Phase 2a samples (10 and 35) and two Phase 2b samples (39 and 18). The other taxa present in the Phase 2a samples were blackthorn/plum (*Prunus spinosa/domestica*), ash, hazel, elm and field maple. There was an average of 6.5 charcoal taxa per sample. In Phase 2a sample 35 (context 1335), the charcoal included ash roundwood (with 3–4 growth rings), immature ash timber and field maple roundwood (with 3 growth rings).

The full range of charcoal taxa from this site are present in the Phase 2b samples (including beech, oak, elm, Pomoideae, ash, hazel, blackthorn/plum, birch and holly), and again there was an average of 6.5 taxa per sample. Roundwood was present in most samples from a range of taxa, but again, much of this was incomplete. Surviving fragments mostly had 3–12 surviving growth rings. Some Pomoideae roundwood fragments in sample 18 (context 1547) had up to 20 growth rings.

Phase 3a (Late Fifteenth to Sixteenth Century). Four samples (13, 16, 3 and 18) were dominated by beech, and one (sample 12) was dominated by oak (Tables 24 and 26). Two other samples, while dominated by oak (sample 11) or beech (sample 66), had more equal proportions of both taxa. The Phase 3a samples had an average of seven taxa. The full range of charcoal taxa from the site were again present, and there were many roundwood fragments, particularly of Pomoideae, elm, field maple and ash (with 3 to 15 growth rings).

[198] S. Boardman, 'Wood charcoal', in S. Teague and B.M. Ford, 'Medieval and Post-Medieval Tenements at Lincoln College, Turl Street, Oxford. Specialist reports', unpublished OA report (2020), https://library.oxfordarchaeology.com/3261/https://library.oxfordarchaeology.com/3261/

Phase 4a (Early to Mid Eighteenth Century). The single Phase 4a sample (2) was beech dominated, with more moderate amounts of beech roundwood as compared to the Phase 2 and 3 samples (Table 24). The other taxa were oak, birch, Pomoideae, field maple and ash. Other than in the smaller proportion of beech roundwood, this sample was very similar to the samples from Phases 2 and 3.

Standardisation in Fuel Wood Supplies

The shift from oak to beech as the main fuel wood utilised has been recorded at a number of sites in Oxford[199] and farther afield. From the samples here, this would seem to have taken place sometime during the period covered by Phase 2a. One Phase 2a sample (10, context 1335) and all the Phase 1 samples were dominated by oak charcoal with very little beech, while the other Phase 2a sample (35, context 1777) produced nearly 100 beech fragments, nearly 40% of which were from roundwood (Tables 23 and 25). Most roundwood fragments from sample 35 were incomplete so could not be measured, but 12 had 6–27 growth rings, suggesting a high degree of variability in the ages of this material. By Phase 2b, all the samples were dominated or (or co–dominated) by beech (see Table 25). Between 32% and 67% of this was from roundwood (Table 25). In Phase 3a, 34% to 79% of the total beech fragments recorded came from roundwood (Table 26). In Figure 25, the overall numbers of growth rings on beech roundwood fragments from samples from Phases 2b and Phase 3a are compared. The roundwood in the Phase 2b samples mostly had 8–16 growth rings, so they remain quite variable in age. This may indicate that much of the material here, as previous periods, was collected from underwood rather than managed woodlands. In contrast, for Phase 3a, two peaks in the growth rings are indicated, at 7–11 rings and, to a lesser extent, 14–16 growth rings. This suggests that at least two different gauges of roundwood were in use by this time.

In Figure 26, the sizes (diameters) of the beech roundwood fragments in the two phases are compared, showing that they are remarkably similar. Each phase has 4–5 more common diameter sizes. It would be interesting to see whether with more data these peaks merge – into a normal distribution curve – or whether some diameter sizes continue to be more common than others. The latter would suggest that different sizes of roundwood were selected, possibly for particular purposes.

Previous work at Lincoln College[200] put the transition from oak to beech as the main fuel wood at the fifteenth/sixteenth century boundary, and it was suggested that beech roundwood or rods here were cut on long coppice cycles of 18–20 years. More recent work at Lincoln College[201] has indicated increased beech utilisation from the early-mid thirteenth century onwards. The results from the current site appear to be broadly consistent with this picture, with increased beech occurring somewhere from the late twelfth to the early to mid

[199] D. Challinor, 'The wood charcoal', in Kamash *et al*., 'Excavations at Lincoln College, Oxford 1997–2000', pp. 271–4; Boardman, in Teague and Ford, 'Medieval and Post-Medieval Tenements at Lincoln College, Turl Street, Oxford'; D. Druce, 'Merton College: Charcoal Assessment', OA Archive Report (2006); D. Challinor, 'The Wood Charcoal', in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford', pp. 165–217; D. Druce, 'Charred Plant Remains and Charcoal', in OA, 'New College, Oxford: Kitchen and Wine Cellar Link Tunnel Projects. Post-excavation Assessment', unpublished OA report (2018).

[200] Challinor, in Kamash *et al*., 'Excavations at Lincoln College'.

[201] Boardman, in Teague and Ford, 'Medieval and Post-Medieval Tenements at Lincoln College. Specialist reports', unpublished OA report, https://library.oxfordarchaeology.com/3261/

fourteenth century onwards. Late medieval beech roundwood stems recovered from kitchens and related deposits have also been investigated at Queen's College.[202] From a study of roundwood growth ring patterns and season(s) of harvest, as well as the numbers of rings and roundwood sizes, it was concluded that some of the beech firewood was supplied from coppiced woodland, and this was harvested on 15- to 20-year rotational cycles. Other gauges of roundwood were also present.[203] The growth ring data for the charcoal from the Provost's Garden does not appear as consistent as this.

In Figure 27, an attempt is made to compare the most common roundwood ages (number of growth rings) for the two phases (2b and 3a), with samples from two comparable (but non-identical) phases from the Lincoln College Garden Building site: Phase 4 (late fourteenth to early sixteenth century) and Phase 5 (sixteenth to early seventeenth century). The curves are quite similar for the later Queen's College phase (3a) and both phases (4 and 5) from Lincoln College. The main peaks in all three occur between 6/7–11/12 growth rings. As noted above, the samples from Phase 2b at Queen's College have one wider peak, between 8 and 16 growth rings.

Charred plant remains

The charred plant remains are listed in Table 27. Each cereal grain, chaff fragment and straw node (if complete), and whole seed or fruit, was counted as one. Fragments are suffixed by 'F'. There were a few mineral-replaced seeds in sample 22, from a Phase 1 cellar pit fill (context 1717). These typically occur in environments with high concentrations of phosphate and calcium ions in solution such as cess pits.[204] A sewage-rich environment is also suggested by the presence of mineralised pupae/puparia of seaweed fly (*Thoracochaeta zosterae*)[205] in sample 22.

The eight samples analysed all had moderate quantities of charred plant remains and much of these were poorly preserved (Table 27). This was particularly true of the large legume (*Vicia/Pisum/Lathyrus*) seeds and some wild plant remains, many of which could not be identified to species. Cereal grains were the most common material. The majority were identified as wheat (*Triticum* sp.) or oats (*Avena* sp.). The wheat grains were of the broad, rounded free-threshing type. A few wheat rachis internodes were recovered from the Phase 2a sample 10 (context 1335), two of which were from hexaploid wheat (*Triticum aestivum/ compactum)*. The other rachis fragments in this sample and a fragment from the Phase 1 sample 51 (context 1745) were too poorly preserved for identification. Two types of free-threshing wheat have been identified at other Saxon and medieval sites in Oxford.[206] The main hexaploid wheat and, economically, the most important crop in these periods was breadwheat (*Triticum aestivum*).[207] Tetraploid wheat (*T. turgidum/durum*) is sometimes

[202] Challinor, 'The Wood Charcoal', in Norton and Mumford, 'Anglo-Saxon Pits and a Medieval Kitchen at The Queen's College, Oxford'
[203] Ibid.
[204] L.M.E. McCobb, D.E.G. Briggs, W.J. Carruthers, W. J. and R.P. Evershed, 'Phosphatisation of Seeds and Roots in a Late Bronze Age Deposit at Potterne, Wiltshire, UK', *Journal of Archaeological Science,* 30 (2003), pp. 1269–81.
[205] S.C. Webb, R.E.M. Hedges and M. Robinson, 'The Seaweed Fly *Thoracochaeta zosterae* (Hal.) (Diptera: Sphaerocidae) in Inland Archaeological Contexts: $\delta^{13}C$ and $\delta^{15}N$ Solves the Puzzle', *Journal of Archaeological Science*, 25 (1998), pp. 1253–7.
[206] Boardman, in Teague and Ford, 'Medieval and Post-Medieval Tenements at Lincoln College'.
[207] P.W. Hammond, *Food and Feast in Medieval England* (Stroud, 1995).

present in small quantities, for example at Lincoln College.[208] This is all probable rivet wheat (*T. turgidum*), which was used for bread (with a different texture) and the straw was used for thatching. In recent year this has become more widely found in medieval deposits across central England and the Midlands.[209]

Oats are represented by grains only. The presence of large and small grains may indicate that both cultivated oats (*Avena sativa*) and wild species (e.g. *Avena fatua*) were present. Hulled barley (*Hordeum vulgare*) grains were found throughout the samples. This was the second most important crop grown in these periods.[210] The presence of some asymmetric barley grains indicates the six-row variety, but there were no rachis internodes to confirm this or other barley varieties. Small quantities of rye (*Secale cereale*) grains were present in four samples (22, 24, 56, 10) from Phases 1–2a, and a few fragments of rye chaff were recovered from sample 10, from the Phase 2a pit fill (context 1335). Rye straw was also valued as a thatching material in the past.[211]

Other frequent finds were large legume seeds and fragments, identified as bean/vetch/ pea/wild vetch (*Vicia/Pisum/Lathyrus*). These probably include additional crops such as pea (*Pisum sativum*) or broad/horse beans (*Vicia faba*), plus possibly larger seeded, wild legume species. Four Phase 1 samples had one or two seeds or fragments of flax (*Linum usitatissimum*) or possible flax. Flax seeds in low numbers have been recovered from many Saxon and medieval sites in Oxford, and flax retting seems to have taken place in the St Aldates area.[212] The scattered seeds in these deposits may have had a largely culinary use.

Hazelnut (*Corylus avellana*) shell fragments were present in all but sample 10 (context 1335) from Phase 2a. A single possible hawthorn (cf. *Crataegus* sp.) fruit stone was tentatively identified in sample 19 (context 1687) from a Phase 1 deposit. At other Saxon and medieval sites in Oxford, a much wider range of wild and cultivated fruits/nuts, legumes and culinary plants were present, including grape, fig, strawberry, blackberry, raspberry, plum, cherry, apple/pear, hazelnut, hawthorn, lentil, fodder vetch and fennel.[213]

The cereal grains were accompanied by smaller seeds and fruits of wild species. including probable weeds of cultivation. These were not present in large numbers and many were in poor condition. Corncockle (*Agrostemma githago*), stinking mayweed (*Anthemis cotula*) and cleavers (*Galium aparine*) all have large seeds or seed heads, so have to be removed from crops by handpicking. These are reasonably common on urban sites. All three are also associated with autumn-sown crops. Stinking mayweed and cleavers are typical weeds of the heavier calcareous clays around Oxford, which are suited to breadwheat

[208] Ibid.
[209] J. Greig, 'The British Isles', in W. van Zeist, K. Wasylikowa, K-E. Behre (eds) *Progress in Old World Palaeoethnobotany* (1991), p. 229–334; J. Greig, 'Archaeobotanical and Historical Records Compared – A New Look at the Taphonomy of Edible and Other Useful Plants from the 11th to the 18th centuries AD', *Circaea*, **12)** (1996), pp. 211–47; L. Moffett, 'The Archaeology of Medieval Plant Food', in C.M Woolgar, D. Serjeantson and T. Waldron (eds), *Food in Medieval England. Diet and Nutrition* (Oxford, 2006), pp. 41–55.
[210] Hammond, *Food and Feast*.
[211] J.B. Letts, 1999 *Smoke Blackened Thatch. A Unique Source of Late Medieval Plant Remains from Southern England* (London, 1999).
[212] M. Robinson, 'Environmental evidence from All Saints Church', in Dodd, *Oxford before the University,* pp. 388–9; M. Robinson and D.R.P. Wilkinson, 'The 'Oxenford': Detailed Studies of the Thames Crossing in St Aldates', in Dodd, *Oxford before the University*, pp. 65–134.
[213] J. Giorgi, 'Plant Remains', in Teague et al., 'Nun's Garden'; Boardman, in Teague and Ford, 'Medieval and Post-Medieval Tenements at Lincoln College'.

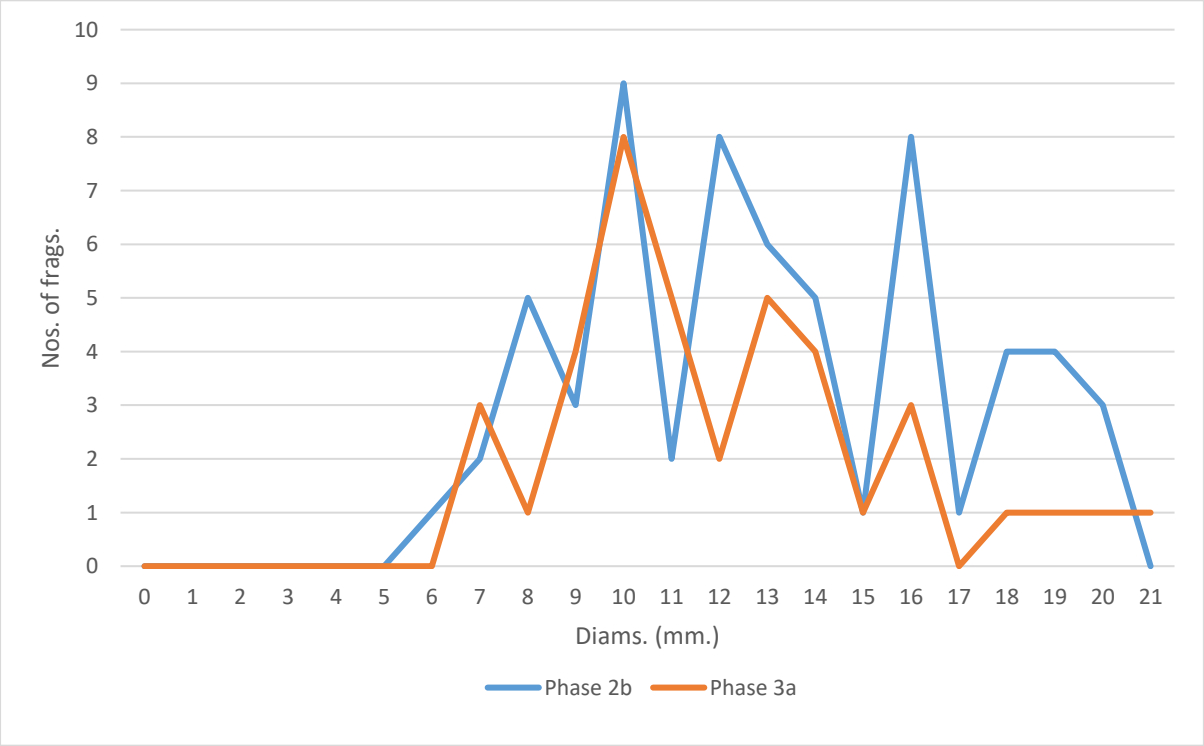
production. Some of the other species may have grown on disturbed, nitrogen-rich ground around the town, in gardens or with spring-sown crops. These include black bindweed (*Fallopia convolvulus*), docks (*Rumex* spp.), goosefoots/oraches (*Chenopodium/Atriplex*) and some mallows (*Malva* spp.). Plants which are more typical of grasslands include grasses (Poaceae), sedges (*Carex* spp.), plantain (*Plantago* sp.) and small-seeded legumes (*Vicia/Lathyrus*, Fabaceae).

Conclusions

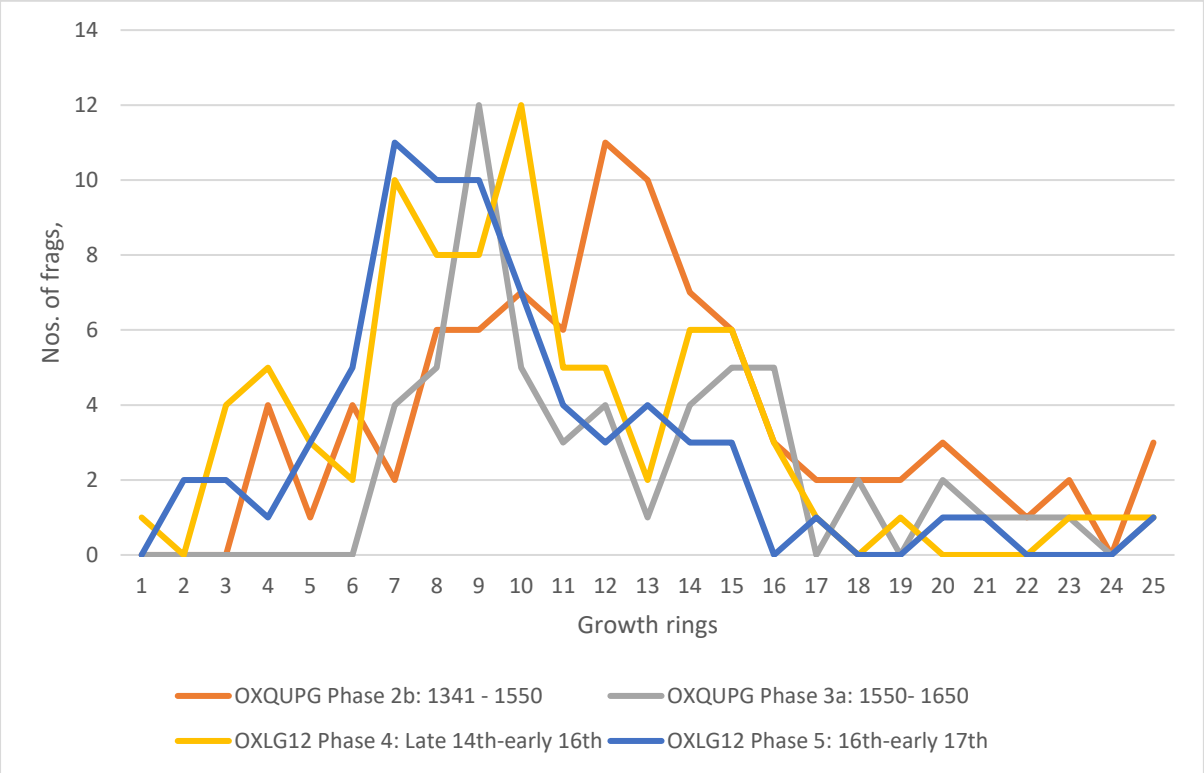
The wood charcoal evidence has added to our knowledge of the how fuel woods were used in early Oxford, and indirectly to our understanding of the regional woodlands in the Saxo-Norman, medieval and post medieval periods. As elsewhere, specific fuels, here oak and beech, seem to have been used, and different gauges of beech roundwood were apparently increasingly utilised from the thirteenth century onward. Much of the beech roundwood, particularly in the later medieval and post-medieval periods, may have come from woodlands managed by coppicing but detailed evidence for the latter (e.g. from roundwood growth ring patterns and evidence for the season(s) of cutting), are very rarely seen in charcoal assemblages. Different patterns of wood use and woodland management may, however, become much clearer with increasing research in this area.

The charred plant remains have shown that several cereal species were probably cultivated in the Saxo-Norman, medieval and post-medieval phases, including bread wheat, hulled barley, rye and oats. Cultivated legumes also seem to be present but the fragmentary remains were too poorly preserved for identification. There were fewer remains of wild and cultivated fruit and nuts, vegetables, culinary plants and/or forage crops compared to other contemporary sites in Oxford, suggesting that the excavated areas here were not strongly associated with either crop processing or food preparation.

Graph 4. Beech roundwood, numbers of growth rings



Graph 5. Beech roundwood diameters, Phases 2b and 3a



Graph 6. Beech roundwood growth rings, Queens College and Lincoln College data compared

Table 12. Wood charcoal from Phase 1. Key: h - heartwood; s - sapwood; r - roundwood; b-bark. Pomoideae inc. Pyrus (pear), Malus (apple), Crataegus (hawthorn) and Sorbus (rowan, service, whitebeam).

Sample No.		22	24	63
Context No.		1717	1745	2265
Cut/Feature No.		1718	1657	2266
Feature type		cellar pit	cellar pit	pit
Phase		1	1	1
Vol. of soil processed (litres)		40	36	8
Rosaceae				
Prunus sp.	blackthorn/cherry	1r	3 + 1r	1
Pomoideae (see below)	hawthorn group	2 + 1r	12 + 1r	1 + 3r
Ulmaceae				
Ulmus	elm		1	
Fagaceae				
Fagus sylvatica	beech	1	2	
Quercus	oak	88hs	83hs	65hs
Betulaceae				
Betula	birch		1	
Corylus avellana	hazel	13 + 2r	3 + 1r	1r
Salicaceae				
Salix/Populus	willow/poplar		2	
Sapindaceae				
Acer campestre	field maple		2	
Indet. charcoal fragments		3 + 1b	1 + 3b	
Total fragments		**112**	**116**	**71**

Table 23. Wood charcoal from Phases 2a–b. Key: h - heartwood; s - sapwood; r - roundwood; b- bark. Pomoideae inc: Pyrus (pear), Malus (apple), Crataegus (hawthorn) and Sorbus (rowan, service, whitebeam).

Sample No.		10	35	34	39	40	44	15	18	68	41
Context No.		1335	1777	1775	1834	1861	1880	1435	1547	2335	1917
Cut/Feature No.		1334	1772	1772	1772	1772	1772	1434	1538	1538	1920
Feature type		pit	pit	pit	pit	pit	pit	pit	pit	pit	pit
Phase		2a	2a	2b	2b	2b	2b	2b	2b	2b	2b
Vol. of soil processed (litres)		8	20	20	20	32	10	40	40	10	20
Rosaceae											
Prunus spinosa/domestica type	blackthorn/plum type	1	9					3			
Prunus sp.	blackthorn/cherry	1	2 + 1r								
Pomoideae (see below)	hawthorn group			1 + 1r	1	4 + 1r	1 + 3r	5	3 + 4r	1	3 + 2r
Ulmaceae											
Ulmus	elm		2r	2r				1	1r	5 + 3r	27 + 5r
Fagaceae											
Fagus sylvatica	beech	1	98r	48r	61r	126r	61r	49r	53r	42r	25r
Quercus	oak, total	59hsr	11hsr	11hs	4hr	16hs	5h	35hs	55hsr	16hs	32hs
Betulaceae											
Betula	birch							2			
Corylus avellana	hazel	3 + 1r				1 + 1r	2 + 2r	2	2 + 1r		2

Salicaceae											
Salix/Populus	willow/poplar			1r				18 + 1r	1		
Sapindaceae											
Acer campestre	field maple	1	1r	1	1r	2 + 1r			5 + 1r		5 + 1r
Oleaceae											
Fraxinus excelsior	ash		7 + 3r	5r		2		3 + 2r	2 + 4r	1 + 1r	1
Aquifoliaceae											
Ilex aquifolium	holly								1r		
Indet. charcoal fragments			1b						1 + 1b	1b	1 + 2b
Total fragments		**67**	**135**	**70**	**67**	**154**	**74**	**121**	**135**	**70**	**106**

Table 24. Wood charcoal from Phases 3a and 4a. Key: h - heartwood; s - sapwood; r - roundwood; b- bark. Pomoideae inc: Pyrus (pear), Malus (apple), Crataegus (hawthorn) and Sorbus (rowan, service, whitebeam)

Sample No.		11	13	12	16	3	8	66	2
Context No.		1354	1355	1356	1374	1055	1300	2054	1044
Cut/Feature No.		1353	1353	1353	1353	1053	1319	1251	1046
Feature type		pit	pit	pit	pit	pit	pit	pit	pit
Phase		3a	3a	3a	3a	3a	3a	3a	4a
Vol. of soil processed (litres)		10	6	4	20	35	20	4	40
Rosaceae									
Prunus spinosa/domestica type	blackthorn/plum type	9		1 + 2r					
Prunus sp.	blackthorn/cherry	4		1	1	1 + 1r			
Pomoideae (see below)	hawthorn group	4 + 1r	2 + 5r	4	4 + 3r	3 + 1r	1	2	2r
Ulmaceae									
Ulmus	elm	5 + 7r	1r	1 + 1r	3 + 8r	5 + 1r	1r	3	
Fagaceae									
Fagus sylvatica	beech	35r	95r		76r	39r	63r	34r	53r
Quercus	oak	52shr	7hs	56hsr	31hs	18hsr	9shr	24hs	10hrs
Betulaceae									
Betula	birch								3 + 1r
Corylus avellana	hazel	1	3r						
Salicaceae									

Salix/Populus	willow/poplar	1	4 + 2r		1				
Sapindaceae									
Acer campestre	field maple		5r		3 + 5r	1	1 + 1r	1	2r
Oleaceae									
Fraxinus excelsior	ash	3	4 + 3r		3 + 2r	5 + 5r	1	4	1r
Aquifoliaceae									
Ilex aquifolium	holly	2r							
Indet. charcoal fragments						2	3b	1b	
Total fragments		**124**	**131**	**66**	**140**	**82**	**80**	**69**	**72**

Table 25. Oak and beech (Phases 1–2b)

Sample No.	**22**	**24**	**63**	**10**	**35**	**34**	**39**	**40**	**44**	**15**	**15**	**68**	**41**
Context No.	**1717**	**1745**	**2265**	**1335**	**1777**	**1775**	**1834**	**1861**	**1880**	**1435**	**1435**	**2335**	**1917**
Cut/Feature No.	**1718**	**1657**	**2266**	**1334**	**1772**	**1772**	**1772**	**1772**	**1772**	**1434**	**1434**	**1538**	**1920**
Feature type	**cellar pit**	**cellar pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**
Phase	**1**	**1**	**1**	**2a**	**2a**	**2b**	**2b**	**2b**	**2b**	**2b**	**2b**	**2b**	**2b**
Fagus sylvatica													
beech, total (no.)	**1**	**2**	**-**	**1**	**98**	**48**	**61**	**126**	**61**	**49**	**53**	**42**	**25**
beech, timber (no.)	1	2	-	-	60	21	20	51	30	29	24	18	17
beech, timber (%)	-	-	-	-	61	44	33	40.5	33	59	45	43	68
beech, roundwood (no.)	-	-	-	1	38	27	41	75	31	20	29	24	8
beech, roundwood (%)	-	-	-	-	39	56	67	59.5	67	41	55	57	32
Quercus													
oak, total (no.)	**88**	**83**	**65**	**59**	**10**	**11**	**4**	**16**	**5**	**35**	**55**	**16**	**26**
oak, heartwood (no.)	27	35	31	42	4	8	2	7	4	14	28	4	14
oak, heartwood (%)	31	42	48	71	-	-	-	44		40	51	25	44
oak, sapwood (no.)	25	24	15	5	4	2	-	7	-	10	17	9	7
oak, sapwood (%)	28	29	23	8.5	-	-	-	44	-	28.5	31	56	22
oak, roundwood (no.)	-	-	-	2	1	-	1	-	-	-	1	-	-
oak, roundwood (%)	-	-	-	3.5	-	-	-	-	-	-	2	-	-
oak, indet. (no.)	36	24	19	10	2	1	1	2	1	11	9	3	11
oak, indet. (%)	41	29	29	17	-	-	-	12	-	31.5	16	19	34

Table 26. Oak and beech (Phases 3a and 4a)

Sample No.	**11**	**13**	**12**	**16**	**3**	**8**	**66**	**2**
Context No.	**1354**	**1355**	**1356**	**1374**	**1055**	**1300**	**2054**	**1044**
Cut/Feature No.	**1353**	**1353**	**1353**	**1353**	**1053**	**1319**	**1251**	**1046**
Feature type	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**	**pit**
Phase	**3a**	**3a**	**3a**	**3a**	**3a**	**3a**	**3a**	**4a**
Fagus sylvatica								
beech, total (no.)	**35**	**95**	**-**	**76**	**39**	**63**	**34**	**53**
beech, timber (no.)	19	22	-	16	9	14	18	35
beech, timber (%)	54	23	-	21	23	22	53	66
beech, roundwood (no.)	17	73	-	60	30	49	16	18
beech, roundwood (%)	46	77	-	79	77	78	47	34
Quercus								
oak, total (no.)	**52**	**7**	**56**	**31**	**18**	**11**	**24**	**10**
oak, heartwood (no.)	9	3	40	16	8	1	16	6
oak, heartwood (%)	17.5	-	71.5	51.5	44.5	-	66.5	-
oak, sapwood (no.)	32	2	11	12	5	6	5	1
oak, sapwood (%)	61.5	-	19.5	39	28	-	21	-
oak, roundwood (no.)	1	-	1	-	3	1	-	2
oak, roundwood (%)	2	-	2	-	16.5	-	-	-
oak, indet. (no.)	10	2	4	3	2	1	3	1
oak, indet. (%)	19	-	7	9.5	11	-	12.5	-

Table 27. Charred plant remains. Key: + = present

Sample No.		**19**	**20**	**22**	**24**	**51**	**55**	**56**	**10**
Context No.		**1687**	**1689**	**1717**	**1745**	**1745**	**1791**	**1711**	**1335**
Cut No.		**1657**	**1657**	**1718**	**1657**	**1657**	**1657**	**1710**	**1334**
Feature type		**Cellar pit**	**Cellar pit**	**Cellar pit**	**Cellar pit**	**Cellar pit**	**Cellar pit**	**Ditch**	**Pit**
Phase		**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2a**
Vol. of soil processed (litres)		**40**	**15**	**40**	**36**	**10**	**35**	**30**	**8**
Flot fraction (100% examined)		**>0.25 mm**	**>0.25 mm**	**>0.25 mm**	**>0.25 mm**	**>0.25 mm**	**>0.25 mm**	**>0.25 mm**	**>0.25 mm**
Cereal grain									
Hordeum vulgare L.	barley, hulled asymmetric	3	1		1			1	
Hordeum vulgare L.	barley, hulled symmetric	1	1						
Hordeum vulgare L.	barley, hulled	3	2	2	3	3	2	1	3
cf. *Hordeum* sp.	cf. barley				1				
Secale cereale L.	rye			1	1			1	4
cf. *Secale cereale* L.	rye							1	1
Secale/Triticum	rye/wheat								1
Avena sp.	oats	14	7	7	6	5	17	20	10
cf. *Avena* sp.	cf. oats	3	3	1		1	2	2	2
Triticum sp.	free threshing wheat	19	8	8	12	5	8	13	8
cf. *Triticum* sp.	cf. wheat	5	3	3	1	1F	1	7	4
Cerealia	indet. cereal	14	9	6	17	6	3	17	15
Cerealia/Poaceae	cereal/large grass	1					1		
Chaff and straw									
Secale cereale L.	rye, rachis internode								2

cf. *Secale cereale* L.	cf. rye, rachis internode								1
Hexaploid wheat - *Triticum aestivum/durum*	breadwheat/durum wheat type, rachis internode								2
Triticum sp.	free threshing wheat, rachis internode					1F			2
Cerealia	cereal, culm node				1				2
Cerealia	cereal, culm base				1F				
Legumes, oil/fibre crops, fruits and nuts									
Vicia/Pisum/Lathyrus	bean/vetch/pea/wild vetch	1.5	3	1	2.5	1	2.5	2	1(F)
Vicia/Pisum/Lathyrus	bean/vetch/pea/etc., fragments	+	+		+	+	+	+	
Linum usitatissimum L.	linseed/flax	1		1 + F					
cf. *Linum usitatissimum*	linseed/flax		1				1 + 1F		
cf. *Crataegus* sp.	cf. hawthorn, stone fragment	1F							
Corylus avellana L.	hazelnut shell/fragments (F)	3F	3F	30F	18F	5F	11F	10F	
Indet.	fruit/nut shell fragment		1F	1F					
Wild species									
Vicia/Lathyrus 2–3 mm	vetch/vetchlings/tares etc								4
Vicia/Lathyrus <2 mm	vetch/vetchlings/tares etc				1.5		2	1	2
Fabaceae	pea family	2				Fs	2	2 + Fs	1
Malva sp.	mallow	1	1						
Brassica/Sinapis	cabbage/mustard								1
Fallopia convolvulus (L.) A. Love	black bindweed					1			
Rumex sp.	dock	2	1	2	2	1	2		
cf. *Rumex* sp.	cf. dock						1		
Polygonaceae indet.	knotweed family				1		1		
Agrostemma githago L.	corncockle, seed					2	1		
cf. *Silene* sp.	cf. catchfly						1		

Caryophyllaceae indet.	pink family						1		
Chenopodium sp.	goosefoot	1							
Chenopodium/Atriplex	goosefoot/orache	1	2						
Galium aparine L.	goosegrass, cleavers	1		1					
Galium sp.	bedstraw				1				
cf. *Plantago* sp.	cf. plantain								1
Anthemis cotula L.	stinking mayweed						2		
Asteraceae	daisy family, small		1					1	
Juncus sp.	rush			1					
Carex sp. (trigonous)	sedge, 3-faced						2	1	
Poaceae	grass, small		1				4	2	1
Poaceae	grass, medium						1F		
Poaceae	grass, large				1				
Indet.	seed/fruit	1	3	3	2	3	3	2	4
Other									
Fabaceae	mineral replaced, pea family			1					
Poaceae	mineral replaced, large grass			1					
Thoracocaeta zosterae	mineral replaced, seaweed fly pupae/puparia			+					
Other insect remains	mineral replaced, indet. frags.			+					
Wood	mineral replaced, indet. frags.			+					
Spherical hammerscale	industrial debris	+	+			+			

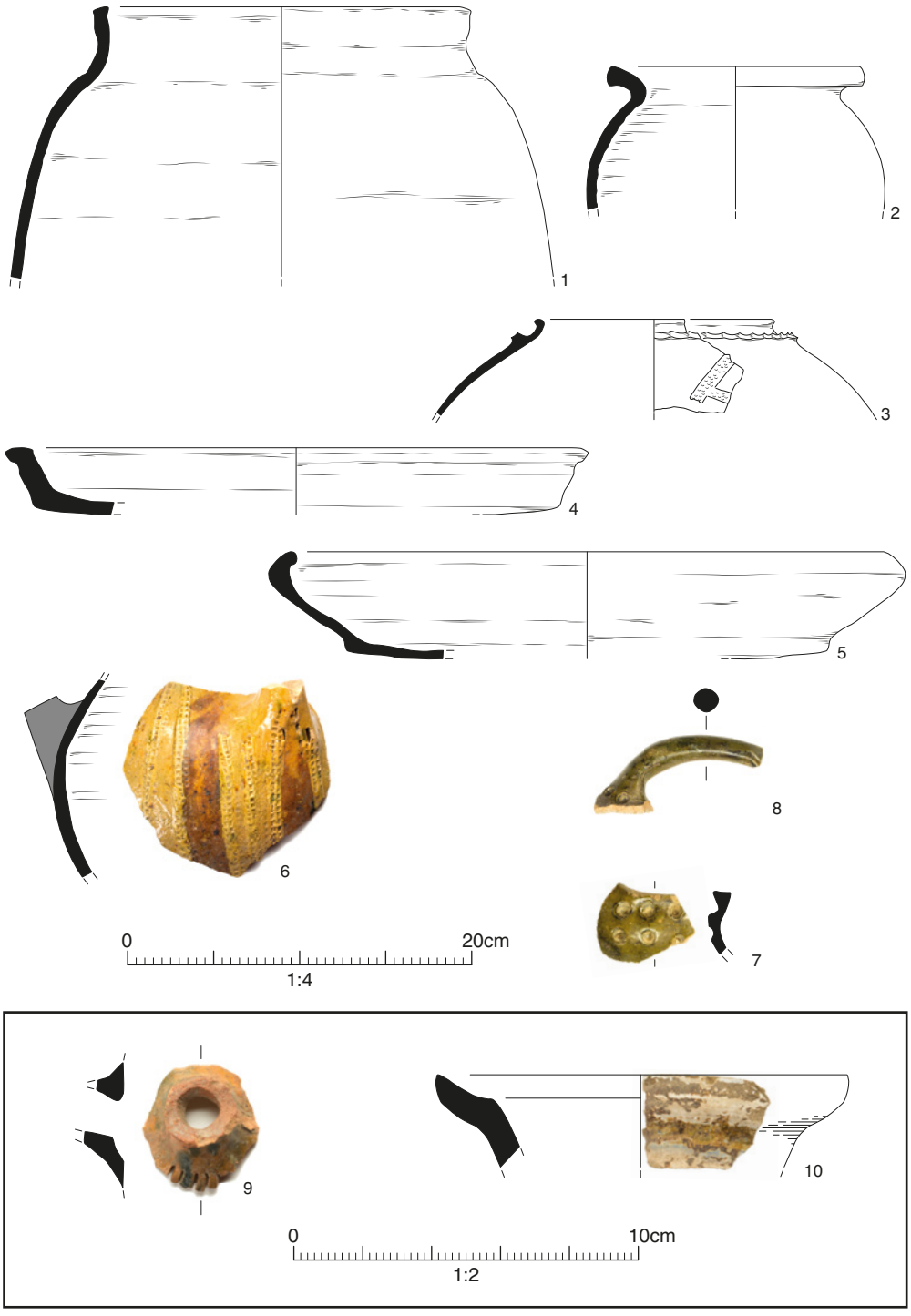


Figure 6.11: Pottery, nos. 1–10

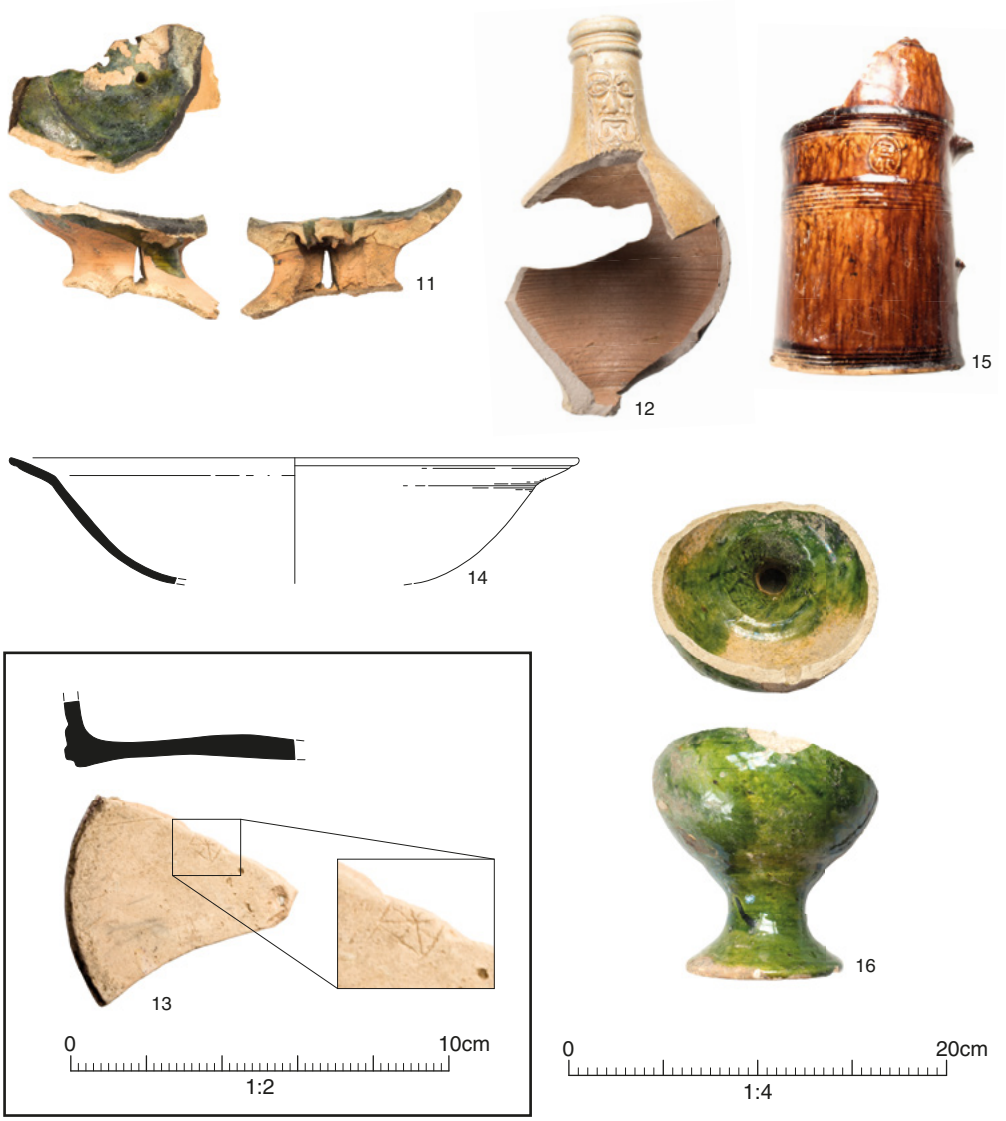


Figure 6.12: Pottery, nos. 11–16

Figure 6.13: Wine bottle seals

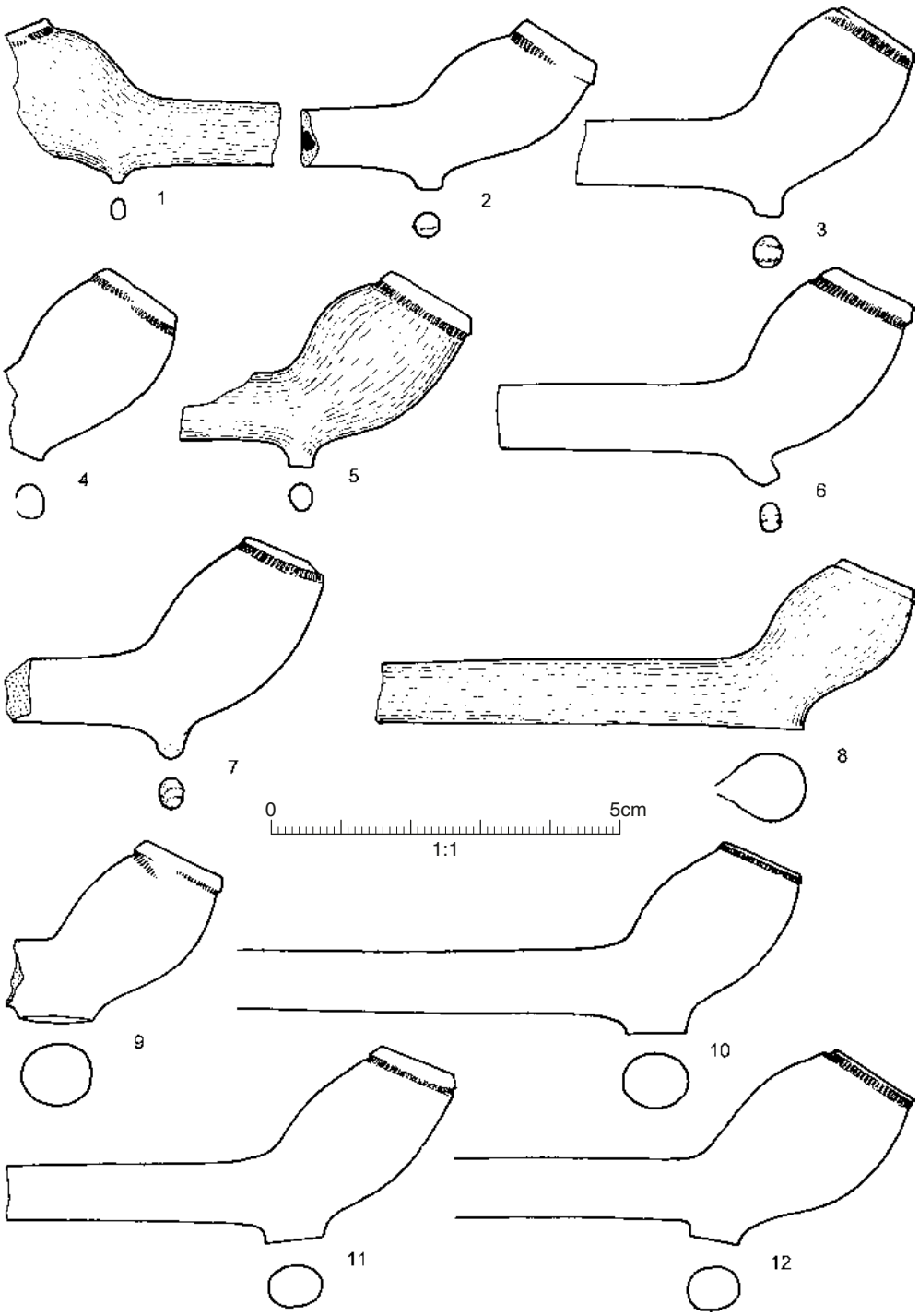


Figure 6.14: Clay tobacco pipes, nos 1–12

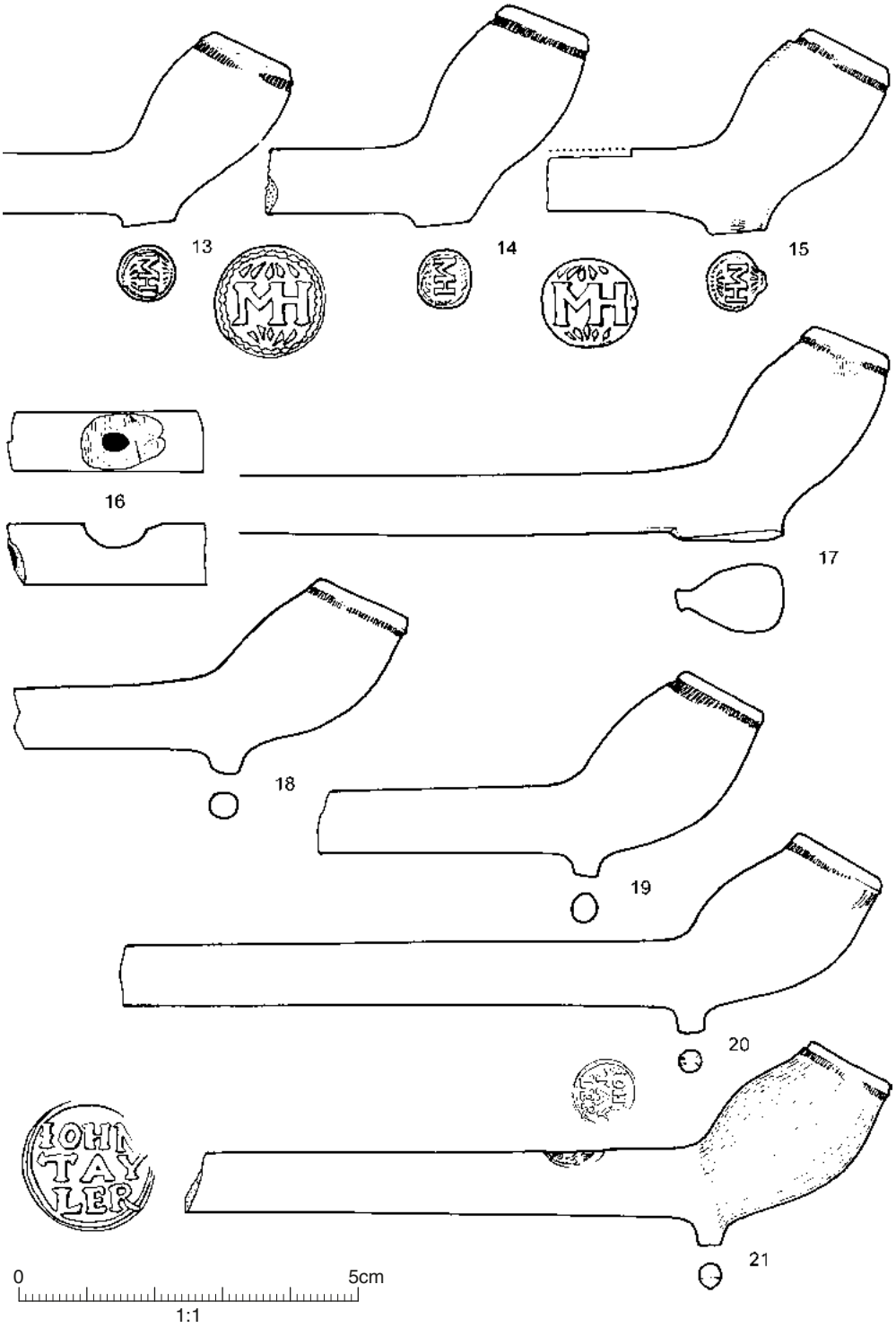


Figure 6.15: Clay tobacco pipes, nos. 13–21

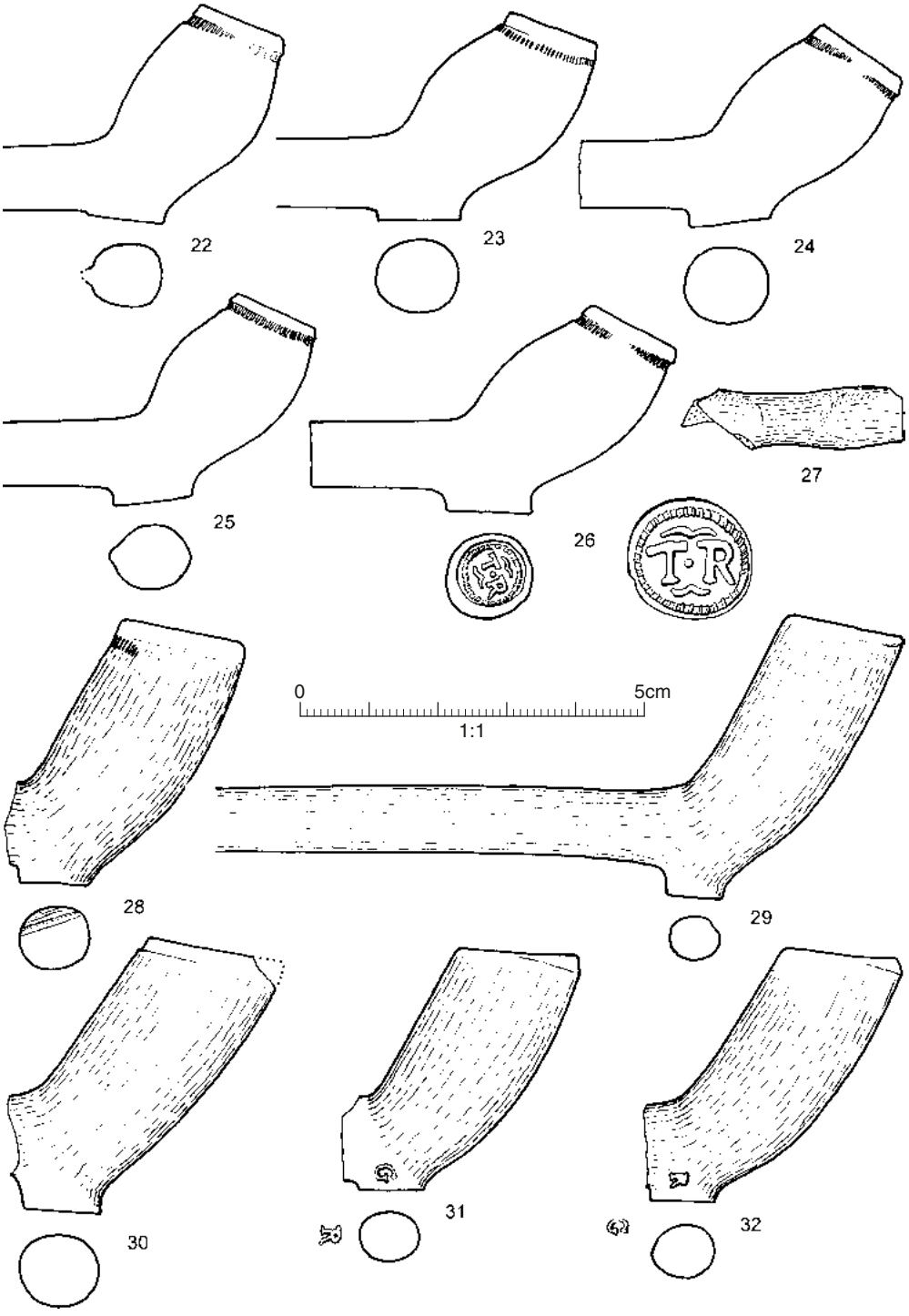


Figure 6.16: Clay tobacco pipes, nos. 22–32

Figure 6.17: Metalwork, nos. 1–5

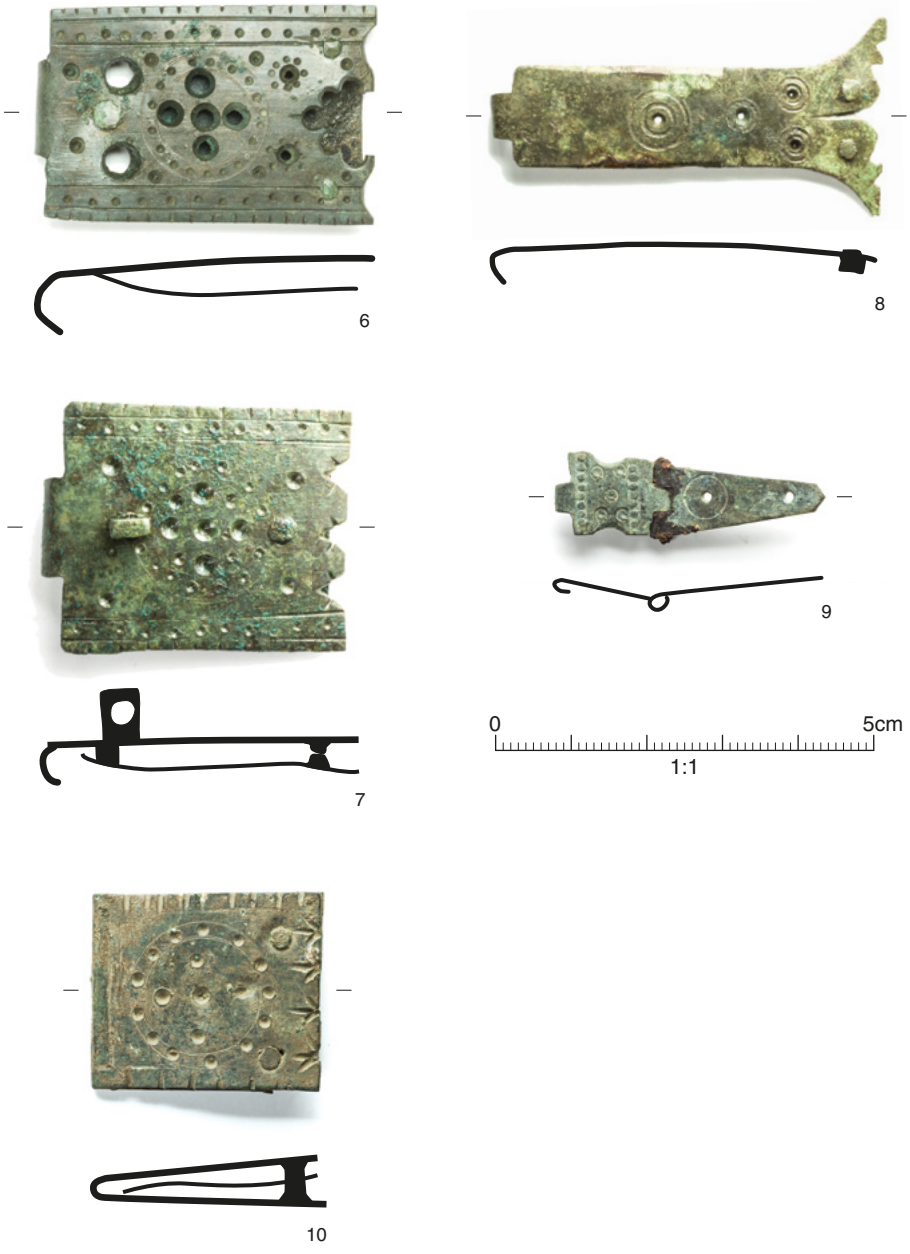


Figure 6.18: Metalwork, nos.6–10

Figure 6.19: Worked bone

Figure 6.20: Coins and jetons

Figure 6.21: Worked stone objects

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