Medieval and Post-Medieval Tenements at the Ashmolean Museum Extension Site, Oxford

Artefact and Environmental Reports

November 2020

Client: Oxford University

oxfordarchaeology

southsouthsouth

Client Name:	Oxford University
Document Title:	Medieval and Post-Medieval Tenements at the Ashmolean Museum Extension Site, OxfordArtefact and Environmental Reports
Document Type:	Digital supplement to publication report
Grid Reference:	SP 5114 0659
Invoice Code:	OXASHEPX
Receiving Body:	Ashmolean Museum
Accession No.:	2006.68
OA Document File Location:	
OA Graphics File Location:	
Issue No:	1
Date:	November 2020
Prepared by:	Steven Teague (Project Officer)
Checked by:	Ben Ford (Project Manager)
Edited by:	Leo Webley (Head of Post-Excavation)
Approved for Issue by:	Leo Webley (Head of Post-Excavation)
Signature:	

OA South
Janus House
Osney Mead
Oxford
OX2 0ES

t. +44 (0)1865 263 800

OA East
15 Trafalgar Way
Bar Hill
Cambridge
CB23 8SG

t. +44 (0)1223 850 500

OA North
Mill 3
Moor Lane Mills
Moor Lane
Lancaster
LA1 1QD
t. +44 (0)1524 880 250

e. info@oxfordarch.co.uk
w. oxfordarchaeology.com
Oxford Archaeology is a registered Charity: No. 285627

Medieval and Post-Medieval Tenements at the Ashmolean Museum Extension Site, Oxford

Artefact and Environmental Reports

Contents

List of Figures

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

Summary

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

Teague, S, and Ford, BM, 2020 Medieval and Post-Medieval Tenements at the Ashmolean Museum Extension Site, Oxford, in *The Archaeology of Oxford in the 21st Century* (eds A Dodd, S Mileson and L Webley), 325–400. Woodbridge: Boydell and Brewer.

Excavations in advance of an extension to the Ashmolean Museum (NGR SP 5114 0659) revealed evidence dating from the middle Anglo-Saxon period to the nineteenth century. A small group of middle Anglo-Saxon Ipswich ware pottery adds to growing evidence for occupation of this period in the vicinity, and is only the second group of such pottery recovered to date in Oxford. From the late twelfth century the area formed part of the developing northern suburb of the medieval town, and evidence was recovered for three tenements extending from St Giles' Street through to the boundary of the royal palace of Beaumont to the west. Most of the excavated area fell within a tenement identifiable with a property documented from the early thirteenth century. Between 1240 and 1260 this was held by Master Ralph of Swalcliffe, one of the earliest medical doctors known from the university, and subsequently by his brother, John. A fragment of window tympanum recovered during the excavations is likely to have come from a stone house constructed at the site by c.1200. This might be identifiable with the documented houses of Andrew Rufus, the earliest known owner of the property, who was alive in the last decade of the twelfth century. Clear evidence for long-lived property boundaries was seen in the excavations, and this suggests some revision of Salter's mapping of the area. Numerous thirteenth- to fifteenth-century features included wells, quarries and rubbish pits, and an unusually high number of medieval coins were recovered. There was some evidence for retrenchment in the later medieval period and for the subdivision of properties into the smaller holdings that are evident on early maps. Nevertheless, as on many sites of this period, the finds and environmental evidence from the fifteenth to the seventeenth centuries also point to a rising standard of living. Fishing is suggested by an unusually rich assemblage of bone from freshwater fish and eels and a group of fishing net weights. Other unusual finds include a coin weight for a James I gold half angel, and an assemblage of musket balls and a powder holder

cover that are likely to date from the Civil War. In the eighteenth century, an assemblage of malting kiln tiles and glass drinking vessels suggests that an inn that brewed ale existed on the site. The excavation archive will be deposited with the Ashmolean Museum under the accession code 2006.68.

1 POTTERY *BY PAUL BLINKHORN*

The pottery assemblage comprised 2,979 sherds with a total weight of 55,675 g. The estimated vessel equivalent (EVE) by summation of surviving rim sherd circumference was 19.76. The assemblage is noteworthy for the presence of a small group of early/middle Anglo-Saxon hand-built wares and Ipswich ware. The medieval and later pottery is typical of domestic assemblages from Oxford, with a notable group of sherds from at least five ceramic lamps from the backfill of early to mid thirteenth century well 663.

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[1] and to the minimum standards laid out in the Minimum Standards for the Processing, Recording, Analysis and Publication of post-roman Ceramics.[2] 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.[3]

Fabrics

The pottery was recorded using the coding system and chronology of the Oxfordshire County type-series,[4] as follows:

F100: OXR: St Neots ware type T1(1), AD 850–1100. 1 sherd, 21 g, EVE = 0.
F200: OXAC: Cotswold-type ware, 975–1350. 277 sherds, 3,115 g, EVE = 2.29.
F202: OXBF: North-East Wiltshire ware, 1050–1400. 193 sherds, 2707 g, EVE = 1.52.
F205: OXZ: Stamford ware, 850–1150. 1 sherd, 5 g, EVE = 0.
F300: OXY: Medieval Oxford ware, 1075–1350. 799 sherds, 8,324 g, EVE = 4.96.
F329: OX68: Potterspury ware, late thirteenth to seventeenth century. 2 sherds, 447 g, EVE = 0.10.
F330: OXBK: Medieval shelly coarseware, 1100–1350. 11 sherds, 241 g, EVE = 0.46.
F352: OXAM: Brill/Boarstall ware, 1200–1600. 959 sherds, 16,161 g, EVE = 7.96.

[1] MPRG, *Guide to the Classification of Medieval Ceramic Forms*, MPRG Occasional Paper 1 (1998).
[2] MPRG, *Minimum Standards for the Processing, Recording, Analysis and Publication of post-roman Ceramics,* Medieval Pottery Res Group Occ Paper 2 (2001).
[3] C. Orton, 'Minimum Standards in Statistics and Sampling', *Medieval Ceramics* 22-23 (1999), pp. 135-8.
[4] Mellor, 'A Summary of the Key Assemblages', in Hassall et al., 'Excavations at St Ebbe's, Part 2'; Mellor, 'A Synthesis of … Pottery in the Oxford Region'.

F355: OXBB: Minety ware. Early twelfth to fifteenth century. 2 sherds, 27 g, EVE = 0.
F356: OXBG: Surrey whiteware, Mid thirteenth to mid fifteenth century. 12 sherds, 165 g, EVE = 0.
F362: OXAG: Abingdon ware, mid/late eleventh to mid fourteenth century. 14 sherds, 109 g, EVE = 0.08.
F403: OXBN: Tudor green ware, late fourteenth century to *c.*1500. 21 sherds, 87 g, EVE = 0.15.
F404: OXCL: Cistercian ware, 1475–1700. 37 sherds, 602 g, EVE = 0.
F405: OXST: Frechen stoneware, 1550–1700. 51 sherds, 2,251 g, EVE = 1.54.
F408: OXAM: Brill/Boarstall 'Tudor green' type ('BBTG'), late fifteenth to sixteenth century. 5 sherds, 10 g, EVE = 0.08.
F410: OXCE: Tin-glazed earthenware, 1613–1800. 91 sherds, 1,367 g.
F412: OXRESWL: Polychrome slipwares, seventeenth to early eighteenth century. 24 sherds, 1032 g.
F413: OXSTW Westerwald stoneware, *c.*1590–1800. 2 sherds, 27 g.
F425: OXDR: Red earthenwares, 1550+. 236 sherds, 11,855 g.
F431: OXFI: Chinese porcelain, *c.*1650+. 16 sherds, 310 g.
F436: XBEWSL: Staffordshire-type slipwares, *c.*1650–1800. 10 sherds, 136 g.
F437: OXBEW: Staffordshire manganese wares, *c.*1700–1800. 34 sherds, 2,041 g.
F438: OXEST: English stoneware, *c.*1680+. 34 sherds, 2041 g.
F443: OXFM: White salt-glazed stoneware, 1720–80. 39 sherds, 442 g.
F448: CRM: Creamware, mid eighteenth to early nineteenth century. 7 sherds, 130 g.
F451: OXFH: Border wares, 1550–1700. 83 sherds, 1,433 g.
F1000: WHEW: Mass-produced white earthenwares, mid nineteenth to twentieth century. 27 sherds, 1,868 g.

The following, not included in the Oxford type-series, were also noted:

F2: Early-middle Anglo-Saxon handmade wares, AD 450–850. 4 sherds, 71 g, EVE = 0
F95: Ipswich ware, 720–850. 4 sherds, 114 g, EVE = 0.62. One of these is an uncertain identification and is discussed further below.
F1001: Romano-British wares. 5 sherds, 208 g

The range of Saxo-Norman and later wares is typical of Oxford and can be paralleled at many sites in the city. The presence of small quantities of Ipswich ware and early/middle Saxon hand-built pottery is worthy of comment. The hand-built pottery is a further small addition to the corpus of such wares in Oxford, including small numbers of sherds from other excavations around the Ashmolean Museum (see below).

The Ipswich Ware is only the second group known from Oxford, with the other being from the adjacent Sackler Library site. The sherds reinforce the initial suggestion that there was a middle Saxon settlement at Oxford centred on what later became the Beaumont Palace site. This is discussed in further detail below.

Chronology
Each context was given a seriated ceramic phase (CP) date, based on the wares present (Table 1). The dating has been adjusted with reference to the stratigraphic matrix to allow identification of assemblages which are lacking contemporary wares. As elsewhere in Oxford,

pottery deposition begins in earnest in the late eleventh or twelfth century (CP2), which covers the period of the establishment of the nearby Beaumont Palace. The peak comes during the thirteenth century (CP3), when tenements were known to be present to the east of the palace, with around 25 per cent of the pottery from this site being of that date. The rate of pottery deposition afterwards remains at a reasonably constant rate up to the nineteenth century, although there is something of a decrease in CP4–CP6, which is not untypical of sites in the town and may reflect retrenchment in population and occupation before pottery deposition rates increase again from the mid sixteenth century.

Table 1. Ceramic phase chronology and defining wares

Ceramic phase	Site phase	Date	Defining fabrics	No. sherds	Weight (g)	EVE
CP 1	2	E–L 11th C	OXAC	19	306	0.18
CP 2	3	L 11th–12th C	OXY, OXBF	257	2649	1.44
CP 3	4	13th C	OXAM, OXBG	1098	12,860	9.06
CP 4	4	14th C	OXAM	162	3137	1.94
CP 5	5	15th–L 15th C	OXBN	190	2014	1.13
CP 6	5	L 15th–M 16th C	OXCL, BBTG, OXST	170	3016	2.23
CP 7	6	M 16th–17th C	OXDR, OXFH	297	6421	1.52
CP 8	6	17th C	OXREWSL, OXCE	234	5878	0.87
CP 9	7	L 17th–M 18th C	OXBEW, OXFI	203	4620	0.31
CP 10	8	M–L 18th C	OXFM, CRM	276	8920	1.00
MOD	8	19th C+	WHEW	72	5845	0.08

The data shows a general pattern which is fairly typical of medieval and later Oxford. There was little activity before the Norman Conquest, with pottery deposition only beginning in earnest in ceramic phase CP2, which covers the period of the establishment of the nearby Beaumont Palace. The peak comes during CP3, when tenements were known to be present to the east of the palace, with around 25% of the pottery from this site being of that date. The rate of pottery deposition afterwards remains at a reasonably constant rate up to the nineteenth century, although there is something of an decrease in phases CP4–CP6, which is not untypical of sites in the city[5] and may represent a drop in both population and the economy in the wake of the Black Death and the economic slump of the later fourteenth century, before pottery deposition goes back to something like the levels seen in the earlier medieval period after the mid-sixteenth century.

This is almost the complete opposite of the bare pottery deposition pattern seen at the Sackler Library site. The early phases are similar, with a very small amount of earlier eleventh century material, and a reasonably large group dating to the post-Conquest period, but there was a fairly sharp drop-off in the thirteenth century, with an increase again in the fourteenth to sixteenth centuries, then steady decline until the nineteenth century.[6] There were however

[5] cf. L. Mepham, 'The Pottery', in P. Andrews and L. Mepham, 'Medieval and Post-Medieval Extra-Mural Settlement on the Site of the Ashmolean Museum Forecourt, Beaumont Street, Oxford', *Oxoniensia*, 62 (1997), pp. 179–223.

[6] P. Blinkhorn, 'Pottery', in D. Poore and D.R.P. Wilkinson, *Beaumont Palace and the White Friars: Excavations at the Sackler Library, Beaumont Street, Oxford*, Oxford Archaeological Unit Occasional Paper, 9 (2001), pp. 37–46.

large amounts of residual earlier medieval material in the later medieval and post-medieval periods at the Sackler site, so it would appear that the levels of activity in terms of pottery deposition were broadly similar.

The Assemblage

Early/Middle Anglo-Saxon, c.*AD 450–850* The early and middle Anglo-Saxon pottery from the site is residual. The small assemblage of hand-built material is a further addition to the growing corpus of such pottery from Oxford.[7] All the sherds from the present site are undecorated, and thus can only be dated to the broad early/middle Anglo-Saxon period.

The group of Ipswich ware from this site is only the second from Oxford, the only other material being from the neighbouring Sackler Library site, where four sherds were found.[8] This suggests very strongly that there was a focus of middle Anglo-Saxon activity in this area of Oxford. The Ipswich ware assemblage included a fragment from the rim of a fairly large jar (Fig. 11.15, no. 1), which is a typical find at sites outside the kingdom of East Anglia, where vessels used for the transportation of trade-goods, probably salt, are more common than small jars. One of the sherds (Fig. 11.15, no. 2) appears to be from the rim of a Buttermarket-type bottle, but the piece is heavily burnt, with a thick black residue adhering to the inner surface, and the identification is tentative. It has been suggested that the piece could be a twelfth- to thirteenth-century curfew/firecover apex in OXY.[9]

Mid to Late Eleventh Century (Ceramic Phase 1; Site Phase 2) The assemblage from this phase comprised entirely Cotswolds-type wares (fabric OXAC). It consisted of plain body sherds apart from a single jar rim sherd and another from a pitcher. The latter is rather unusual, as such vessels in this fabric are relatively rare, although others have been noted at other sites in the town.[10] None of the context-specific assemblages of this date numbers more than four sherds, so it is entirely possible that at least some of them are later, and lack the defining wares, as it is a relatively long-lived ceramic tradition. The fact that only a single sherd of St Neots ware occurred at the site indicates that there was virtually no activity before the early to mid eleventh century. This broadly supports the chronological picture gained from the Sackler Library excavations. There, a small assemblage of eleventh century material (nine sherds) was noted, and no St Neots ware, with activity (in terms of pottery deposition) only really beginning in the late eleventh to twelfth century.

Late Eleventh and Twelfth Century (Ceramic Phase 2; Site Phase 3) The mean sherd weight for the pottery from this phase is quite low for a medieval assemblage (10.2 g) and suggests that a large proportion of the pottery is the product of secondary deposition, perhaps due to midden material being used to backfill earth-cut features during the re-organisation of the site around this time. The assemblage is characteristic of sites of this period in Oxford. It was dominated by early medieval Oxford ware (fabric OXY, 65.7 per cent by weight) along with smaller assemblages of OXAC (21.0 per cent) and North-East Wiltshire ware (OXBF, 10.1 per cent). A few sherds of medieval Shelly ware (1.5 per cent), two sherds of Abingdon ware and a single residual

[7] P. Blinkhorn, 'Pottery', in A. Norton and G. Cockin, 'Excavations at the Classics Centre, 65–67 St Giles', Oxford', *Oxoniensia*, 73 (2008), pp. 161–94.
[8] P. Blinkhorn, 'Pottery', in Poore and Wilkinson, *Beaumont Palace*, pp. 42–4.
[9] Personal communication from John Cotter.
[10] For example, Mellor, Mellor, 'A Synthesis of … Pottery in the Oxford Region', fig. 14, no. 2.

early/middle Anglo-Saxon hand-built sherd were also present. The rim sherd assemblage was dominated by jars (61.1 per cent), along with smaller quantities of jugs (26.4 per cent) and bowls (12.5 per cent). The handles included a single example from an OXY skillet. These generally occur in small numbers amongst the larger assemblages of the period. Decorated sherds were extremely rare, other than glazed body sherds from OXY pitchers. Just one other was noted, a fragment of an OXBF storage jar with thumbed applied strips.

Thirteenth Century (Ceramic Phase 3; Site Phase 4) Property 1 (Table 2) produced entirely plain body sherds apart from two small fragments of OXY jar rims and a very unusual modelled piece (Fig. 11.15, no. 4), which is glazed and slipped, and appears to be an antler from a modelled deer's head. Such decoration is very rare on the products of the Oxford ware industry, although it is possible that this piece is from a roof finial in Abingdon ware (fabric OXAG).[11] The large Property 2 assemblage is not unusual for this date in Oxford (Tables 3 and 4). The relative occurrence of jars, bowls and jugs is as expected although the fairly large quantity of lamps is a little unusual, and not seen in the other properties, suggesting that this tenement may have had a different function to the others. The small assemblage from Property 3 comprised entirely body sherds (Table 5).

*Table 2. Pottery occurrence by fabric type, Property 1, Ceramic Phase 3 *In addition, a single sherd of Romano-British pottery (38 g) also occurred*

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	5	54	0	7.7%
OXBF	3	14	0	2.0%
OXY	20	207	0.12	29.5%
OXBK	1	11	0	1.6%
OXAM	49	416	0	59.3%
Total*	78	702	0.12	

*Table 3. Pottery occurrence by fabric type, Property 2, Ceramic Phase 3. *In addition, a single sherd of Romano-British pottery (74 g) also occurred*

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	106	1314	1.05	11.4%
OXBF	121	1710	1.29	14.8%
OXY	411	4180	2.79	36.1%
OXAG	8	79	0.08	0.7%
OXBK	7	190	0.42	1.6%
OXAM	325	4098	3.06	35.4%
Total*	978	11,571	8.69	

[11] Personal communication from John Cotter.

Table 4. Rim sherd occurrence, in EVE, expressed as a percentage of the Property and Ceramic Phase vessel assemblage, Property 2

Fabric	Jars	Bowls	Jugs	Lamps
OXAC	8.7%	3.3%	0	0
OXBF	14.8%	0	0	0
OXY	23.2%	0	8.9%	0
OXAG	0	0.9%	0.9%	0
OXBK	2.8%	0	20.0%	0
OXAM	2.4%	0.6%	1.8%	11.5%
Total%	51.9%	4.8%	31.6%	11.5%

Table 5. Pottery occurrence by fabric type, Property 3, Ceramic Phase 3

Fabric	No. Sherds	Wt Sherds (g)	% (by wt)
OXAC	4	20	18.5%
OXBF	1	9	8.3%
OXY	7	32	29.6%
OXBB	2	27	25.0%
OXAM	5	20	18.5%
Total	19	108	

Fourteenth Century (Ceramic Phase 4; Site Phase 4) This phase produced a generally smaller assemblage than that which preceded it, but a wider range of regional imports such as Potterspury and Surrey wares were noted. This is consistent with sites of the period elsewhere in Oxford. The pottery from Property 1 (Table 6) comprised entirely plain body sherds, apart from a OXAM lamp base. The data are distorted somewhat by the presence of the single, very large sherd from a Potterspury ware jug (Fabric OX68) but otherwise the dominance of OXAM in the assemblages for both properties is characteristic of the period. This Property 2 group (Tables 7 and 8) also shows a fairly wide range of vessel types, with stems from two further lamps. No pottery of this phase was recovered from Property 3.

*Table 6. Pottery occurrence by fabric type, Property 1, Ceramic Phase 4. *In addition, a single sherd of Romano-British pottery (86 g) also occurred*

Fabric	No. Sherds	Wt Sherds (g)	% (by wt)
OXBF	1	20	2.7%
OXY	4	25	3.4%
OXAM	16	238	31.9%
OX68	1	423	56.7%
OXBG	3	40	5.4%
Total*	25	746	

Table 7. Pottery occurrence by fabric type, Property 2, Ceramic Phase 4

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	13	148	0.29	6.4%
OXBF	1	28	0.04	1.2%
OXY	30	406	0.89	17.7%
OXAM	89	1692	0.62	73.6%
OX68	1	24	0.10	1.0%
OXBG	1	2	0	0.1%
Total*	135	2300	1.94	

Table 8. Rim sherd occurrence, in EVE, expressed as a percentage of the Property and Ceramic Phase vessel assemblage, Property 2

Fabric	Jars	Bowls	Jugs	Bottles	Lamps
OXAC	8.8%	6.2%	0	0	0
OXBF	2.1%	3.6%	0	0	0
OXY	17.5%	0	3.6%	24.7%	0
OXAM	9.3%	0	13.4%	0	9.3%
OX68	5.2%	0	0	0	0
Total%	42.9%	9.8%	17.0%	24.7%	9.3%

Fifteenth Century (Ceramic Phase 5; Site Phase 5) This phase generally sees the end of many of the earlier medieval traditions, such as fabrics OXAC, OXBF, OXY and OXBK, and the start of the later-medieval tradition, particularly cooking and drinking pottery, and Surrey 'Tudor green' whitewares. Residuality is quite high at this time, with at least 29.3 per cent of the pottery in Property 1 being redeposited (Table 9). The actual figure is likely to be higher, as at least some of the OXAM is also likely to be residual. This may explain why so little pottery occurred in earlier features, and there seems to have been a degree of disturbance, presumably due to quarrying. All the rim sherds were from OXAM jugs, apart from a single OXBN example, from a lobed cup or bowl, a common product of the tradition. Some 37.3 per cent of the Property 2 pottery in this phase is also residual (Table 10), and in addition, a single sherd (25 g) of residual middle Anglo-Saxon Ipswich ware occurred with this group. This again suggests disturbance of earlier strata due to gravel extraction. Eight rim sherds occurred, comprising jars (EVE = 0.24), bowls (EVE = 0.10), jugs (EVE = 0.16) and two small fragments of 'Tudor green' lobed cups (EVE = 0.07). Two of the jar rims were residual (EVE = 0.16). All the others, the 'Tudor green' apart, were in OXAM. No pottery of this phase was recovered from Property 3.

Table 9. Pottery occurrence by fabric type, Property 1, Ceramic Phase 5. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	7	67	0	6.7%
OXBF	3	21	0	2.1%
OXY	15	196	0	19.7%
OXAM	52	664	0.51	66.9%
OXBN	9	21	0.05	2.1%
Total*	89	993	0.56	

Table 10. Pottery occurrence by fabric type, Property 2, Ceramic Phase 5. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	9	117	5	11.7%
OXBF	8	93	7	9.3%
OXY	16	162	0	16.3%
OXAM	63	614	34	61.6%
OXBN	4	10	7	1.0%
Total*	100	996	53	

Late Fifteenth to Mid Sixteenth Century (Ceramic Phase 6; Site Phase 5) For Property 1, the data are somewhat distorted by the presence of a near-complete German stoneware jug. The vessel is somewhat unusual in that it has a hole through the centre of the base which appears to have been made after firing but before deposition. It is possible that this was to enable the vessel to be used as a watering-pot, but this is by no means certain. Residuality is still fairly high, with 18.4 per cent of the assemblage consisting of such types (Table 11). Three jug rims occurred, two of which were in OXST and the other OXAM, along with two jar rims, one OXAM, the other residual. Property 2 produced only a small assemblage with a very high level of residuality (at 61.9 per cent; Table 12). The actual figure is probably even higher, given that some of the OXAM is likely to be residual. The only stratified rims were a single example from an OXAM jar and another from an OXST mug. A fragment of a residual lamp in OXY also occurred. Property 3 did not produce any pottery of this date.

Table 11. Pottery occurrence by fabric type, Property 1, Ceramic Phase 6. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXZ	1	5	0	0.3%
OXAC	9	143	0.05	8.3%
OXBF	2	26	0	1.5%
OXY	9	142	0	8.3%
OXAM	27	316	0.25	18.4%
OXCL	2	109	0	6.4%
OXST	3	972	1.14	56.7%
Total*	53	1713	1.44	

Table 12. Pottery occurrence by fabric type, Property 2, Ceramic Phase 6. Shaded cells = residual

Fabric	No Sherds	Wt Sherds	EVE	% (by wt)
OXAC	5	31	0	8.1%
OXBF	2	32	0	8.4%
OXY	10	174	0.21	45.4%
OXAM	16	107	0.10	27.9%
OXST	4	39	0.20	10.2%
Total*	37	383	0.51	

Mid Sixteenth to Seventeenth Century (Ceramic Phase 7; Site Phase 6) The Property 1 assemblage is dominated by utilitarian red earthenware fabric OXDR, as is fairly typical of sites of the period, with OXAM also fairly common, although some of this is likely to be residual (Table 13). The rest of the contemporary pottery is OXCL, OXST and OXFH, again, a fairly typical pattern, with residuality much lower than in the previous phase, at 11.6 per cent. Just four rims were noted, two from OXST mugs, one from an OXAM jar, and one residual. In addition to those listed, a single sherd of Ipswich ware (17 g) also occurred. For Property 2E, the entire assemblage was dominated by OXDR, with very little residual pottery, and just a few sherds of OXAM and OXST making up the rest (Table 14). For Property 2W, residual pottery comprised 15.3 per cent of the assemblage, although some of the OXAM is also likely to be residual, such as two lamp fragments (Table 15). There is also a rather unusual stamped OXY jar rim (Fig. 11.15, no. 5). An OXAM skillet handle is also present, which may be residual although such vessels were still in use at this time. Two cup rims, one in BBTG and the other in OXBN, were noted and are probably also residual. Most of the rim assemblage consisted of redeposited medieval examples, with three OXAM jars (EVE = 0.28) and a jug in the same fabric (EVE = 0.20) probably being the only contemporary pottery. Red earthenware (OXDR) formed a smaller part of this assemblage when compared to Property 2E in the same period, although this may be due to higher levels of residuality. Property 3 did not produce any pottery of this date.

Table 13. Pottery occurrence by fabric type, Property 1, Ceramic Phase 7. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	5	36	0	1.5%
OXBF	5	80	0	3.2%
OXY	8	94	0.08	3.8%
OXBG	2	66	0	2.7%
OXAM	28	504	0.07	20.3%
OXBN	1	9	0	0.4%
OXCL	3	26	0	1.0%
OXST	9	237	0.20	9.6%
OXDR	22	1302	0	52.6%
OXFH	7	123	0	5.0%
Total*	90	2477	0.35	

Table 14. Pottery occurrence by fabric type, Property 2E, Ceramic Phase 7. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	1	16	0	4.9%
OXAM	9	71	0	21.7%
OXST	1	4	0	1.2%
OXDR	6	236	0	72.2%
Total*	17	327	0	

Table 15. Pottery occurrence by fabric type, Property 2W, Ceramic Phase 7. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	16	111	0.12	3.3%
OXBF	5	69	0.03	2.1%
OXY	40	288	0.22	8.6%
OXBG	2	5	0	0.2%
OXAM	86	1719	0.69	51.6%
OXBN	4	25	0.03	0.8%
OXCL	1	2	0	0.1%
BBTG	4	9	0.08	0.3%
OXDR	13	1029	0	30.9%
OXFH	6	73	0	2.2%
Total*	177	3330	1.17	

Seventeenth Century (Ceramic Phase 8; Site Phase 6) Residuality is again high for Property 1 in this phase, with 37.8 per cent of the assemblage by weight comprising such wares (Table 16). The contemporary pottery is typical of reasonably well-to-do household in Oxford in the seventeenth century, comprising a mixture of utilitarian wares such as red earthenware OXDR and OXFH along with finer display and tablewares, such as tin-glazed earthenware OXCE, and the slipwares, and drinking pottery in the form of German stonewares. One tin-glazed sherd, the rim of a dish, has polychrome decoration and is of better than usual quality. At Property 2W, residuality is low, comprising just 7.0 per cent of the assemblage (Table 17). The contemporary wares demonstrate a similar range to the material from Property 1 in this ceramic phase, suggesting a similar level of wealth and social standing. No pottery of this date was recovered from Properties 2E or 3.

Table 16. Pottery occurrence by fabric type, Property 1, Ceramic Phase 8. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	3	19	0	0.4%
OXBF	4	211	0	4.8%
OXY	5	87	0	2.0%
OXBG	1	26	0	0.6%
OXAM	63	1306	0.75	30.0%
OXBN	2	5	0	0.1%
OXCL	7	192	0	4.4%
OXST	8	427	0	9.8%
OXDR	16	969	0	22.2%
OXFH	16	221	0	5.1%
OXCE	14	365	0	8.4%
OXRESWL	4	489	0	11.2%
OXBEWSL	1	20	0	0.5%
OXSTW	1	23	0	0.5%
Total*	145	4360	0.75	

Table 17. Pottery occurrence by fabric type, Property 2W, Ceramic Phase 8. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXBF	1	23	0	1.7%
OXY	6	27	0	2.0%
OXAM	8	45	0	3.3%
OXCL	5	19	0	1.4%
OXST	5	74	0	5.4%
OXDR	19	754	0	54.9%
OXFH	18	327	0	23.8%
OXCE	16	65	0	4.7%
OXRESWL	2	36	0	2.6%
OXSTW	1	4	0	0.3%
Total*	81	1374	0	

Late Seventeenth to Mid Eighteenth Century (Ceramic Phase 9; Site Phase 7) In Property 1, residuality is reasonably low at 14.8 per cent (Table 18). The contemporary assemblage is dominated by utilitarian red earthenware (OXDR), with small quantities of display and drinking and tablewares. In Property 2W, residuality is again at reasonable levels, at 8.0 per cent of the assemblage (Table 19). This assemblage is also dominated by red earthenware (OXDR), along with small quantities of drinking pottery and tablewares. Some of the drinking pottery, particularly the German stoneware, is quite ornate. Two of the vessels have decorated moulded medallions, and another, moulded oak leaves. The latter is very typical of the Cologne potteries of the first half of the sixteenth century, with the former used extensively in most of the German industries in the sixteenth and seventeenth centuries. One of the medallions is nearly complete, and is of a floral design which is reasonably common. A Frechen vessel with a similar medallion is known from Norwich and dated to the mid sixteenth to mid seventeenth century.[12] A fragment of an English (Nottingham or Derby) stoneware gorge (tavern-mug) with an 'AR' assay mark was also present (Fig. 11.15, no. 6). These marks were introduced in June 1700 after parliament passed an act for ascertaining the measures for retailing ale and beer. This made it illegal to retail ale or beer in vessels without a stamped assay mark.[13] The 'AR' ale-mark dates from the reign of Queen Anne (1702–14) although pots with these marks were sometimes still in use at the end of the eighteenth century. The vessel may be evidence of an inn on or near the site, although gorges with ale-marks do occur in pottery assemblages from domestic dwellings. Another fragment worthy of note is a handle from an Anglo-Dutch tin-glazed posset-cup, with high-quality blue-painted decoration. The pottery from Property 2E was entirely residual apart from a single sherd (4 g) of OXBEW. Property 3 produced 2 sherds with a total weight of 68 g (EVE = 0). One sherd (26 g) was OXCE, the other, OXBEW.

[12] S. Jennings, *Eighteen Centuries of Pottery from Norwich*, East Anglian Archaeology, 13 (1981), fig. 49, no. 811.
[13] M. Bimson, 'The Significance of 'Ale-Measure' Marks', *Post-Medieval Archaeology*, 4 (1970), pp. 165–6.

Table 18. Pottery occurrence by fabric type, Property 1, Ceramic Phase 9. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAC	4	40	0	2.1%
OXY	2	19	0	1.0%
OXAM	16	136	0.10	7.0%
OXBN	1	17	0	0.9%
OXCL	7	29	0	1.5%
OXST	3	54	0	2.8%
OXDR	23	1464	0	75.1%
OXFH	8	44	0	2.3%
OXCE	8	50	0	2.6%
OXBEWSL	1	9	0	0.5%
OXEST	11	88	0	4.5%
Total*	84	1950	0.1	

Table 19. Pottery occurrence by fabric type, Property 2W, Ceramic Phase 9. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXR	1	21	0	1.0%
OXBF	1	3	0	0.1%
OXY	6	50	0	2.4%
OXAM	12	63	0.08	3.0%
OXCL	5	32	0	1.5%
OXST	8	108	0	5.2%
OXDR	32	1549	0	74.3%
OXFH	8	75	0	3.6%
OXCE	8	110	0	5.3%
OXBEWSL	1	5	0	0.2%
OXBEW	2	13	0	0.6%
OXEST	2	57	0	2.7%
Total*	86	2086	0.08	

Mid to Late Eighteenth Century (Ceramic Phase 10; Site Phase 8) In Property 1, residuality is very high, with 54.0 per cent of the pottery falling into this category (Table 20). These figures are perhaps artificially increased by the presence of a number of large sherds of OXAM jugs, including virtually all of the lower half of a baluster vessel. It seems very likely that the OXAM is from an earlier feature, probably of fourteenth-century date, which was not recognised during excavation. Amongst the contemporary pottery, OXDR is again the dominant assemblage, with small quantities of finer tablewares, such as fragments of white and brown stonewares (OXEST and OXFH). One fragment of note is a large sherd from the base of a plain tin-glazed bowl. It is possible that this is from a vessel of Iberian origin, although such pottery is quite rare at sites in the Thames valley to the west of London, despite being a common find in small quantities in the capital. However, it is also possible that this is an English product, from Bristol.[14]

[14] Personal communication from John Cotter.

Some 67.8 per cent of the assemblage from Property 2W is residual (Table 21). This is due to the presence of a small number of large sherds of Border ware (OXFH). It is possible that this material, which had more or less ceased to be made by the end of the seventeenth century, was contemporary in the sense that it was a group of old pots which had been in use up until this time. It is not unusual to see fairly large dumps of domestic pottery from this period, as it was a time of rapidly changing technology and tastes, with new wares being introduced at fairly regular intervals from around 1720 onwards, and some fashionable households seem to have responded to this by clearing out old pottery and replacing it with the new. The contemporary assemblage is fairly small, and again comprises mainly OXDR, along with small quantities of stonewares and Staffordshire tablewares. There was no pottery of this date from Properties 2E or 3.

Table 20. Pottery occurrence by fabric type, Property 1, Ceramic Phase 10. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	EVE	% (by wt)
OXAM	32	3161	1.00	42.4%
OXCL	2	6	0	0.1%
OXST	1	23	0	0.3%
OXDR	79	2744	0	36.8%
OXFH	10	88	0	1.2%
OXCE	30	344	0	4.6%
OXBEWSL	4	78	0	1.0%
OXBEW	1	23	0	0.3%
OXEST	16	234	0	3.1%
OXREWSL	17	492	0	6.6%
OXFI	5	28	0	0.4%
OXFM	27	231	0	3.1%
Total*	224	7452	1.00	

Table 21. Pottery occurrence by fabric type, Property 2W, Ceramic Phase 10. Shaded cells = residual material

Fabric	No. Sherds	Wt Sherds (g)	% (by wt)
OXBF	1	14	1.8%
OXAM	1	4	0.5%
OXST	1	22	2.9%
OXDR	4	115	14.9%
OXFH	9	475	61.6%
OXCE	3	8	1.0%
OXBEWSL	3	24	3.1%
OXBEW	1	31	4.0%
OXEST	2	29	3.8%
OXFM	7	49	6.4%
Total*	32	771	

Nineteenth century (Ceramic Phase MOD; Site Phase 8) This phase produced 72 sherds with a total weight of 5845 g. The assemblage is dominated by mass-produced white earthenwares, along with residual medieval and earlier material. Two large (56 g) sherds of early/middle Anglo-

Saxon hand-built pottery occurred in the phase, as did the middle Anglo-Saxon Ipswich ware rim sherd (Fig. 11.15, no. 1).

Discussion

The pottery assemblage from this site is large although there are high levels of residuality. Apart from the unusual early and middle Anglo-Saxon pottery, the assemblage is generally consistent with domestic pottery from elsewhere in medieval and post-medieval Oxford. The general range of fabrics and forms is similar to that from earlier excavations at the Ashmolean Forecourt, with much of the medieval pottery dating to the earlier part of the period, and late-medieval pottery scarce.[15] Skillets and lamp fragments were also noted at that site, together with an unusual (for Oxford) sherd of a thirteenth century London ware imitation Rouen-style jug. The range of post-medieval wares was also very similar, with most of the material dating to the eighteenth century. The range of vessel types and consumption patterns at the nearby Classics Centre site is also very similar.[16] Most of the medieval pottery there occurred in contexts of the thirteenth century, with otherwise low levels of pottery deposition until the late fifteenth to sixteenth century. Large quantities of lamps were noted in the main medieval groups. In contrast to the present site, however, the latest medieval groups from the Classics Centre produced a fairly large assemblage of drinking pottery.

The small group of Ipswich ware is of considerable importance. Together with the four sherds of the same type from the adjacent Sackler Library site, it provides evidence for settlement in this area of Oxford in the early eighth to ninth century. The small group of hand-built pottery may be contemporary with the Ipswich ware, but could be earlier. It is entirely possible that the middle Anglo-Saxon inhabitants of Oxford were not using hand-built pottery, and the only ceramics in use were imported wares, by-products of trade rather than desired objects in their own right. Evidence from the middle Anglo-Saxon levels at Yarnton and Eynsham abbey indicates very strongly that there was a hiatus in the making and using of pottery in this area of the Thames valley at that time.[17] Thus, a fairly extensive middle Anglo-Saxon settlement may not leave much evidence in the form of pottery, especially if the strata of that date have been heavily disturbed. At both this and the Sackler Library site all the Ipswich ware was residual, and occurred in much later contexts.

Pottery only begins to be deposited at the present site in any significant quantities in the late eleventh or twelfth century, but the assemblage of this period is fairly mundane, and appears entirely domestic in nature, comprising largely undecorated jars, along with smaller quantities of bowls and jugs, and a single skillet handle. The thirteenth to fourteenth century saw the development and occupation of three tenements. The most interesting medieval assemblages came from Property 2 where there was a large assemblage of thirteenth-century pottery, dominated by OXAM, as would be expected; there was also a fairly wide range of common coarsewares, but also a few regional glazed wares such as Abingdon ware and Surrey whiteware, which often occur in small quantities at sites of the period in the town. Much of the assemblage comprised jars, bowls and jugs, with the first-named the most common, but 11.5

[15] Mepham, 'The Pottery'.
[16] Blinkhorn, 'Pottery', in A. Norton and G. Cockin, 'Excavations at the Classics Centre'.
[17] P. Blinkhorn, 'Early and Middle Anglo-Saxon Pottery', in G. Hey, *Yarnton. Anglo-Saxon and Medieval Settlement and Landscape*, Oxford Archaeology Thames Valley Landscapes Monograph, 20 (2004), pp. 267–72; P. Blinkhorn, 'The Pottery', in A. Hardy et al., *Aelfric's Abbey. Excavations at Eynsham Abbey, Oxfordshire, 1989–92*, Thames Valley Landscapes Monograph, 16 (2003).

per cent of the rim sherds (by EVE) were OXAM lamps, which although not uncommon, do not usually occur in such large numbers. However, these vessels are sometimes unusually numerous in Oxford, particularly at medieval educational establishments such as Merton College.[18] Most of the lamps came from the backfills of pits or wells and were fairly well spread out and occurred singly. Significantly, none were from the earlier pits along the boundary with Property 1. This would suggest that the lamps were used by the inhabitants of Property 2 rather than having been brought in with soil to backfill existing features when the tenements were being laid out. Lamps are also well represented in the assemblage from the fourteenth century features in Property 2, with lamps making up at least 9.3 per cent of the rims. Also worthy of note is a rather unusual rim from an OXAM jug with what appears to be a modelled owl face-mask (Fig. 11.15, no. 3). Very little pottery occurred in the period from the late fifteenth to mid sixteenth century (38 sherds), and nearly two-thirds of it (61.9 per cent) was residual, indicating that there was a fairly sharp drop-off in occupation activity at the time, a suggestion supported by the small amounts of pottery of this date as residual material in later contexts.

The mid sixteenth to seventeenth century saw the property divided in two. The easternmost tenement, 2E, produced just 18 sherds dating to this time, with around 5 per cent of it residual. The western tenement, 2W produced a much larger assemblage, 177 sherds, with residual material comprising just over 15 per cent of this. Most of the contemporary material was utilitarian earthenwares, but lamps and a few sherds of later-medieval drinking pottery were noted amongst the residual group. The seventeenth-century pottery from Property 2W, as with Property 1 at this time, consisted mainly of utilitarian earthenwares along with small quantities of drinking and display vessels. The eighteenth-century pottery from the property was largely red earthenware, but some of the drinking pottery, particularly the German stonewares, was quite ornate, with oak leaf or moulded medallions. These could be residual, however, as such decoration was more common in the sixteenth and seventeenth centuries. A Nottingham/Derby stoneware tavern-mug ('gorge') fragment occurred with a Queen Anne ale-mark (within Phase 7 pit 1159), offering a secure *terminus post quem* of 1702 (Fig. 11.15, no. 6). Property 2E produced very little post-medieval pottery. Property 3 produced very little evidence of activity in the thirteenth century, and there was no pottery at all from the fourteenth to late seventeenth century, and just two sherds from the late seventeenth to mid eighteenth century.

Catalogue of Illustrated Pottery (Fig. 11.15):

1. Ipswich ware. Rim sherd from a medium to large jar. Uniform dark grey fabric, surfaces somewhat abraded. Ctx 223, Phase 7 (residual).
2. Light grey fabric with darker surfaces, inner surface sooted and with a heavy black burnt residue. Ipswich ware bottle rim or possibly OXY curfew apex. Ctx 662, well 663, Phase 4.
3. Fabric OXAM. Rim sherd from a jug with applied 'owl' mask. Pale grey fabric with buff surfaces, dark green, copper-rich glaze on outer surface. Ctx 662, well 663, Phase 4.
4. Fabric OXY or OXAG. Modelled spike, possibly a deer antler? Grey fabric with an orange core, olive green glaze over yellow slip decoration. Ctx 774, pit 773, Phase 4.
5. Fabric OXY. Rim sherd from a jar. Pale yellow-green glaze on upper rim over ring-and-dot stamp impressions. Ctx 1027, Phase 7 (residual).

[18] Blinkhorn, '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.

6. Fabric OXEST. Body sherd from a mug with an ‘AR’ ale-mark. Grey fabric with brown salt-glaze on outer surface. Ctx 300, pit 1159, Phase 7.

2 ARCHITECTURAL STONE *BY ALISON DE TURBERVILLE*

The majority of stonework excavated was in a fragmentary state. The quantities of stonework from each phase are given in Table 22.

Table 22. Summary of architectural stone

Phase	Quantity
3 - 12th Century	1
4 - 13th and 14th Century	18
5 - 15th to mid 16th century	7
6 - Late 16th to mid 17th century	56
7 - Late 17th to 18th century	4
8 - Early to mid 19th century	12
9 - Late 19th century onwards	5
Unstratified	2
TOTAL	**105**

Out of a total of 105 fragments, the majority of pieces were small (*c*.30–*c*.140mm), unidentifiable pieces of stone with no obvious worked features. The unidentifiable pieces formed the majority of the Phase 3 to 6 material. The fragments of worked stone mostly had visible tool markings (chisel, saw, claw and score lines), although weathering and calcification sometimes meant there were no visible marks. In total, only 29 pieces of stone displayed any form of worked surface making analysis of the stonework in relation to the development of the buildings at the site difficult.

The majority of the assemblage was limestone, but there are some occurrences of sandstone mostly within the unidentifiable fragments. There are three pieces of worked marble, white in colour with grey veins. The main Oxford stone used in the construction of Oxford buildings in the thirteenth to fifteenth centuries was supplied from Wheatley and later, Headington. Dressings were made using Taynton and Burford stone, though the latter decayed poorly and needed frequent replacement.[19] Without full lithological examination the exact lithology of each piece is not possible, but they are mostly of limestone and similar to other stones found within buildings in Oxford.

Description

As discussed above, the fragments from the earliest phase contexts are largely small pieces with no visible signs of working and therefore unidentifiable. Only one fragment of unidentifiable stone was found in a phase 3 context, the fill of a pit (735).

Phase 4 stonework

The stonework from Phase 4 contexts was also, in the main, unidentifiable, but there were five fragments which showed evidence of stone working. The most significant piece came from the Phase 4 fill (662) of well 663 (Fig. 11.16). This was an oolitic limestone fragment of a tympanum above a window with an outer roll moulding forming an overall arch and inner roll

[19] W.J. Arkell, *Oxford Stone* (London, 1947), pp. 20–2.

which forms the head of the window light. This fragment is part of a window for a stone house probably dating to the twelfth century. It is similar to, although simpler in design than, a fragment recorded during an excavation at No. 4A Merton Street.[20] Several depictions of stone houses in visual records and mentions in property documents suggest that this style of house was not concentrated in a particular area, but occurred across all of Oxford during the twelfth century.[21] The present fragment is likely to be from a house either on or very close to the excavation site. Another fragment, found within the same context, was a corner section of a limestone window frame with the remains of corroded metal bars set within a rebate. This is a roughly made piece and probably comes from a lower status building. A further fragment from the same context is probably a quoin stone with a plain chamfered corner (ST 17); the weathered surface suggests this was a jamb for an external door or window. The remaining piece (ST 6) of moulded stonework within the Phase 4 assemblage (context 263) is a corner piece of limestone with bead moulding and a recessed flat panel and has a weathered appearance to the finished face suggesting it was an external door surround or similar decoration. Context 1289 produced a fragment of stone roof tile with the partial nail hole clearly visible (ST 5).

Phase 5 and 6 stonework

The stonework from Phase 5 contexts consists of 7 small unidentifiable fragments, two of which appear natural. With a total of 56 pieces, Phase 6 has the largest quantify of stone fragments, though 53 pieces are also unidentifiable with no obvious signs of working. The three remaining stone pieces within this phase are from context 186 and consist of an extremely weathered quoin with plain chamfer detail which was probably part of a door or archway (ST 10) and a roughly hewn block with an indent to the rear and weathering to the front (ST 12b). The final fragment (ST 12) from this phase is a medium-size block of stone with plain chamfering detail suggesting it was probably a quoin, and limewash traces on the upper faces confirm this; however, the lower face is weathered and worn suggesting it was also reused as some form of paving. There are two 1 cm diameter holes set within a 4 cm deep indent to one side, of unknown use.

Phase 7 stonework

Stonework from Phase 7 contexts include an offcut of stone within context 930 of a door or fire surround with flush bead and hollow chamfer moulding (ST 9), and also within this context a flat fragment of stone 40 mm deep with partial moulding to the edges which is of unknown use, possibly an unfinished piece (ST 10) and a fragment of white marble with holes for fixing, probably of eighteenth century date probably used as flooring due to wear pattern on upper face (ST2). One small unidentifiable fragment of sandstone was found within context 863 and is probably natural.

Phase 8 stonework

A total of 12 fragments of worked stone were recovered from Phase 8 contexts, 9 of which are from context 547, a soakaway which reused stone as the lining. ST 14 is a fragment of

[20] J. Munby, 'Worked Stone' and 'Stone Houses in Oxford', 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. 305, 340–1, fig. 5 and plate XI.
[21] Ibid.

limestone with plain chamfer detail, probably an offcut of post-medieval date. Another offcut of stone (ST 15) is also an offcut, triangular in shape and made from a very pale whitish-coloured limestone, possibly Portland limestone of eighteenth-century date. ST 15b is a fragment of medieval/post-medieval window mullion with hollow chamfer detail. One side of the mullion has the long thin rebate for glass and the other side has a larger flatter rebate with deep chisel marks which is of unknown purpose. Interestingly, the stone on this side is also orange in colour suggesting the stone was burnt or stained. There are traces of limewash on the remaining worked surfaces. A fragment of window lintel, also with hollow chamfer moulding (ST 16), has a possible mason's mark to one end of the worked surfaces. There is also a hole within the worked surface suggesting this window was barred and there is a rebate within the chamfer which has two peg holes with the remains of two wooden pegs within. This is possibly the remains of a later lean-to structure; the chamfering at this point is calcified suggesting this was the external face. Context 547 also contains two fragments of flat stone (ST 20/21) with wear to the upper face suggestive of paving/flooring. ST 22 is a corner fragment of either a window or drain, roughly executed, and ST 32 is a fragment of limestone with a deep rebate, which is of unknown use. ST 24 is a fragment of bowtell moulding, broken off of a larger moulded piece which has mortar with stone inclusions to the worked surface, probably from its reuse within the soakaway. Two fragments of stone were recovered from context 172, a stone-lined soakaway associated with Property 2. ST 11 is a large flat section of moulded fireplace or door surround. The moulding is finely executed with astragal and apophyge detailing and the piece appears to be late seventeenth/early eighteenth century in date. The traces of mortar with stone inclusions visible on the upper face are probably from the reuse of the stone within the soakaway. ST 15 is potentially an offcut of moulded door or fire surround of late/post-medieval date. The moulding includes ogee and reverse ogee with central bead detailing. Finally, a corner section of coping stone (ST13) with fascia detailing, probably of post-medieval date, was recovered from context 221, the fill of a robber cut.

Phase 9 and unstratified stonework

Two fragments of white marble with grey veins (both ST 1) were found in context 100, which is the machined overburden. Both fragments have polished upper faces and one piece has a circular moulding detail and was possibly used as part of a decorated panel. A further fragment of white marble was recovered from context 1167, which is the fill of a pit. All the marble fragments are of post-medieval date, probably eighteenth/nineteenth century date. Contexts 1351 and 1352 included three architectural stone finds. ST 7a is a large fragment of a door/arch quoin stone with plain and hollow chamfering whereas ST 7b is a fragment of door/arch quoin stone with keel moulding detail which is probably medieval in date. ST 8 is a fragment of coping stone with moulded detail to each side. The upper face is deeply incised with chisel marks suggesting that there was maybe another stone or detail that originally rested above this.

Two fragments of stone are listed as unstratified. One (ST 5) is a small fragment of limestone with no visible worked surfaces and the second piece (ST 9) is a fragment of moulded limestone with scroll detailing. The worked surfaces are extremely weathered and one uneven face has traces of a friable lime mortar with stone inclusions. It is possible that this was an unfinished piece of moulded stonework, later reused in an external setting.

3 CERAMIC BUILDING MATERIAL AND STONE ROOF TILES *BY JOHN COTTER AND ALISON DE TURBERVILLE*

Date, nature and condition of the assemblage

The assemblage appears to consist entirely of medieval and post-medieval material spanning the 13th to the 19th century, though very little material dating to the 19th century was noted (Table 23). The assemblage mostly comprises ceramic building material (CBM) and a smaller amount of stone building material (BM) the latter consisting mostly of stone roofing tiles and odd bits of stone rubble. A few very minor miscellaneous categories, such as cement and painted wall plaster, were also noted. In general the quality and condition of the material is fairly poor given the known proximity of the medieval Beaumont Palace and the Whitefriars. The material overall is not well preserved but there are a few nearly complete ceramic and stone roofing tiles and at least one complete example of each. The main categories of material are described below.

Table 23: Building material assemblage by phase

Phase	Roof	Floor	Bricks	Other	Sherds	Weight
3 - 12th Century	104	1	1	3	109	7632
4 - 13th and 14th Century	568	1	2	9	584	42,745
5 - 15th to mid 16th century	309	0	0	3	312	15,102
6 - Late 16th to mid 17th century	343	17	5	22	387	43,544
7 - Late 17th to 18th century	237	4	3	27	269	29,939
8 - Early to mid 19th century	35	3	1	14	53	7422
9 - Late 19th century onwards	57	0	1	0	58	3423
Unstratified	20	0	0	1	21	961
TOTAL	**1673**	**26**	**13**	**79**	**1793**	**150,768**

Flat clay roof tiles

These are by far the commonest category comprising approximately, 75-80% of the assemblage by fragment count. These are traditional medieval/post-medieval flat roofing tiles (peg tiles) with a pair of circular nailholes at one end. Glazed examples are rare. A near-complete tile measuring 270 mm long x 173 mm wide x 11–15 mm thick was noted in context 1025 – this is warped and may be a 'second' or waster. Two complete tile widths of 171 mm and 173 mm were also noted in context 374 and another of 172 mm in 612. At least 17 smallish fragments of glazed or partially glazed roof tiles, which are likely to be medieval, were noted in the following contexts: 1150, 1054, 351, 594, 688, 612, 662, 1280, 1281, 1217, 1164, 1165, 1204. All but a handful of tiles are in red-firing sandy fabrics. A few scraps of distinctive 13th-14th century pink or cream fabric tiles were noted in 850, 895, 1280. One red-firing tile with a scorched edge may have come from a tiled hearth or a fireplace (1243).

Stone roof tiles

These are of medieval and post-medieval date and are fairly common but mostly fragmentary. They have not been quantified in detail but around 80–100 fragments is a likely estimate. These are of roughly hewn limestone with a single drilled nail hole at one end (illustrated

example from latrine pit 1373, context 1026; Fig. 11.17, no. 1). Some of the more complete examples are ovate in form and some are sub-rectangular. Two complete smallish tiles were noted in context 1026. One of these is of tapered sub-rectangular form with a rounded top, it measures 200 mm tall x 140 mm wide at the base. A large quantity of complete or nearly complete tiles was recovered from context 1151. Other significantly complete tiles were noted in the following contexts: 1147, 1150, 1046, 1332, 1036, 1027 and other smaller pieces noted in 1054, 340, 343, 440, 446, 588, 468, 850 and 977.

Ceramic ridge tiles

There were 27 fragments recovered which are mainly of medieval date although a few examples appear to be post-medieval. Overall the collection is in a poor condition consisting, for the most part, of small worn fragments, most of which are probably residual. Most examples are glazed or partially glazed, usually with a greenish-brown or brown glaze. Fragments from the plain sides or edges of ridge tiles can be confused with plain roof tile fragments and it is possible that some were recorded as such. Most examples are in red- or grey-firing sandy fabrics but at least two small pieces are in the rarer Oolithic limestone-tempered fabric which is thought to be of thirteenth and early fourteenth century date. One of these (from 490) shows evidence of attached crests (now detached). The other small piece is from 1027. Most pieces are from the edges of ridge tiles. A smallish piece with triangular crests was recovered from 368 (pit 370, Phase 5; Fig. 11.17, no. 2). The best preserved example appears to be of post-medieval date, possibly seventeenth/eighteenth century. This survives as a plain unusually thick (28 mm) curved or slightly angled profile in a red fabric with zone of black glaze along its apex (two main pieces from 1035 and five smaller pieces from 1027, both of which are Phase 7 contexts). A small piece of ridge tile from context 449 is unusual in having a green glaze and a thumbed lower edge. Other pieces of ridge tile were noted in the following contexts: 206, 141, 100, 1135, 402 (5 pieces), 374 (a warped waster or second?), 372 (unglazed post-med?), 850 and 935.

Floor tiles

Only 26 occurrences of floor tile were recovered from Phase 4 to Phase 8 contexts, none of which were complete. All of these are in a fairly poor condition with many showing signs of surface wear and loss of glaze. The low quantity of glazed floor tiles from the site is surprising given the proximity of Beaumont Palace and the later Friary. Two samples found in Phase 4 contexts are both glazed – a greenish glazed fragment in context 1280 and a fragment of blown coloured glazed tile in context 440. There were no floor tiles within the assemblage from Phase 5 contexts.

The majority of the assemblage was recovered from Phase 6 contexts with a late sixteenth to mid seventeenth century date. A single corner fragment from a decorated medieval 'printed' floor tile was recovered from context 1145, the fill of pit 1143 (Fig. 11.17, no. 3). The fragment has a complete length measurement of 110mm and a depth of 32mm and has a brown and yellow glazed pattern on the upper face. This is likely to be a Penn/Chiltern or south-east Oxfordshire piece dating from the fourteenth century.

A total of seven fragments of unglazed clay (with unusual chalk-flecked fabric) floor tile were recovered from context 127, which is demolition layer within the cellar for building 2E, no glazed samples were found within this context. A mixture of glazed and unglazed floor tile was recovered from context 1127, the backfill of a stone cellar in property 2W.

Oast/malting kiln tiles

Twenty-nine fragments of these were noted of which 25 came from context 301 (Phase 7; Fig. 11.17, no. 4). These are smaller than Victorian examples and less regular in appearance and therefore probably earlier in date – possibly eighteenth century. Some of these are definitely rectangular in shape and others may be square but none is complete although several large fragments preserve complete widths and significant surviving lengths. Two complete widths of 142 mm and 144 mm and a broken length of 178+ mm were recorded from context 301. Another complete width of 140 mm with a broken length of 156+ mm was recorded from context 374. Thicknesses vary from 24-26 mm. Edges can be straight or bevelled. The tiles have a soft orange brick-like fabric and many have a thin pale grey ?ash glaze along their edges and most show traces of white mortar on their undersides – usually along the edges. The surfaces are perforated with circular 'socket'-like perforations typical of oast kiln tiles – each main circular perforation exiting on the other side of the tile as a group of three smaller perforations. Alternating main perforations exit as a single small perforation thus creating a regular pattern of perforations on both sides of the tile – big perforations on one side and a sieve-like pattern of finer perforations on the reverse side. Tiles of this sort formed the raised floors of oast houses or malting kilns with the perforations allowing the circulation of heat and air throughout the kiln. Malting kilns were usually for the malting of barley and are often associated with brewing. Their presence in some quantity on this site may indicate the presence of a brewing industry either here or in the vicinity. One other tile fragment was found in context 322 and two other badly damaged fragments in 979. Oast kiln tiles are known to have been produced at the Nettlebed potteries in south-east Oxfordshire during the eighteenth and probably the nineteenth century, but may have been produced elsewhere in the county too.

Bricks

Unusually, only a small quantity of brick fragments are within the assemblage. All 13 fragments are of unfrogged red brick. None is complete and most are smallish worn pieces with few measurable dimensions except, in a few cases, thicknesses. They appear to range in date from late medieval (15/16th century) to eighteenth or early nineteenth century. Bricks were noted in the following contexts: 127, 395, 397, 374, 480, 703 (medieval?), 831, 935, 919 (medieval?) and 1027.

Other Items

The following items of building material are each represented by a single piece. A single fairly small worn sherd from context 455 (max width 60 mm) appears to be from a thick-walled cylindrical object with an oblique perforation through the wall – most likely part of a rare medieval chimney pot. This occurs in late Saxon/early medieval calcareous gravel-tempered ware, also known as Cotswolds-type ware (Fabric OXAC), dating to *c*. 900-1250, most likely from the later end of this range. Only one or two other examples of this form have been noted from Oxford before. A lump of painted wall plaster was recovered from context 1274. This is white, on a backing of grey render, with crudely painted bands of red ochre just about distinguishable. It could be late medieval or early post-medieval in date. Other single items include a piece of modern grey slate from 141, a fragment of modern cement with tile impressions from 206 and a small piece of nineteenth-century stoneware drainpipe from 1015.

Conclusions

The assemblage as a whole appears to represent material from buildings of average status. Given the very low presence of brick fragments the buildings were probably of stone, or timber framed with wattle and daub infill and with ceramic and stone roofing including a few ridge tiles. The ridge tile and floor tile assemblage however is neither plentiful nor in good condition and may not all derive from these buildings.

4 GLASS *BY HUGH WILLMOTT*

The glass assemblage comprised 440 fragments from both vessels and windows; much was relatively recent in date or in a very fragmentary condition. All the glass was assessed and the most interesting items are discussed here.

Phase 4 (Thirteenth to Fourteenth Century)
Only two fragments of glass were recovered, both from pit 1091 (ctx 1088) in Property 1. These are both fragments of green devitrified plain window glass which are roughly datable to the thirteenth to fifteenth centuries.

Phase 5 (Fifteenth to Mid Sixteenth Century)
Property 1: Pit 745 contained a single fragment of green devitrified plain window glass, which although difficult to date precisely is likely to be fifteenth rather than sixteenth century in date. More diagnostic are fragments of curved base from a urinal, found in pit 815 (Fig. 11.18, no. 1). Urinals were a commonly used tool for the diagnosis of health problems in the late medieval period, and are often associated with higher-status properties.[22]
Property 2: A fragment of green-tinted plain window glass was found in pit 370. This is slightly lighter in colour and of better quality suggesting that it dates to the sixteenth, rather than the fifteenth, century.

Phase 6 (Late Sixteenth to Mid Seventeenth Century)
Larger assemblages of glass were found in association with Properties 1 and 2W.
Property 1: Glass was found in four pits. Pit 883 contained fragments of folded tubular base-ring from a pedestal beaker. The glass is green and potash-rich with medium weathering. This was a form produced at a large number of regional glassmaking sites in England throughout the late sixteenth and early seventeenth centuries.[23] Three other pits from this phase contained residual material, or glass that was deposited many years after it was manufactured. Pit 702 included a fragment of thirteenth to fourteenth century window glass decorated with a painted grisaille design, as well as two fragments of plain late-medieval window glass. Possible well 835 contained fragments of late-medieval window glass which, although plain, retain their original grozed edges. Pit 1143 contained the upturned rim from a late-medieval urinal (Fig. 11.18, no. 2), as well as part of a later seventeenth century case bottle (Fig. 11.18, no. 3). Interpreting these finds is difficult, but the presence of so much earlier glass might suggest that during the late sixteenth to mid seventeenth century a late-medieval building of some status was being altered or demolished.

Property 2W: A number of glass finds dating to the seventeenth century were recovered. Late-medieval window glass came from horse burial pit 613, although this may well be a residual find. Two other features did contain glass contemporaneous with Phase 6. Pit 417 included a small fragment of better-quality plain window glass, as well as the portion of an ordinary storage jar decorated with an optic-blown mesh design. Such vessels are

[22] R. Tyson, *Medieval Glass Vessels Found in England c.AD 1200–1500*, CBA Research Report, 121 (2000), pp. 149–53.
[23] H. Willmott, *Early Post-Medieval Vessel Glass in England c.1500-1670*, CBA Research Report, 132 (2002), p. 68.

commonly found on seventeenth-century sites.[24] Of similar date was the rim and neck from a small square-section case bottle from pit 851, another common type of storage vessel.[25] Slightly earlier in date, but probably still post-medieval, were several finds from latrine pit 1373. These include the base, neck and rim from a flask, and two plain fragments of window glass. Although small in size, the presence and domestic character of the assemblage does seem to indicate that there were buildings on the property at this time. However, all the glass is very ordinary in character, with there being no definitive suggestion that this was high-status in nature.

Phase 7 (Late Seventeenth to Eighteenth Century)

The bulk of the glass came from Phase 7 contexts across Properties 1, 2W and 3. A wide range of vessel and window glass was found on Property 1. In pit 380 was found one of the most interesting of these, the rim from a good-quality lead crystal wine glass that is eighteenth century in date. In association were a significant number of wine bottle fragments of the late seventeenth- to early eighteenth-century onion form. Other glass present in this feature includes a portion of cylindrical phial and two fragments of window glass. Pit 777 contained a small number of fragments from a similar onion wine bottle, whilst pit 847 included a phial, wine bottle and window glass. Pit 918 also had a small number of window glass fragments in its fill. The remaining glass was more diverse. Pit 920 contained a fragment of rim and neck from a sandglass. These vessels are surprisingly common in seventeenth-century contexts, although it is often unclear why people were so concerned with measuring time in this way.[26] Pit 1122 included a portion of a flattened oval bottle (Fig. 11.18, no. 4), which differs from normal in that it has an intentionally sheared, rather than the usual out-turned, rim. The final vessel (Fig. 11.19, no. 9) is rather more remarkable, being a complete mallet wine bottle dating to the 1760s and impressed with a seal of All Souls College (pit 380). The glass finds from Property 1 suggest that there was a fairly dense level of occupation here during Period 7. Furthermore, whilst the increased level of evidence for wine consumption might indicate a domestic function, it is just possible that it could have derived from an inn. Property 2W produced a very similar assemblage to Property 1 with quite a high proportion of glass associated with wine consumption, and it therefore could have derived from a similar source. These include a single wine bottle from pit 287, and several different examples from pit 371. This latter feature also contained the base from a small lead glass decanter, another decorative ribbed bottle, and a small phial (Fig. 11.18, no. 5). Pit 1159 contained portions of a shaft and globe bottle (the earliest type of wine bottle) dating to *c.*1650–80, as well as a slightly later onion wine bottle and five fragments of window glass. Just one glass vessel, from pit 393, was recovered from Property 3, this being two fragments of base from a seventeenth-–century shaft and glove wine bottle.

Phase 8 (1800–92)

A very interesting assemblage of glass came from Property 2. Although apparently deposited during the nineteenth century, without exception all the glass was manufactured during the preceding century. This might suggest that there was significant clearance or redevelopment of earlier buildings taking place that this time. The glass includes a mixture of drinking and

[24] Ibid. pp. 97–9.
[25] Ibid. pp. 87–8.
[26] Ibid. p. 91.

dining wares, storage vessels and some interesting gardening items. The lack of window glass in this phase is also notable. The largest group came from pit 392 and can be closely dated to the first half of the eighteenth century. These include the base and lower body from a fashionable lead crystal jelly glass (Fig. 11.18, no. 6), and a portion of bevelled edge mirror, an expensive item in the eighteenth century. More ordinary vessels include a large bottle-shaped phial (Fig. 11.18, no. 7), and two near-identical square medicine bottles. More unusual were portions of folded edge from two different green glass cloches or 'bell glasses' (Fig. 11.18, no. 8). Although documentary sources suggest these became increasingly popular during the eighteenth century for the cultivation of delicate and often exotic plants,[27] they are rarely identified on sites, presumably because of their similarity to wine bottles when fragmented. The remaining thirty-four fragments from this pit were from eighteenth century wine bottles. Glass was recovered in much smaller quantities from two other contexts. Rubble layer 1274 contained a fragment of lead crystal wine glass base, although its precise form could not be reconstructed, and part of the moulded stem from another jelly glass. Pit 1296 contained fifty-two fragments of wine bottles, all forms datable to the first half of the eighteenth century.

Catalogue of Illustrated Glass (Figs. 11.18 and 11.19):

1. Convex base with external pontil mark from a urinal base. Clear green potash glass with quite light weathering. Fifteenth century. Ctx 814, pit 815, Phase 5.
2. Flat rim with up-turned edge from a urinal. Green clear potash glass with heavy weathering. Rim diameter 90mm. Fifteenth to early sixteenth century. Ctx 1144, pit 1143, Phase 6.
3. Rim, body and base from a small square case bottle. Green clear mixed alkali glass with medium weathering. Rim diameter 26 mm, base diameter 47 x 47 mm. Seventeenth century. Ctx 1147, 1148 and 1149, pit 1143, Phase 6.
4. Long tapered neck with a sheared rim from a flattened oval bottle. Green mixed alkali glass with little weathering. Early to mid eighteenth century. Rim diameter 18 mm. Ctx 983, pit 1122, Phase 7.
5. Flat base and squared body from a very small rectangular phial. Green mixed alkali glass with very little weathering. Base diameter 22 x 20 mm. Late seventeenth to early eighteenth century. Pit 371, Phase 7.
6. Base and lower body from a jelly glass, decorated with mould-blown mesh design. Clear lead glass with medium weathering. Base diameter 56 mm. Early to mid eighteenth century. Ctx 395, pit 392, Phase 8.
7. Pushed-in base with pointed kick from a large bottle-shaped phial. Green mixed alkali glass with no weathering. Base diameter 80 mm. Early to mid eighteenth century. Ctx 396, pit 392.
8. Folded-out edge from a cloche. Green mixed alkali glass with light weathering. Eighteenth century. Ctx 397, pit 392, Phase 8.
9. Mallet wine bottle. Decorated with an applied seal from All Souls College. Green glass with little weathering. 1760s. Ctx 1350, pit 380, Phase 7.

[27] A. Noël Hume, *Archaeology and the Colonial Gardener*, Colonial Williamsburg Archaeological Series, 7 (1974), pp. 62–3.

Catalogue of Glass by Context

Vessel and Painted Window Glass

100

One fragment of base and plain drawn stem, without internal tear, from a wine glass. Clear lead glass with light weathering.
Base diameter 80mm. Surviving height 135mm. Mid eighteenth century

One fragment of solid twisted handle from a large cylindrical tankard. Clear lead glass with no weathering.
Late eighteenth-mid nineteenth century

374

1 fragment of pushed-in base from a small decanter or bottle. Clear lead glass with some surface weathering.
Base diameter 60mm. Early-mid eighteenth century.

1 fragment of pushed-in base from a small bottle decorated with vertical ribbing. Blue green mixed alkali glass with medium weathering.
Base diameter approx. 50mm. Late seventeenth-early eighteenth century.

1 fragment of flat base and squared body from a very small rectangular phial. Green mixed alkali glass with very little weathering.
Base diameter 22x20mm. Late seventeenth-early eighteenth century.

381

1 fragment of everted rim and short neck from a cylindrical phial. Blue green mixed alkali glass with no weathering.
Rim diameter 27mm. Late seventeenth-early eighteenth century.

383

I fragment of rim from a trumpet-shaped goblet bowl. Clear lead glass with no weathering.
Rim diameter 70mm. Eighteenth century.

395

3 fragments of base and lower body from a jelly glass, decorated with mould-blown mesh design. Clear lead glass with medium weathering.
Base diameter 56mm. Early–mid eighteenth century.

1 fragment of polished mirror glass with a bevelled edge. Very slight evidence of 'silvering' remaining on one side. Clear lead glass with light weathering.
Eighteenth century?

2 fragments of base from a mould-blown square-section medicine bottle. Clear lead glass with no weathering.
Base diameter 21x21mm. Mid eighteenth century.

396

5 fragments of pushed-in base with pointed kick from a large bottle-shaped phial. Green mixed alkali glass with no weathering.
Base diameter 80mm. Early-mid eighteenth century.

1 fragment of base from a mould-blown square-section medicine bottle. Clear lead glass with no weathering.
Base diameter 21x21mm. Mid eighteenth century.

2 fragments of base from a mould-blown square-section medicine bottle. Clear lead glass with no weathering.
Base diameter 21x21mm. Mid eighteenth century.

5 fragments of folded out edge from a cloche. Green mixed alkali glass with medium weathering.
Base diameter uncertain. Eighteenth century.

397
4 fragments of folded out edge from a cloche. Green mixed alkali glass with light weathering.
Base diameter uncertain. Eighteenth century.

418
One fragment of low pushed-in base from a bottle or jar decorated with mould-blown mesh design.
Base diameter uncertain. Mid-late seventeenth century

703
2 fragments of window glass. Painted with an indistinct foliage design. One fragment has a grozed edge.
Thirteenth-fourteenth century.

814
9 fragments of convex base with external pontil mark from a urinal base. Clear green potash glass with quite light weathering.
Thirteenth-late fifteenth century.

830
1 fragment of plain window with two grozed edges.
Thirteenth-fifteenth century.

846
1 fragment of pushed-in base from a globular phial. Green clear mixed alkali glass with light weathering.
Base diameter uncertain. Eighteenth century.

850
5 fragments of body, neck and everted rim from a small square case bottle. Green clear mixed alkali glass with medium weathering.
Rim diameter 21 mm. Seventeenth century.

884
5 joining fragments of tubular base from a possible pedestal beaker. Green potash-rich glass with medium weathering.
Base diameter uncertain. fifteenth-early sixteenth century.

935
1 fragment of flat rim and tapering neck from an hour glass phial. Green clear mixed alkali glass with light weathering.
Rim diameter 25mm. Late seventeenth-early eighteenth century.

983
1 fragment of long tapered neck with a sheared rim from a flattened oval bottle. Green mixed alkali glass with little weathering.
Rim diameter 18mm. Early-mid eighteenth century

1025
35 fragments of pushed-in base, neck and everted rim from a flask. Green potash glass with heavy weathering.
Base diameter uncertain, rim diameter 38mm. Thirteenth-early sixteenth century.

1144
4 fragments of flat rim with up-turned edge from a urinal. Green clear potash glass with heavy weathering.
Rim diameter 90mm. Fifteenth-early sixteenth century.

1147
1 fragment of body from a small square case bottle. Green clear mixed alkali glass with medium weathering. Same vessel as (1148 & 1149).

Seventeenth century.

1148
2 joining fragments of low pushed-in base from a small square case bottle. Green clear mixed alkali glass with medium weathering. Same vessel as 1147 & 1149.
Base diameter 47x47mm. Seventeenth century.

1149
18 fragments of body, neck and everted rim from a small square case bottle. Green clear mixed alkali glass with medium weathering. Same vessel as 1147 & 1148.
Rim diameter 26 mm. Seventeenth century.

1274
1 fragment of wine glass base. Clear lead glass with little weathering.
Base diameter 66mm. Eighteenth century?

1 fragment of base and very lower moulded stem from a jelly? Clear lead glass with little weathering.
Base diameter 64mm. Mid-late eighteenth century.

Summary of the wine bottles

Context	*No*	*Description*	*Type*	*Date*
100	1	Neck	cylindrical	Mid-late 18th century
135	4	Small body fragments	onion/bladder	Late 17th-mid 18th century
137	5	Body fragments	onion/bladder	Late 17th- 18th century
146	1	Small body fragments	onion/bladder	Late 17th-mid 18th century
218	5	Small body fragments	onion/bladder	Late 17th-early 18th century
260	1	Body fragments	cylindrical	Late 18th-19th century
261	1	Small fragment	uncertain	17th-early 18th century
307	1	Small fragments	uncertain	17th-18th century
321	2	Rim, neck and body	onion/bladder	Late 17th-early 18th century
374	80	Necks, bases and body fragments	onion/bladder some early cylindrical	Late 17th-mid 18th century
376	4	body	uncertain	18th-19th century
378	1	Body	cylindrical	18th-19th century
381	7	Small fragments	uncertain	17th-19th century
382	30	Nick, body and base	onion/bladder	Late 17th-18th century
383	14	Wine bottle	uncertain	18th century
395	17	Neck & bases	cylindrical	Mid-late 18th century
396	16	Rim, neck and body	bladder	early 18th century
397	1	Base	cylindrical	Late 18th-early 19th century
400	2	Base	shaft & globe	Mid-late 17th century
402	1	Small fragment	uncertain	18th-19th century
420	1	Body	uncertain	18th century?
730	4	Rim and base	onion	Early 18th century
775	4	Body fragments	onion/bladder	Late 17th-early 18th century
827	1	Body	uncertain	18th century?
846	2	Body fragment	uncertain	18th century?
890	3	Neck	uncertain	Late 17th-early 18th century
895	1	Small body fragment	uncertain	18th century?
925	6	Small body fragments	uncertain	17th-18th century
935	1	Small body fragment	uncertain	18th century?
983	3	Small body fragments	uncertain	18th century
1035	3	Necks and bases	onion/bladder	Late 17th-early 18th century
1073	2	Small body fragments	uncertain	Late 17th-18th century

1152	2	Rim and neck	onion	Late 17th-early 18th century
1157	2	Base and neck	shaft & globe	Late 17th century
1158	5	Rim, neck and body	onion	Late 17th-early 18th century
1297	52	Necks, body and bases	cylindrical	Late 18th-early 19th century
1350	1	Complete sealed All Souls wine bottle	Mallet	1760s

Summary of the wine bottles

Context	*No*	*Date*
141	2	18th century
148	1	17th-18th century
260	1	Late 18th-19th century
261	1	16th-17th century
299	5	17th-18th century
359	2	16th-17th century
381	2	18th-19th century
418	1	18th-19th century
612	4	13th-15th century
703	2	13th-15th century
744	1?	Late medieval?
779	1	18th-19th century
811	1	18th-19th century
830	1	Late medieval
846	2	17th-18th century
895	1	18th century?
919	1	18th century?
921	1	18th century?
1015	3	18th-19th century
1024	1	Late medieval
1027	1	18th century?
1088	2	Late medieval
1301	1	Late medieval

5 CLAY TOBACCO PIPES *BY DAVID A. HIGGINS*

Methodology

The pipe fragments have been individually examined by the author and further notes on each context group entered onto an Excel worksheet, including a refinement of the context dating. The layout of the worksheet is based on the clay tobacco pipe recording system that has been developed at the University of Liverpool.[28] The context summary shows the numbers of bowl (B), stem (S) and mouthpiece fragments (M) from each context and gives two date ranges for them – the overall range represented by the fragments and the most likely date of deposition based on the fragments present. This assessment and dating was prepared before any other context descriptions or relationships were considered. This methodology avoids any pre-conceptions being formed as to the dating or interpretation of a particular deposit. A more detailed catalogue of some of the key pieces has also been made. Copies of the context summary and the more detailed notes have been provided for the site archive.

The Pipes in Context

The excavations produced a total of 837 fragments of pipe, comprising 181 bowl, 630 stem and 26 mouthpiece fragments from 74 different contexts. There is also one fragment of tobacco pipe kiln waste. The majority of the fragments date from the seventeenth or eighteenth century with only a very small quantity of nineteenth-century material represented. Bowls from dating *c.*1620–50 (Figs 11.20–11.22) onwards are represented, with the majority of the pipes dating from *c.*1620–1750. The key pieces and groups have been illustrated, with die numbers for the stamped marks having been allocated in the as yet unpublished national catalogue that is being compiled by the author. This is a good-sized assemblage of pipes and one that provides a good framework for dating and interpreting the post-medieval phases of the site's use.

The pipe evidence from this site is particularly important because many of the fragments were recovered from the fills of discreet cut features, such as pits and quarries. The pipes provide accurate dating for many of these contexts, details of which can be found in the context summary in the site archive. Three of the pits produced especially interesting groups of pipes, as follows.

Pit 1159 (Fills 1157 & 1158; Fig. 11.20, nos 3–5) Two of the fills of pit 1159 produced a total of 14 pipe fragments (4 bowls and 10 stems). Three of the bowls are late seventeenth-century spur types, one with quite a sharply pointed spur but otherwise similar to an example from Abingdon[29] and the other two shown here as Fig. 11.20, nos 3 and 4. Taken together, these forms suggest a date of *c.*1670–90 for the pit fill. The final bowl is an extremely rare miniature heel form (Fig. 11.20, no. 5), which is discussed in detail below. Its significance here is in showing that 'novelty' items were being used by the site's occupants at this time.

[28] 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 c1600-1800*, British Archaeological Reports, Oxford, British Series No 374 (2004), pp. 487-90.

[29] D.A. Higgins, 'Clay Tobacco Pipes', in K. Brady and A. Smith 'Excavations at Abingdon West Central Redevelopment: Iron Age, Roman, Medieval, and Post-Medieval Activity in Abingdon', *Oxoniensia*, 72 (2007), fig. 21.36.

Pit 380 (Fills 381, 382, 383 & 730; Fig. 11.20, nos 7–8 and Fig 11.21, nos 9–17) Pit 380 was a gravel quarry that had been used as rubbish pit during the eighteenth century and it produced a total of 155 pipe fragments (31 bowl, 127 stem and 7 mouthpieces) from four of its fills (Table 24).

Table 24. Clay tobacco pipes from pit 380

Context	Bowl	Stem	Mouthpiece	Total	Marks Present
381	11	68	3	82	ED/BEAS/TEN x 3; WP x 1
382	13	33	2	48	ED/BEAS/TEN x 2; WILL/PEARCE x 1
383	3	15	2	20	
730	4	1	0	5	
Total	31	127	7	155	

Context 381 contained a lot of residual seventeenth-century material and all the bowls are broken to fragments, suggesting a well trampled and/or disturbed deposit. Three of the stems are badly burnt and have become discoloured and encrusted. One or two longer, fresh looking pieces of stem (up to 133 mm) are present and these are likely to date from the early eighteenth century. The best dating, however, is provided by four marked stems imported from the Wiltshire/Hampshire area, three marked ED/BEAS/TON and one WP (Fig. 11.21, nos 14 and 17; see below for details). These are all quite thick stems and likely to date from *c.*1700–30.

Context 382 also produced stems of seventeenth or eighteenth century date, although these are mainly late seventeenth or early eighteenth century in character with less residual material and some large fragments of up to 109 mm long. There are two stems with ED/BEAS/TON marks (different dies; Fig. 11.21, nos 16 and 17) from the Newbury/East Woodhay area and one with a WILL/PEARCE mark from Marlborough (Fig. 11.21, no. 15). The latter can be dated to around 1700–40. As with context 382, the bowls are rather fragmentary and none are complete. There are, however, four joining pieces that make up most of a large, thin-walled spur bowl of *c.*1720–60 style made of a local sandy fabric but in a Wiltshire style (Fig. 11.21, no. 13). There are parts of at least three local Oxford type heel bowls in sandy fabrics of typical *c.*1700–60 types. One of the sandy bowl fragments cross joins with the larger part of a bowl from 383 to make a complete example (Fig. 11.21, no. 10). There are also three bowl fragments in a much finer fabric that matches the Wiltshire/Hampshire stem marks and which represent at least two heel bowls (Fig. 11.21, nos 11 and 12). Although very broken, these indicate the bowl forms that are likely to have been associated with the stem marks.

Context 383 also produced stems of seventeenth or eighteenth century date, but with the emphasis being firmly on material dating from the late seventeenth or early eighteenth century. One spur bowl is in a fine fabric and imported to the area, almost certainly from the Wiltshire/Hampshire area (not illustrated as the spur is missing and the rim chipped). The form of this bowl is similar to an example from Reading,[30] although the spur of the Ashmolean example is set nearer the smoker. It has quite a thin stem – too thin for the Beasten and Pearce marks from the same pit. The other two bowls are heel forms made of sandy fabrics and typical of

[30] D.A. Higgins, 'Clay Tobacco Pipes', in B.M. Ford, D. Poore, R. Shaffrey and D. Wilkinson, *Under the Oracle* (Oxford, 2013).

eighteenth-century Oxford area products. One of these cross joins with a bowl fragment from 382 (Fig. 11.21, no. 10).

The final group, from context 730, is odd in that it contains four complete bowls, three of which have good lengths of stem surviving and yet there is only one stem fragment. One of the bowls is a residual heel form of *c.*1640–60 and one is an early eighteenth-century heel style with an internally cut and bottered rim (Fig. 11.20, no. 7), which also seems a little early for the rest of the pit group. The other two heel types, however, have cut rims and are of slightly later forms, dating from *c.*1720–60 (Fig. 11.20, no. 8 and Fig. 11.21, no. 9).

Taken together, the context groups from the pit clearly contain odd residual pieces (especially 381) but they all contain fresher looking pieces that suggest a final deposition around 1720–50, and perhaps 1720–40 if the generally accepted dating of the stem marks is reliable. Unfortunately, neither of the two makers represented by the stem marks has actually been pinned down from documentary sources and so the dating has to rely on parallels with similar marks. Other finds from the pit include white salt-glazed stoneware, which only became common after about 1720, thus confirming the dating provided by the pipes. Not only do the pipes suggest a close dated for this pit but they also include five stem 'imported' stamps from the Marlborough and Newbury areas some 25–30 miles from Oxford.

Although two examples of Beasten marks have previously been recorded from Oxford, it is not a particularly common mark from the town and so it is remarkable that five were found together in this single pit group. These pipes may well represent part of a single batch or consignment that was purchased and used at a single property. A similar situation was noted at Oxford Castle where six Joseph Barnes stems from East Woodhay in Hampshire were found in just two different contexts – the mark being otherwise unrecorded from Oxford.[31] It is worth noting that this pit group also included two other imported stem marks from the Marlborough area (WP and WILL/PEARCE; see below for details), perhaps indicating that the property from which this waste came had a particular preference for pipes from the Wiltshire/Hampshire area, or that they had particular trading or family links there.

Pit 371 (Fills 372 & 374; Fig. 11.22, nos 18–21) Pit 371 produced a total of 105 pipe fragments (16 bowl, 87 stem and 2 mouthpieces) from two of its fills (contexts 372 and 374). These two fills both produced large, fresh looking fragments of pipe, including stem fragments of up to 113 mm in length. Two of the stems fitted bowl fragments to give surviving stems of up to 193 mm in length and both contexts share common mould types, showing that two fills are likely to be exactly contemporary. For this reason, the two groups are discussed together here.

Although there are one or two residual fragments, including two late seventeenth-century spur fragments from 372, the majority of the finds (including all the other bowls) represent a coherent group that probably dates from the second quarter of the eighteenth century. As such, it provides a good reference point for the bowl forms that were being used at this time. There are four distinct types that are represented, which are described as types A–D below.

Type A – Fig. 11.22, no. 18 This is an unusual form with four examples from the same mould represented (one from 372 and three from 374). The bowl has the curved lines typical of West Country spur forms and yet it has slightly forward leaning heel. Two of the bowls fit with stem

[31] D.A. Higgins, 'Clay Tobacco Pipes', in J. Munby, A. Norton, D. Poore and A. Dodd, *Excavations at Oxford Castle, 1999–2009*, Thames Valley Landscapes Monograph, 44 (Oxford, 2019)

fragments to give up to 193 mm of surviving stem. This confirms that these were straight stemmed pipes and the extrapolated stem taper from other fragments in the group suggests that they would have been around 330mm long, which is in the mid-range for pipes of this period.[32] All four examples are made of a fine sandy fabric and can be identified by distinctive mould flaws on both sides of the heel. They are neatly finished with cut rims and stem bores of 6/64". None of them is burnished.

Type B - Fig. 11.22, no. 19 The second form comprises a typical local eighteenth century form and is represented by one example from 372 and two from 374. This form is characterised by its relatively large heel and can be identified from a distinctive vertical mould flaw on the left-hand side of the heel, towards the stem. As with Type A, all are made from a fine sandy fabric and none of them have burnished surfaces. The rims are square cut and the stem bores measure 6/64" (two examples) or 7/64" (one example).

Type C - Fig. 11.22, no. 20 This form is represented by five examples from 374, but four of these are incomplete and, unlike the examples above, they cannot be matched to an individual mould type. The only complete example is illustrated and, although the general bowl form is very similar to Type B, it is characterised by a much slighter heel. This example is also made of a fine sandy fabric and has a cut rim. Unlike the previous examples, it also has a poor-quality burnish to both the bowl and stem. The stem bore measures 6/64". The other four fragments are similar in that they all have small heels and all are made of a fine sandy fabric. However, they probably represent two or three very similar but different mould types from the illustrated example. Three of these other examples are burnished; two have stem bores of 6/64" and one has a bore of 5/64".

Type D - Fig. 11.22, no. 21 Only one example of this type was recovered (from 372). It is similar to Type C in that it has a relatively small heel but, in addition, it is marked with the relief moulded maker's initials RG for one of the Robert Gadney's of Oxford (father and son), both of whom were working in 1722.[33] The G is distinctive in that it has a dot moulded underneath the initial and, possible, smaller dots around it. The pipe is made of a fine sandy fabric and has a square cut rim; it is not burnished and the stem bore measures 5/64".

Taken together, this group is characterised by the use of fine sandy fabrics and the dominant form is the typical upright eighteenth-century type with a fairly cylindrical bowl (Types B-D), which has five or six different mould types represented. Three of the nine examples have burnished surfaces and the stem bores are usually 6/64" (occasionally 5/64"). None of the eight Type A or B bowls were burnished, which suggests that these types were habitually made this way. This contrasts with early eighteenth-century assemblages from elsewhere in Oxford, where almost all the pipes appear to have been burnished.[34] The rims from Pit 371 are also notable in that they are all square cut and without the internal trimming or bottering that is typical of early

[32] D. A. Higgins, *The Interpretation and Regional Study of Clay Tobacco Pipes: A Case Study of the Broseley District*, doctoral thesis submitted to the University of Liverpool (1987), p. 444.
[33] A. Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations in St Ebbe's, Oxford, 1967–1976: Part II: Post-Medieval Domestic Tenements and the Post-Dissolution Site of the Greyfriars', *Oxoniensia*, 49 (1984), p. 255.
[34] D.A. Higgins, 'Clay Tobacco Pipes', in J. Munby et al., *From Studium to Station, Rewley Abbey and Rewley Road Station, Oxford*, Oxford Archaeology Occasional Paper, 16 (2007), p. 45; Higgins, 'Clay Tobacco Pipes', in Munby et al., *Excavations at Oxford Castle, 1999–2009.*

eighteenth-century Oxford groups. Finally, pipes dating from early in the century tend to have slightly larger stem bores (typically 7/64" or 6/64") and rather taller forms.[35]

These subtle changes in form and finish enable the groups to be differentiated and so this pit group can probably be placed no earlier than *c.*1720, a dating supported by the presence of white salt glazed stoneware from the pit as well. Conversely, the pipes include a Gadney mark and are consistently made of a fine sandy fabric, which is thought to have gone out of use around 1750.[36] Although in one part of the St Ebbe's report Oswald gives a date of 1772 for the second Robert Gadney,[37] this appears to be a typographic error and should read 1722.[38] This is the latest known date for Gadney and both this and the fabric type argue for a date of before the middle of the century for this group. As a result it seems reasonable to attribute this group, and the characteristics that it exhibits, to the period *c.*1720–50. Good groups of this date have not hitherto been available for study which is why the groups from Pits 371 and 380 are of such importance.

The Pipes Themselves

Recent studies have, to a large extent, been able to establish the nature and evolution of pipe styles in Oxford and surrounding areas. The pipes from the Ashmolean excavations generally follow the trends that have been established with, for example, groups of *c.*1640–60 being dominated by heel forms (Pit 851), whereas by *c.*1650–90 it is the spur forms that dominate (e.g. pits 392, 393 & 1159). Heel forms regain the ascendancy by the start of the eighteenth century. The pit groups from the second quarter of the eighteenth century (e.g. 371 & 380 above) are particularly important since good quality material of this date has not previously been studied and they now allow clear differences to be seen with the early eighteenth-century material. Early eighteenth-century pipes generally have bottered rims and burnished surfaces with few flared heels. By the second quarter of the century most rims are simply cut, burnishing is much rarer and the heels are more frequently flared. Later material is, once again, sparse from this site, particularly for the nineteenth century.

Marked Pipes

A total of twelve marked pipes were recovered from the excavations, comprising two heel stamps, seven stem stamps and three moulded marks. These represent at least six different makers and make a valuable contribution to the relatively small number of marked pipes that are known from Oxford, especially since several previously unrecorded marks are present. There is also an important group of imported stem marks, all of which were found together in a single pit (see pit 380 above). The marks are described in alphabetical order by surname below:

ED/BEAS/TEN (Fig. 11.21, nos 16–17). A total of five incuse stamped Edward Beasten marks dating from *c.*1700–30 were found in pit 380, three from context 381 and two from context 382. These are all on fairly thick, chunky stems made of a fine, hard fired fabric, different from that in contemporary use at Oxford, and they all have burnished surfaces (one of fine quality and four of good quality). Four of the stems have bores of 6/64" and one is of 5/64". One of the marks has been placed 17 mm from the bowl junction (Fig. 11.21, no. 17) and another 22 mm, which is

[35] Higgins, 'Clay Tobacco Pipes', in Munby et al., *Excavations at Oxford Castle, 1999–2009.*
[36] Higgins, 'Clay Tobacco Pipes', in J. Munby et al., *From Studium to Station*, p. 45.
[37] Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 262.
[38] cf. Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 255.

the same distance as an example from Abingdon.[39] None of the marked stems from the Ashmolean are attached to their bowl forms, but the Abingdon example occurred on a pipe with a small heel.[40] Similar fragments made of a fine (non local) fabric were found in pit 380 (Fig. 11.21, nos 11–12) and these are likely to represent the bowl forms associated with these five stems. Four of the Beasten stem marks are probably of the same type, with large lettering and a small star before the first letter (Die 2124). None of these examples has any clear edge to the die itself showing in the impression but the small sections that show suggest a circular die in the composite drawing (Fig. 11.21, no. 17). In contrast, one of the examples from 382 has been marked with a smaller die that does not have a star before the first letter and where the square die edge is clearly visible (Die 2123; Fig. 11.21, no. 16).

This maker is well known from his marks but has proved difficult to pin down in documentary sources. Cannon[41] notes that the largest concentration of his marks has been found in the Newbury area, suggesting that Beasten either worked there or at the neighbouring (and regionally important) pipemaking centre of East Woodhay in Hampshire. Cannon goes on to note examples of Beaston marks from Brinkworth, Cirencester, Cricklade, East Woodhay, Fulham, Hannington Wick, Highworth, Littlecote, Marlborough, Newbury, Old Swindon, Overton, Salisbury, Stroud, Swindon and Winchester, which not only shows how prolific this maker was but also the market area that he was able to achieve. Examples of this mark have also been recorded from Magdalen Street and Rewley Abbey in Oxford,[42] at Abingdon[43] and at Faccombe Netherton, Hampshire.[44]

RG. One pipe with the relief moulded heel mark RG was found (Fig. 11.22, no. 21) and another marked GR (Fig. 11.20, no. 6). Occasionally moulds were made with the initials transposed from the normal order, probably by mistake, and this seems likely to be the case here. There were two Oxford pipemakers named Robert Gadney, father and son, who are well known from their marked pipes. It seems likely that both of these pipes were made by them and that the initials are supposed to read RG. Both pipes date from the first half of the eighteenth century and so could have been made by either maker, since they were both working in 1722.[45]

MH. A heel bowl of *c.*1620–50 was recovered from context 321 with a relief stamped MH mark on its heel (Fig. 11.20, no. 2). The mark is quite simply cut and there is a small star above and below the initials. The bowl has been made of a fine sandy fabric and neatly finished, but not burnished. The rim is fully milled and the stem bore measures 8/64". There is also a clear mould flaw on the left hand side of the heel, which shows that the bowl was made in the same mould

[39] D.A. Higgins, 'Clay Tobacco Pipes', in K. Brady and A. Smith 'Excavations at Abingdon West Central Redevelopment: Iron Age, Roman, Medieval, and Post-Medieval Activity in Abingdon', *Oxoniensia*, 72 (2007), p. 166.
[40] Ibid., fig. 24.66.
[41] P. Cannon, 'Evidence of Tobacco Pipe Making in East Woodhay and District', *Transactions of the Newbury and District Field Club*, 14.1 (1991), p. 22.
[42] P. Cannon, 'Clay Tobacco Pipes', archive report on finds from the Debenham's excavations, 1-12 Magdalen Street, Oxford (NBD 99/33) prepared for the Cotswold Archaeological Trust (2000); Higgins, 'Clay Tobacco Pipes', in J. Munby et al., *From Studium to Station*, fig. 22.19.
[43] Higgins, 'Clay Tobacco Pipes', in K. Brady and A. Smith 'Excavations at Abingdon West Central Redevelopment', fig. 24.66.
[44] A. Oswald, 'Pipe Stamp Index', unpublished copy of Adrian Oswald's archive index, held at the National Clay Tobacco Pipe Archive, which is currently housed at the University of Liverpool (1991).
[45] Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 255.

as another example from context 299. The example from 229 is also made of a fine sandy fabric and with a fully milled rim, but the stem bore only measures 7/64". The other difference is that the example from 299 is not marked, which shows that the MH maker did not always stamp his products. The MH maker has not yet been identified from documentary sources but must have worked in Oxford, where this is one of the most common marks found. There are 11 examples from Parks Road in Woodstock Museum and a further three from Arlosh Hall, Mansfield Road, that are now in the Decorative Arts collections at the World Museum Liverpool. These 14 other examples range from around 1630–70 in date and at least four stamp types are represented, all of them different from the Ashmolean example. The range of bowl forms and different marks used by this maker suggest that he ran a well-established and long-lived workshop.

GN (Fig. 11.22, no. 22). One plain pipe with the relief moulded mark GN was recovered from context 396, a fill of pit 392. This can be attributed to a member of the Norwood family, who were one of the principal pipemaking families in Oxford during the nineteenth century. At least five different patterns of marked pipe produced by this family were found during the excavations at St Ebbe's.[46] Despite this, the only published details relating to this family are two brief entries listing the dates for George Norwood as 1852-63 and for Robert Norwood as 1851.[47] Given the importance of marked pipes in providing dating evidence it is essential to understand as much as possible about the working lives of the pipemakers involved. Some additional research has therefore been carried out which greatly extends both the number of family members known to have been involved in pipemaking and their working dates. This new information will provide a much better framework for identifying future finds. It has been gathered by consulting three online resources: the International Genealogical Index (http://www.familysearch.org); the 1841–81 census returns (through Genes Reunited, http://www.genesreunited.co.uk) and Jackson's Oxford Journal, 1800–1900 (Nineteenth Century Papers, through Gale Publishing).

The Oxford pipe making business was almost certainly founded by **George Norwood (I)**, who was baptised at Eton, Buckinghamshire, on 19 November 1793, the son of William and Maria. William was a pipemaker in Eton and so George would have learned the trade from his father (other members of the Norwood family continued to work as pipemakers in Eton until at least 1903).[48] George must have moved to start his own business in Oxford as a young man, although it did not necessarily run smoothly since, by the 1820s, he had become an insolvent debtor. He is listed as a tobacco pipe maker of Oxford when he successfully petitioned for discharge as an insolvent in 1826 (Jackson's Oxford Journal, 18 February 1826). He married Mary from Shipton and in the 1841 Census the family were living in Grandpont with son George Norwood (II), born about 1828, who was later to become a pipemaker as well. It is probable that they also has a son Robert Pickman Norwood, who was born in about 1825 and also became a pipemaker briefly, but who was at an Independent school at Summertown, Oxford, in 1841. The choice of the unusual middle name Pickman may well be significant, since Charles Pickman was apprenticed as a pipe maker to his father Richard at Henley in 1752 and a Richard Pitman (*sic*), probably the same person, is recorded at Eton in 1758.[49] The use of this middle name for Robert probably indicates that the two pipemaking families from Eton were related by marriage.

[46] Ibid., p. 258.
[47] Ibid., p. 262.
[48] A. Oswald, , *Clay Pipes for the Archaeologist*, British Archaeological Reports, British Series 14 (Oxford, 1975), p.161.
[49] Ibid.

By 1841 it seems likely that George (I) had quite a large business, since his wife **Mary** is listed as a pipemaker and the adjoining properties in Grandpont housed five other pipemakers, who were probably employed by him. The census is very faded making it hard to read, but these appear to be **Ann Steventon** (70), **Ann Steventon** (30), **William Steventon** (age uncertain but possibly Ann senior's husband), **John Lawton** (25) and **William Pallet?** (15), who was an apprentice pipe maker. The Steventons were another Oxford pipemaking family, with various members of the family employed in the trade until the 1870s. Despite the apparent size of Norwood's business he still had financial difficulties and was again insolvent in 1842. The newspaper entries of this period provide a rare insight into the exact location and layout of his business, and the facilities that he had at his disposal. The notice of his insolvency provides details of where his house and workshop were located (Jackson's Oxford Journal, 28 May 1842):

"Insolvent debtors, to be heard at Oxford . . . 16 June 1842 . . . George Norwood late of Wyatt's-yard, St Aldate's-street, in the borough of Oxford, tobacco pipe maker, and having at the same time a workshop on the premises of Messers. Carter, Hall and Sherratt, boat builders, in St. Aldate's-street, in Oxford aforesaid."

Further details come from the auction particulars of the property he had occupied, which also shows that the name Wyatt's Yard referred to Alderman Lawrence Wyatt, to whom the property belonged. The auction was held at the Mitre Inn on 16 June 1842 and the advertisements for it included the following description (Jackson's Oxford Journal, 14 and 21 May 1842):

"All that freehold messuage, facing St. Aldate's-street, lately occupied by Mr. George Norwood; and seven tenements adjoining, on the east side; and a cart shed, pieces of ground, and a small stable. The whole premises extending from St. Aldate's-street eastward to the stream adjoining Christ Church Meadow. Lot 1 – A convenient dwelling house, lately occupied by Mr. George Norwood, at the rent of 20l*., and a stable and strip of ground at the east end of the premises. Quit rent, 1*l*."*

These references make it clear that Norwood has a cart shed and small stable, which would have been essential for housing a horse and cart for distributing his wares, as well as giving the unlikely location of his actual workshop at a nearby boat yard. They also provide an insight into the sort of property (and rental) that he had been trying to maintain from his pipemaking business. It is not known what happened to the family immediately following George (I)'s insolvency, but it is probable that it was his son, 'George Norwood the younger' (no occupation given), who was convicted of damaging a fence at North Hinksey in May 1843 and ordered to pay £1.0.6, or two weeks hard labour (Jackson's Oxford Journal, 27 May 1843).

By the time of the 1851 Census George (I) and his wife Mary were living in Bridport Street, with George again being listed as a tobacco pipe maker. He was presumably trading on his own account, since the dates of 1852–63 quoted by Oswald[50] are likely to have been taken from trade directories. Son George (II) was not at home (and could not be located) in 1851 but, a couple of doors away, was **Robert Pickwood Norwood**, who was also working as a pipemaker, presumably for his father. This is the only year in which he appears as a pipemaker since, in 1861 and 1871, he was a school master and, by 1881, a clerk in holy orders.

[50] Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 262.

In the 1861 census, George (I) and Mary are still recorded in Bridport Street but by this time their son **George Norwood (II)** was also living with them, together with his wife and two small children. George (II) was given as 33 years old and was working as a pipe maker, presumably for his father. Dutton, Allen & Co's 1863 trade directory still lists George Norwood as a pipe maker in Bridport Street but there were changes to the family during the 1860s in that Mary, wife of George (I), died on 13 November 1868 (Jackson's Oxford Journal, 27 May 1868). By the time of the 1871 census the family had moved to Pensons Gardens in Headington but it was then George (II) who was listed as head of the household. His occupation was given as that of a pipemaker, as were his two children, **Charlotte P. Norwood** (15) and **George R. Norwood** (13), but no occupation was given for his 78-year-old widowed father. He had probably retired by this time with George (II) running the family business.

George (I) had presumably died by 1881, since he could not be found in the census of that year. George (II) was listed as a 'Masonic Tyler' in 1881 and 1891 and appears to have given up the pipemaking trade. His connection with the Masons continued for the rest of the century and he is listed as a steward for them in newspaper reports of 1878 and 1890 (Jackson's Oxford Journal).

This research has shown that the family had pipemaking roots in Eton and that it was probably George (I) who moved to establish a new business in Oxford around 1820. Despite becoming insolvent in the 1820s, he went on to build up a workshop in a boat yard in St Aldate's Street that appears to have employed a number of people by 1840. He became insolvent again in 1842 and moved to Bridport Street, where he continued to work as a pipemaker until the 1860s. His wife Mary was listed as a pipemaker in 1841, as were his sons Robert in 1851 and George (II) in 1861 and 1871. His wife died in 1868 and George (I) retired and moved to live with his son, George (II), at Headington, where his son continued to trade as a pipemaker with the aid of his two children, Charlotte and George (III). George (I) probably died during the 1870s and the family gave up the pipemaking trade, which had spanned at least four generations stretching back to the eighteenth century in Eton. In summary, the dates when the various members of the Norwood family are actually documented as pipemakers in Oxford are as follows:

Charlotte P. Norwood	1871
George (I) Norwood	1826–63
George (II) Norwood	1861–71
George R. (III) Norwood	1871
Mary Norwood	1841
Robert Pickman Norwood	1851

Unfortunately this means that, in theory, the pipe marked GN could have been made by any of the three generations of the family with these initials. In practice, the initials almost certainly refer to George (I), who appears to have set up and run the business from the 1820s–60s, with his son taking over briefly before changing profession to work for the Masons. Apart from the St Ebbe's examples mentioned above, another spur fragment marked GN has been recovered from the Sackler Library site in Oxford.[51]

[51] D.A. Higgins, 'Clay Tobacco Pipes' in D. Poore and D. R. P. Wilkinson, *Beaumont Palace and the White Friars: Excavations at the Sackler Library, Beaumont Street, Oxford*, Oxford Archaeological Unit, Occasional Paper No 9 (Oxford, 2001), fig. 19.9.

WP / WILL/PEARCE. There is an incuse WP stem stamp from context 381 (Die 2165) and an incuse WILL/PEARCE stem mark from 382 (Die 1137), both of which are fills of pit 380 and both of which seem likely to represent the same maker (Fig. 11.21, nos 14–15). Both marks occur on finely burnished stems made of fine clay, with the WP stem having a bore of 6/64" and the WILL/PEARCE stem having a bore of 5/64". The latter mark starts 30 mm from the bowl junction. As with Beasten, Pearce is clearly identified from his marks, which date from *c.*1700–40, but has yet to be traced in the documentary record. His marks are not nearly as numerous as those of Beasten, but WP marks have been noted from Marlborough and WILL/PEARCE marks from Marlborough, Oxford and at Queenhithe in London.[52] The Oxford example is from St Ebbe's and occurs on the stem of a typical Wiltshire style spur bowl.[53] Although the St Ebbe's mark is of the same design as the Ashmolean example, detailed comparison of the two shows that they were actually made using different dies (but that they are too similar to be allocated different die numbers).

Atkinson only noted this mark from Marlborough and considered that it probably represented a son the John Pearce who was apprenticed there in 1668 (Atkinson 1965, 90 & 93). While a family connection seems likely, the name was relatively common during the seventeenth century and a search of the Internet IGI in May 2010 found at least ten references to individuals named William Pearce in Marlborough alone during the period 1660–1740. These included baptisms in 1660, 1672, 1703, 1709, 1722, 1725, 1729 and 1740 as well as marriages in 1677 (William Pearse/Pears and Sarah Kymber/Kinbar) and 1695 (William Parce and Elizabeth Allin). If this was a Marlborough maker, then the 1672 baptism (William, son of Thomas Pears, baptized 16 January 1672) and the 1695 marriage (16 December) would fit the date of the stem marks best.

GR – *See RG above*.

TR. Context 1158, one of the fills of pit 1159, produced a very small pipe, the dating and interpretation of which was originally problematic. In terms of size alone, it would fit within the range of the very earliest pipes, which are generally dated to *c.*1580–1610. These early pipes, however, often just have cut (not bottered) rims and they are very rarely milled. They also have their own distinctive range of bowl forms. The example from 1158 has a more developed looking bowl form and the rim is both milled and bottered (Fig. 11.20, no. 5). Furthermore, it has very fine sandy inclusions in its fabric, which is a local Thames valley characteristic, but one which is not thought to have come into general use in Oxford until around 1660–80.[54] Finally, the pipe is substantially complete with 63 mm of surviving stem, which suggests that it freshly deposited and not residual. The accompanying bowls from the pit (contexts 1157 and 1158) suggest a date of *c*1670–90 for the deposition of this piece.

Taken together, the above evidence strongly suggests that this is a miniature pipe, made using later styles, techniques and fabric, so that it superficially looks like a very early pipe. Miniature pipes certainly existed, since one has been recovered from St Mary's City in Maryland, USA, the size of which would suggest a much earlier date than the settlement's actual foundation date of 1634. Miniature pipes such as this are extremely rare and so this is an important addition

[52] Oswald, 'Pipe Stamp Index'.
[53] Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations at St Ebbe's, Part 2', fig. 52.15.
[54] Higgins, 'Clay Tobacco Pipes', in K. Brady and A. Smith 'Excavations at Abingdon West Central Redevelopment', p. 172.

to the known examples, particularly since it is not only associated with other datable pipes but also because it is marked. On the heel are the incuse stamped initials TR, without any border or other decoration (Die 2166). Although very early makers' marks often consisted of unbordered incuse initials such as this, the style was rarely used later – except at Oxford, where a number of examples are known from the late seventeenth and early eighteenth centuries.[55] The sandy fabric suggests local production and a Thomas Reeve is recorded as an Oxford pipemaker from 1667–1700.[56] 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). The evidence all points to Reeve being the maker, thus making this one of only two miniature pipes that can not only be accurately dated but also attributed to a particular production centre and manufacturer.

The only other miniature pipe that can be attributed to its maker is a heel bowl from Coventry stamped IP. The same IP mark also occurs on bowls of *c.*1680–1720 and can be attributed to John Pottifer, who is recorded working in that city *c.*1710.[57] The Oxford bowl is, if anything, a little larger than the Coventry example but it is very similar in size to the example from St Mary's City (18 ST 1-103 2318 D/AT). Excavations in Chester have produced a miniature spur bowl (CHE 12 HP92 VI 1533), with the associated normal sized bowls dating mainly from *c*1630-60 but with one later piece of early eighteenth-century date. The use of a local fabric for the Chester example shows that it was made somewhere in or near that city. Although the author is only aware of these four examples, it is clear that miniature pipes were made in both heel and spur forms and that they produced at various places across the country (Oxford, Coventry and Chester). The two securely dated examples were probably made between about 1670 and 1720 while the St Mary's City example shows that these 'novelty' items were also exported to the colonies. Despite its small size, the Oxford example has clearly been smoked, showing that these pipes were not only entertaining, but functional as well.

Coloured Pipes

The final point of note with regard to the pipes is that a number of them appear to have been coloured red originally. This is an extremely unusual phenomenon but there now appears to be compelling evidence that it was a regular practice on pipes produced in or near Oxford over quite a period of time.

A total of eight stems were noted with traces of a rust-red colouring on them. This colouring now appears thin and patchy and generally seems to have been applied in streaks, as if something hard, like a lump of pigment, has been rubbed against the stems – although on one piece is a more concentrated patch that looks as if it could have been applied in solution with a brush (context 1037). The red colouring may well be prone to loss during burial, and washing after excavation, so that these eight examples probably under-represent the numbers of pieces that were originally coloured. Some of the fragments noted only have very small areas or patches of surviving colouring, but the better examples have clearly defined lines of colour surviving. It is not clear whether these are the only surviving areas of an all over colour coat or whether the original effect was intended to be stripy. Colouring occurs on stems ranging from thick pieces

[55] Higgins, 'Clay Tobacco Pipes', in J. Munby et al., *From Studium to Station*, pp. 46–7.
[56] Oswald, 'Clay Pipes', in T.G. Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 262.
[57] S. Muldoon, 'Marked Clay Pipes from Coventry,' in P. Davey (ed.) *The Archaeology of the Clay Tobacco Pipe, I*, British Archaeological Reports, British Series, 63 (1979), pp. 268-9.

from adjacent to the bowl junction right down to thin pieces from near the tip of a pipe – so it appears that the whole stem length was coloured. No coloured bowl fragments were noted.

There also appears to be a chronological spread of these pipes in that they occur in deposits ranging from *c.*1650–1750 in date. The earliest pieces are probably from context 1037, where the associated bowls suggested a date of *c.*1650–90. Furthermore, the two pieces from this context are both made of a fine almost inclusion free fabric, which pre-dates the use of the later Thames valley sandy fabric. All the other examples occur on stems made of this sandy fabric (which shows they were made locally), with the latest pieces occurring in context 374, a fill of pit 371, which dates from *c.*1720–50 (see above and Fig. 11.22, nos 18–21).

Coloured or painted surfaces on pipes are now extremely rare, although they may have been more common in the past and simply not survived burial. The author has only ever seen a couple of broadly comparable examples, including a stem that had several red lines along its length from London and an example from Abingdon with a single red line on it.[58] The Abingdon example was also a stem made of a sandy fabric and was recovered from a context dating from *c.*1660–1710. The Ashmolean examples are shown in Table 25, which gives the context; total numbers of bowl (B), stem (S) and mouthpiece (M) fragments; the likely date range of the deposit; the number of red coloured stems; the fabric of the coloured stems; the stem bore of the coloured stems in 64ths of an inch and any comments on them.

Table 25. Coloured pipes

Context	B	S	M	Tot	Date	Red	Fabric	B/64	Comments
374	11	69	2	82	1720-1750	3	sandy	6	2 pieces from near tip of the stem
775	1	21	0	22	1660-1690	2	sandy	8	
919	1	11	0	12	1660-1710	1	sandy	8	
1037	4	5	0	9	1650-1670	2	fine	7	1 piece has red running up to bowl junction

Kiln Furniture

One piece of pipe kiln furniture was recovered from context 137 (Fig. 11.22, no. 23). This comprises a small fired pipe clay roll with dished pipe bowl impressions on both sides (the remains of two opposing impressions on each side – see section detail). The roll would have been used damp to help secure the load when stacking the muffle kiln for firing. It appears to have been formed on or using a piece of woven material since it has a textured surface. The roll itself is made of a typical local fabric with fine sandy inclusions, the use of which died out during the second half of the eighteenth century. Conversely, the relatively large diameters of the pipe bowl impressions suggest a late seventeenth or later date. The other pipes from this context were generally not later than the mid-eighteenth century and so a date within the 1660–1750 range is most likely for this piece. There is no other evidence of pipemaking from the site itself, but this piece of waste clearly indicates that it was taking place nearby.

[58] Higgins, 'Clay Tobacco Pipes', in K. Brady and A. Smith 'Excavations at Abingdon West Central Redevelopment', p. 171.

Catalogue of Illustrated Clay Pipes (Figs 11.20–11.22)

The pipes are all illustrated at 1:1 with details of the stamped marks added at 2:1. Relief marks are shown in outline and incuse marks in solid black. Die numbers relate to the as yet unpublished national catalogue that is being compiled by the author. Burnished surfaces are indicated using a light broken line and damaged areas with a stippled finish. A complete outline is used if the entire fragment is shown, with a heavier line marking the profile and a lighter line the broken edges. Where a stem has been shortened to accommodate the page layout, the truncated end has been left open. All drawings are by the author.

1. Heel bowl of *c.*1620-50 made of a fine fabric and with a stem bore of 7/64". The rim is bottered and three-quarters milled. Context 850.

2. Complete heel bowl of *c.*1620-50 with 52mm of surviving stem. This is made of a fine sandy fabric and has a stem bore of 8/64". The rim is bottered and fully-quarters milled. There is a crudely executed relief stamped mark reading MH with stars above and below the initials on the base of the heel. Various versions of the mark are known from Oxford, where they must represent an as yet unidentified maker. This particular version (Die 2125) has not been previously recorded. This pipe was made in the same mould as an unmarked example from context 299, showing that this maker did not always mark his products. Context 321.

3. Spur bowl of *c.*1660-90 made of a sandy fabric and with a stem bore of 8/64". The rim is bottered and three-quarters milled. There is a large inclusion in the bowl that has clearly expanded or exploded during firing, causing an area of the bowl surface to flake away. Found in the same context as a slightly earlier looking spur bowl and a miniature pipe (Nos 4 & 5). Context 1158 (Fill of pit 1159).

4. Spur bowl of *c.*1660-80 made of a sandy fabric and with a stem bore of 7/64". The rim is bottered and half milled. Found in the same context as a slightly later looking spur bowl and a miniature pipe (Nos 3 & 5). Context 1158 (Fill of pit 1159).

5. A very rare miniature heel form with the incuse stamped initials TR for Thomas Reeve of Oxford, who is recorded working from 1667-1700 (Oswald 1984, 262). The bowl is made of a sandy fabric and with a stem bore of 7/64". The rim is bottered and three-quarters milled. The other pipes from this pit suggest a date of *c*1670-90 for this piece. Context 1158 (Fill of pit 1159).

6. Heel bowl of *c.*1700-50 made of a sandy fabric and with a stem bore of 7/64". The rim has been internally trimmed and lightly bottered but is not milled. A freshly broken piece of stem joins to give 154mm surviving. The pipe has a light burnish (poor quality) all over the bowl and stem. There are the initials GR moulded on the sides of the heel, which are probably the reversed initials of one of the Robert Gadney's of Oxford (father and son, recorded from at least 1667-1722; Oswald 1984, 255). This is a large fresh-looking pipe fragment that provides a good date for this context. Context 260.

7. Heel bowl of late seventeenth or early eighteenth-century style but which occurs in a pit group of *c.*1720-50. Made of a fine fabric and with a stem bore of 6/64". The rim is internally cut and bottered but not milled. Context 730 (Fill of pit 380).

8. Heel bowl from a pit group of *c.*1720-50 made of a sandy fabric and with a stem bore of 5/64". The rim has been cut and is not milled. Most of the slightly flared heel base has been trimmed, but one area has been missed and shows mould marks. Context 730 (Fill of pit 380).

9. Heel bowl from a pit group of *c.*1720-50 made of a sandy fabric and with a stem bore of 5/64". The rim has been cut but not milled and there is a mould line around the rim where it has been altered or repaired. There is also an internal bowl cross made up of thin, sharply cut lines (one of which is double cut). Context 730 (Fill of pit 380).

10. Heel bowl made up of two joining fragments from different contexts within a pit group of *c.*1720-50. The bowl is made of a sandy fabric and with a stem bore of 6/64". The rim has been cut but not milled and there is a mould line around the rim where it has been altered or repaired. Slightly flared heel. Contexts 382 and 383 (Fill of pit 380).

11. Heel bowl fragment from a pit group of *c.*1720-50. The bowl is made of a fine almost inclusion free fabric that matches marked stems from the Wiltshire/Hampshire borders in the same pit. This example has an average quality burnish and a stem bore of 6/64". There are clear horizontal mould flaws on the sides of the flared heel. Context 382 (Fill of pit 380).

12. Heel bowl fragment from a pit group of *c.*1720-50. The bowl is made of a fine almost inclusion free fabric that matches marked stems from the Wiltshire/Hampshire borders in the same pit. This example has a poor quality burnish, a stem bore of 6/64" and a flared heel. Context 382 (Fill of pit 380).

13. Spur bowl made up of four joining fragments from a pit group of *c.*1720-50. The bowl is made of a typical local sandy fabric but is copying a typical style from the Hampshire/Wiltshire area. It is well made with thin walls and a stem bore of 5/64". It has a poorly burnished surface. Context 382 (Fill of pit 380).

14. Stem fragment from a pit group of *c.*1720-50. The stem is made of a fine almost inclusion free fabric and has a stem bore of 6/64". The stem is finely burnished and stamped with an incuse maker's mark reading WP. This is a previously unrecorded mark (Die 2165) that may well represent William Pearce from the Marlborough area (cf no. 15). Context 381 (Fill of pit 380).

15. Stem fragment from a pit group of c.1720-50. The stem is made of a fine almost inclusion free fabric and has a stem bore of 5/64". The stem has a good quality burnish and is stamped with an incuse maker's mark reading WILL PEARCE. This mark (Die 1137) is normally attributed to a Marlborough area maker on the basis of distribution, although he has not yet been traced documentary sources. See also the WP mark (cf no. 14). Context 382 (Fill of pit 380).

16. Stem fragment from a pit group of *c.*1720-50. The stem is made of a fine almost inclusion free fabric and has a stem bore of 6/64". The stem has a good quality burnish and is stamped with an incuse maker's mark reading ED/BEAS/TEN (Die 2123). This has rather poorly defined lettering and is clearly contained within a rectangular frame. The much more common form of this maker's mark has larger, more clearly defined letters within a rounded frame (no. 17). Edward Beasten was a prolific maker with a wide market for his products, which suggest that he worked in the Newbury area, about 25 miles to the south of Oxford. Context 382 (Fill of pit 380).

17. Stem fragment from a pit group of *c.*1720-50. The stem is made of a fine almost inclusion free fabric and has a stem bore of 6/64". The stem has a good quality burnish and is stamped with an incuse maker's mark reading *ED/BEAS/TEN (Die 2124). This mark is one of four of this type from the pit and has larger and much more clearly defined letters than the previous example (no. 16). Edward Beasten was a prolific maker with a wide market for his products, which suggest that he worked in the Newbury area, about 25 miles to the south of Oxford. The die detail is a composite drawing made from three examples of this mark from Context 381 (Fill of pit 380).

18. Heel bowl from a pit group of *c.*1720-50 made of a sandy fabric and with a stem bore of 6/64". The rim has been cut but not milled. This bowl joins a stem to give the larger part of a pipe (193mm of surviving stem - extrapolated stem taper suggests a length of around 330mm originally). The bowl form shows a distinctive west country influence in the curve to its profile. There are distinctive mould flaws on the sides of the heel and three further examples from this mould are present in context 374, another fill from the same pit. This example is from context 372 (Fill of pit 371).

19. Heel bowl from a pit group of *c.*1720-50 made of a sandy fabric and with a stem bore of 7/64". The rim has been cut and is possible lightly bottered. The heel is slightly flared. Context 374 (Fill of pit 371).

20. Heel bowl from a pit group of *c.*1720-50 made of a sandy fabric and with a stem bore of 6/64". The rim has been cut and lightly bottered and there is quite a pronounced mould line around the rim where it has been altered or repaired. Poorly burnished surface. Context 374 (Fill of pit 371).

21. Heel bowl from a pit group of *c.*1720-50 made of a sandy fabric and with a stem bore of 5/64". The rim has been cut but not milled and there is an internal bowl cross, the arms of which stop short of the sides of the internal base. There are the moulded initials RG for one of the Robert Gadney's of Oxford in the sides of the heel (father and son, recorded from at least 1667-1722; Oswald 1984, 255). Context 372 (Fill of pit 371).

22. Plain bowl with the initials GN moulded on the sides of the spur for one of the George Norwood's of Oxford (the N is poorly cut). The Norwoods worked in Oxford from the 1820s until the 1870s and this bowl could date from anywhere during the period *c.*1820-70. The bowl is rather poorly moulded and finished with defects in the clay surface as well as handling marks. There are lots of small chips at the front of the bowl, suggesting that the pipe was well-used and frequently 'tapped out'. Context 396.

23. A piece of pipe kiln furniture which comprises a small fired pipe clay roll with dished pipe bowl impressions on both sides (the remains of two opposing impressions on each side – see section detail). The roll appears to have been formed on or using a piece of woven material since it has a textured surface and it is made of a typical local fabric with fine sandy inclusions. The other pipes from this context were generally not later than the mid-eighteenth century in date and this fragment probably dates from *c.*1660-1750. Context 137.

6 METALWORK AND WORKED BONE *BY LEIGH ALLEN*

A total of 886 metal objects and 7 worked bone objects were recovered from the excavation. The metalwork assemblage comprises 225 copper alloy objects, 621 iron objects and 41 lead objects. The metalwork has been x-rayed and a conservator has assessed the condition of the objects. A small proportion of the metalwork, particularly the copper alloy objects, were in excellent or good condition but the ironwork is thickly corroded and fragmentary.

A number of miscellaneous (unidentifiable) fragments of sheet and strip were recovered but they are not reported on here; a full list will be deposited with the archive. The remaining assemblage of identifiable objects comprises 186 copper alloy objects (including 56 wire pins), 418 iron objects (including 380 nails) and 32 lead objects. Items from the following functional categories have been identified: personal objects, household items, objects associated with books and writing, horsegear, small arms accessories, keys and lock furniture, weights and measures and structural objects (including nails). The assemblage is discussed below by phase.

The majority of the objects from the excavation are late medieval/post-medieval in date. They were recovered from rubbish pits, cesspits, quarry pits and wells located in an area to the rear of Properties 1, 2 and 3.

The assemblage includes a large number of nails, wire pins and lace tags that occur in all areas of the site in all but the very earliest phases and these are of limited interest. However, personal and domestic items and objects associated with the structure of the properties and the furniture within were also recovered from the site, as well as items of horsegear and a small number of military items. In general the objects are of utilitarian form with only a small number of items that can be closely dated and there is a marked absence of any high-status items.

The assemblage is very similar in make up to that recovered from the Ashmolean Forecourt excavations.[59] Yard areas to the rear of two properties were exposed, containing pits filled with domestic rubbish as well as parts of two successive buildings of medieval and late medieval date. The two assemblage are characterised by the complete absence of any tools and both almost exclusively comprise personal, household and structural items, suggesting that the range of activities carried out across the two sites were primarily domestic. The same is true of the assemblage recovered from 65–67 St Giles, the Classics Centre to the north of the site,[60] where the material recovered from cesspits, rubbish pits and gravel extraction pits indicated that the inhabitants were of modest status.

Phase 3 (Twelfth Century)

A small writing lead (Fig. 11.24, no. 17) was recovered from ditch 1388; at Winchester writing leads of this form (class II) were recovered from thirteenth and fourteenth century contexts.[61] A large trapezoidal shaped iron buckle frame with a sheet metal roller came from rubbish pit

[59] P. Andrews and L. Mepham, 'Medieval and Post-Medieval Extra-Mural Settlement on the Site of the Ashmolean Museum Forecourt, Beaumont Street, Oxford', *Oxoniensia*, 62 (1997), pp. 179–223.
[60] A. Norton and G. Cockin, 'Excavations at the Classics Centre, 65–67 St Giles', Oxford', *Oxoniensia*, 73 (2008), pp. 161–94.
[61] M. Biddle and D. Brown, 'Writing Equipment', in M. Biddle, *Object and Economy in Medieval Winchester* (1990), p. 735, fig. 212, no. 2298.

768. Heavy-duty buckles of this type were used to connect straps (or harness) of differing thickness. A late-medieval or post-medieval pin came from the upper fill of linear feature 673.

Phase 4 (Thirteenth and Fourteenth Century)

Most of the finds from this phase were recovered from rubbish pits and wells located at the eastern and western ends of Property 2, especially the well house (1402) and adjacent features. Smaller numbers of objects, predominantly nails, pins and lace tags, came from clusters of pits in the western end of Properties 1 and 3. Virtually no objects were recovered from the subsoil quarry pits at the centre of the site.

The 27 personal objects include 12 fine wire pins and 11 lace tags. Small, slender pins with wire wound heads are common finds on medieval and post-medieval sites; analysis of a large assemblage from Winchester established that this type of pin was first produced in the thirteenth century in this country.[62] They become more common from the fourteenth century onwards. They are often found in association with lace tags, which saw a similar increase in popularity in the late medieval/post-medieval period. The most interesting of the remaining four personal objects is a cast decorative bar mount from pit 473 (Fig. 11.23, no. 1). Bar mounts were used to decorate belts, straps or harness. A small annular iron buckle for light clothing was found in pit 472, and two simple folded buckle plate fragments came from pit 477 and layer 219. The five household items comprise part of a needle, a bone bobbin and the remains of three whittle tang knives. The bobbin, from the backfill of well 1176, is probably a lace bobbin; it has a globular head and tapers very slightly along its length. It is decorated with bands of incised grooves and has a narrow axial perforation running the entire length. This form of bobbin dates from the twelfth to the fourteenth century.[63] Pit 543 contained a fragment of an eleventh to fourteenth century horseshoe, and three contemporary horseshoe 'fiddle key' nails came from layer 219, well 663 and pit 712.

Phase 5 (Fifteenth to Mid Sixteenth Century)

The personal objects comprise 22 pins, 7 lace tags, a loop fastener, a button and a buckle plate, and were all recovered from quarry or rubbish pits 355, 412, 448, 495, 815 and 821. The pins all have wire wound heads but a broad range of sizes are represented, including two very slender pins measuring in excess of 70 mm. This variation in size reflects the diverse uses of these items. Lace tags and a simple wire loop fastener (probably used to secure light clothing) were found along with the pins. A small, solid biconvex button with a simple looped shank was also recovered from pit 495 (Fig. 11.23, no. 2); this type of button was in common use in the thirteenth to fourteenth century, although it did continue into the early post-medieval period. A fragment from a simple folded buckle plate came from pit 815. A pair of tweezers (Fig. 11.23, no. 8) was recovered from pit 781. Tweezers of this form are generally found in early to middle Anglo-Saxon contexts, and this is an interesting find in view of the presence on the site of pottery of a similar date. The three household items recovered from this phase are all whittle tang knives but only SF 110 from pit 412 is complete (Fig. 11.23, no. 11). It has a long slender triangular blade and the tang is centrally placed. It is fourteenth to fifteenth century in date, and was probably a table knife. A fragment from a horsehoe and a horseshoe nail were recovered from pits 370 and 495. The horseshoe fragment is from the tip of the arm and has

[62] M. Biddle and K. Barclay, 'Sewing Pins and Wire', in Biddle, *Object and Economy*, pp. 560–71.
[63] A. MacGregor, *Bone, Antler, Ivory and Horn: The Technology of Skeletal Materials since the Roman Period* (1985), pp. 183–5.

a countersunk circular nail hole and a calkin. The horseshoe nail is of 'fiddle key' form. The corroded remains of a key for a mounted lock were recovered from pit 1083. It has a kidney-shaped bow and a long stem, but all trace of the bit is missing. Keys with bows of this shape date to the late fourteenth to fifteenth century and beyond.[64] A possible arm from a steelyard weight was recovered from pit 370. The rectangular bar has a rounded end that is perforated, and on the lower edge there is a perforated lug.

Phase 6 (Late Sixteenth to Mid Seventeenth Century)

Objects from most of the functional categories were recovered from rubbish pits, cesspits and wells within Properties 1 and 2W, with a high concentration of objects coming from the backfill of latrine pit 1373 and adjacent rubbish pits. Objects from Property 1 are mainly limited to tools, horsegear and structural items.

The 23 personal objects include 13 pins, 5 lace tags, 4 buckle components and a hooked clasp. The pins are all small with wire wound heads; together with the tags they came from pits 375, 417, 702 and 835 and from the back fill of latrine pit 1373. A plain buckle came from pit 702; a second plain buckle and a very corroded hooked clasp came from latrine pit fill 1373. The plate of the clasp is highly decorated with filigree spirals and granulation similar to that seen on spherical headed dress pins from Norwich dating to the early post-medieval period.[65] The seven household items include a bone knife, a highly polished bone handle with swag decoration, a blade fragment, a drape ring, a vessel fragment and the finger loop from a pair of scissors. The small bone knife recovered from pit 783 (Fig. 11.23, no. 9) was possibly a butter knife or letter opener. Scissors are known from the medieval period but they were not as popular as shears. They become more widely used in the sixteenth to seventeenth century. Two keys from pits 851 (Fig. 11.24, no. 15) and 1121 are both designed for mounted locks. They both have 'kidney'-shaped bows, datable to the late medieval period and beyond (see above), moulded stems and complex bits. A near-complete horseshoe of late-medieval form was recovered from the upper fill of pit 937. The majority of the structural items are nails recovered in large numbers from pits 702, 815 and latrine pit 1373. A small number of structural fittings were also recovered; these include a hinge pivot, a rectangular staple and a long 'S'-shaped hook.

Phase 7 (Late Seventeenth to Eighteenth Century)

The great majority of objects from this phase came from soil layer 223. This spread of finds includes numerous weights, musket balls and book clasps, categories not represented in previous phases. Personal objects include buckle components (many from shoes), strap loops, five buttons, mounts, pins, a brooch, and a clog fastener. The buckle components include frames, plates and pins. The majority of the buckle frames are shoe buckles ranging in style from simple rectangular/sub-rectangular shaped frames with a central bar (Fig. 11.23, no. 3) to a more decorative double oval form with ornate outside edges (Fig. 11.23, no. 4). The two mounts were both recovered from context 223; one (Fig. 11.23, no. 5) is similar to an example from London dating to the late fourteenth to fifteenth century.[66] These mounts would have

[64] I.H. Goodall, 'Locks and Keys' in Biddle, *Object and Economy*, p. 1008.
[65] S. Margeson, *Norwich Households: The Medieval and Post-Medieval Finds from Norwich Survey Excavations 1971–1978*, East Anglian Archaeological Report, 58 (1993), pp. 10–11, fig. 4, nos. 26–38.
[66] G. Egan and F. Pritchard, *Medieval Finds from Excavations in London: 3. Dress Accessories c.1150–c.1450* (1991), pp. 198–200, fig. 125, no. 1078.

been used singly or in groups to decorate belts, straps or other leather items. A small, delicate annular brooch (Fig. 11.23, no. 6) from the same context has a pin with an expanded collet at the centre (from which the stone is missing). It is similar in form to a brooch from London from a mid fourteenth to fifteenth century context.[67] A small decorative open-work fitting from context 223 is an eighteenth-century clog fastening. The household items comprise three spoons, two thimbles, a skimmer/strainer fragment, a knife handle and a blade fragment. The complete spoon (Fig. 11.24, no. 13) comes from pit 393; it is of pewter, and has a fig-shaped bowl and simple 'slip-top' handle with a flattened oval section; there is a maker's mark at the top of the bowl. This type dates from the early sixteenth century onwards; two detached spoon handles were also recovered, one of the same date, the other of the late seventeenth century. The thimbles, both from context 223, are of two different forms. One (Fig. 11.23, no. 10) is an example of an open-topped thimble for heavy duty tailoring, whereas the other is a short squat thimble with hand applied indentations on the top and sides. The remains of a scale tang knife were recovered from pit 1077 (Fig. 11.23, no. 12).

The upper plates of three hooked and sprung book clasps were recovered (Fig. 11.24, nos. 18-20). These are sixteenth century or later in date and an identical example was recovered from the Beaumont Palace excavations.[68] A fourth clasp is a hinged open-work fitting also of post-medieval date. A second small writing lead identical to the one recovered from Phase 3 was recovered from context 261 (deposit overlying medieval pit 264); it dates to the thirteenth to fourteenth century. The items associated with furniture are drape rings, upholstery tacks, a drawer handle and a hinge plate. A set of spurs were recovered from pit 847 (Fig 11.24, no. 22); the short straight arms would probably indicate a late-medieval/post-medieval date. A sexfoil mount (Fig. 11.24, no. 21) is highly decorated and resembles the small bosses or pendants used on harness.

Eleven weights of various forms were recovered from context 223; they include three disc or pan weights that would have been used with scales, and seven cylindrical or biconical weights that might have been used with fishing nets. A copper alloy coin weight (identified by Martin Allen) was recovered from context 223 (Fig. 11.24, no. 16). The weight, measuring *c.*12 mm square and weighing 2.23 g, is for a James I gold half angel and dates from 1612–25.[69] Coin weights were made to correspond to the weights of particular coin denominations; they were most commonly made of copper alloy and were generally produced for high-value pieces, gold rather than silver coins. Their purpose was to check the weight of coin in circulation and ensure that coin received was of good quality. Normally they would correspond to the lowest weight at which the coin remained legal tender. They could be used to guard against clipped, worn or counterfeit coin and to check the standards of foreign coin permitted in currency.

All the items associated with firearms came from this phase (context 223); they include 13 musket balls and a powder holder cover. The musket balls range in diameter from 10–17 mm; two examples still have traces of the pontil attached and therefore have probably not been used. The powder holder cover is cup-shaped with a flat bottom, straight sides and two small loops at the rim for attachment. It would have been connected to the bandolier by a

[67] Ibid. p. 254, fig. 163, no. 1331.
[68] M. Biddle and D.A. Hinton, 'Book-Clasps and Page Holder' in Biddle, *Object and Economy*, pp. 755–8; L. Allen, 'Metal and Worked Bone', in Poore and Wilkinson, *Beaumont Palace*, p. 59, fig. 18, no. 4.
[69] P. Withers and B. Withers, *British Coin-Weights. A Corpus of the Coin-Weights Made for Use in England, Scotland and Ireland* (1993).

cord running through the two cap loops and two loops on the body of the flask; the cap could therefore be removed without risk of loss.[70]

Phase 8 (1800–92)

The only three notable finds are a patten, a key and part of a composite button. The iron patten (Fig. 11.23, no. 7) would have been riveted to the sole of a wooden or leather overshoe to raise the wearer off the ground and away from the dirt and rubbish of the street or the cold of a stone floor. This form of patten dates from the seventeenth to eighteenth century.

Catalogue of Illustrated Metal and Worked Bone Objects (Figs. 11.23–11.24):

1. Bar mount, copper alloy, complete. 'V'-shaped section; pairs of expanded lobes at either end and one on either side at the mid point on the bar. There are three integral spikes on the back for attachment. L: 42 mm. SF 115, ctx 474, pit 473, Phase 4
2. Button, copper alloy, complete. D: 11 mm. Ctx 742, pit 495, Phase 5
3. Buckle, copper alloy, complete. L: 27 mm. SF 287, ctx 223, Phase 7
4. Buckle, copper alloy, complete. L: 44 mm. SF 236, ctx 223, Phase 7
5. Mount, copper alloy, complete. L: 19 mm. SF 227, ctx 223, Phase 7
6. Brooch, copper alloy, complete. L:17 mm. SF 292, ctx 223, Phase 7
7. Patten, iron, incomplete. L: 134 mm. Ctx 236, construction cut 237, Phase 8
8. Tweezers, copper alloy, complete. L: 66 mm. SF 131, ctx 778, pit 1017, Phase 5
9. Knife, bone, incomplete. L: 80 mm. Ctx 782, pit 783, Phase 6,
10. Thimble, copper alloy, incomplete. L: 22 mm. SF 214, ctx 223, Phase 7
11. Knife, iron, complete. L: 173 mm. SF 110, ctx 413, pit 412, Phase 5
12. Knife handle, complete, bone scales secured to the tang by four copper alloy rivets. The handle expands towards the rounded butt end, which has a small decorative foot at the base. L: 78 mm. Pit 1077, Phase 7
13. Spoon, pewter, complete. L: 58 mm. Ctx 400, pit 393, Phase 7
14. Spoon handle, pewter, incomplete. L: 95 mm. SF 252, ctx 223, Phase 7
15. Key, iron, complete. L: 145 mm. Ctx 850, pit 851, Phase 6
16. Coin weight, copper alloy, complete. L: 13 mm. SF 298, ctx 223, Phase 7
17. Stylus, lead, complete. L:45 mm. Ctx 597, ditch 1388, Phase 3
18. Hooked clasp, copper alloy, incomplete. L: 38 mm. SF 170, ctx 1035, pit 1034, Phase 7
19. Hooked clasp, copper alloy, incomplete. L: 26 mm. SF 228, ctx, 223, Phase 7
20. Hooked clasp, copper alloy, incomplete. L: 29 mm. SF 235, ctx 223, Phase 7
21. Harness boss, copper alloy, complete. L: 23 mm. SF 291, ctx 223, Phase 7
22. Spurs, iron, incomplete. L: 93 mm. Ctx 846, pit 847, Phase 7

[70] P. Courtney, 'Finds Research Group 700–1700 Datasheet 11. Small Arms Accessories of the mid 17th Century', (1988), figs. 2–3.

7 ROMAN COINS *BY PAUL BOOTH*

SF	CTX	DATE	DEN/SIZE	OBV	REV	MINT	DIE AXIS	WEAR	COMMENT
123	651	364-378?	AE3 17mm	head r	?Securitas Reipublicae	]UGP Lyons	?5	W/W	damaged - part broken away and may have been hit as part of obv bust has a poss ?chisel mark
127	744	1C-e 2C	Dupondius?	head r	figure		?6	C/C	worn and corroded
204	223	270-273?	antoninianus 18mm	]P ESU TET[RICUS AUG	?SPES AU]GG		?12	W/W	some encrustation, coin has been roughly halved up vertical axis. Difficult to tell whether or not it is irregular - the reverse figure seems rather sketchy

8 MEDIEVAL AND POST-MEDIEVAL COINS, TOKENS AND JETONS *BY MARTIN ALLEN*

No.	Context	Description	Date	Weight	Condition
117	501	Henry I (1100-35) silver penny, type 10, uncertain mint and moneyer	*c.*1117-19	0.99 g	
203	223	Richard I (1189-99), silver penny, Short Cross class 2 or 3, uncertain mint and moneyer	*c.*1189-94	1.45 g	bent double (reverse not visible)
207	223	Henry III (1216-72), silver cut halfpenny, Short Cross class 7cC , uncertain mint, moneyer Nichole	*c.*1242	0.65 g	
160	1150	Scotland, Short Cross and Stars coinage, silver cut halfpenny, inscriptions illegible	1195-*c.*1249	0.72 g	
182	1217	Scotland, Short Cross and Stars coinage, silver cut halfpenny, inscriptions illegible	1195-*c.*1249	0.67 g	
190	223	Edward III (1327-77), silver penny, Pre-Treaty series G, Durham mint	*c.*1356-61	0.72 g	clipped
103	413	France, Charles VI (1380-1422), billon *double tournois* or *niquet*, Lafaurie 1951 no. 417	1421-2	1.99 g	
132	814	Copper alloy jeton, Nuremberg, anonymous Shield of France/Orb type, cf. Mitchiner 1988 no. 1079 (same reverse die), 26 mm	*c.*1500-25	2.38 g	
125	730	Copper alloy jeton, Nuremberg, anonymous Rose/Orb type, 25 mm	*c.*1500-1580s	1.49 g	
212	223	Copper alloy jeton, Nuremberg, anonymous Rose/Orb type, 25 mm	*c.*1500-1580s	1.14 g	six piercings around circumference, chipped
188	223	Copper alloy jeton, Nuremberg, Hans Schultes I (fl. 1553-84), Rose/Orb type, cf. Mitchiner 1988 nos 1370-5a, 25 mm	1553-84	1.74 g	
209	223	Copper alloy jeton, Nuremberg, Hans Krauwinckel I (fl. 1562-86), Rose/Orb type, cf. Mitchiner 1988 nos 1486-8 (same obverse die), 25 mm	1562-86	1.49 g	pierced
199	223	Copper alloy jeton, Nuremberg, Hans Krauwinckel II (fl. 1586-1635), Rose/Orb type, 'Gottes gaben' legend, cf. Mitchiner 1988 no. 1537, 22 mm	1586-1635	1.41 g	
189	223	Copper alloy jeton, Nuremberg, Hans Krauwinckel II (fl. 1586-1635), Rose/Orb type, 'Gotes segen' legend, cf. Mitchiner 1988 nos 1555-64 22 mm	1586-1635	1.38 g	
108	418	Copper alloy jeton, Nuremberg, Hans Krauwinckel II (fl. 1586-	1586-1635	1.27 g	

		1635), Rose/Orb type, 'Gotes segen' legend, cf. Mitchiner 1988 nos 1571-3, 22 mm			
196	223	Copper alloy jeton, Nuremberg, Hans Krauwinckel II (fl. 1586-1635), Rose/Orb type, 'Heit rott' legend, cf. Mitchiner 1988 nos 1574-9, 21 mm	1586-1635	1.07 g	
187	223	James I (1603-25), copper alloy royal farthing token, Peck 1964 Lennox type 3c, Everson 2007 type 3, privy mark key	*c.*1616-22/3	0.68 g	
202	223	James I (1603-25), copper alloy royal farthing token, Peck 1964 Lennox type 3c, Everson 2007 type 3, privy mark cross pattée forchée	*c.*1616-22/3	0.37 g	
192	223	James I (1603-25), copper alloy royal farthing token, Peck 1964 Lennox type 3, Everson 2007 types 1-3, privy mark uncertain	*c.*1616-22/3	0.78 g	
206	223	James I (1603-25) or Charles I (1625-49), copper alloy royal farthing token, Peck 1964 Lennox type 3, Everson 2007 types 1-4, or Peck 1964 Richmond types 1a-1c, Everson 2007 type 1 or 2, privy mark uncertain	*c.*1616-31	0.31 g	
130	775	Charles I (1625-49), copper alloy Rose farthing token, Peck 1964 type 1c, Everson 2007 type 3, privy mark mullet	*c.*1636-37/8	0.79 g	
210	223	Charles I (1625-49) copper alloy Rose farthing token, Peck 1964 type 2a, Everson 2007 type 4a, privy mark lis	*c.*1639-43	0.92 g	
201	223	Charles I (1625-49) copper alloy Rose farthing token, Peck 1964 type 2e or 2f, Everson 2007 type 4a/4b or 4b, privy mark crescent	*c.*1639-43	0.92 g	
136	884	Charles I (1625-49), copper alloy Rose farthing token, Peck 1964 type 2f, Everson 2007 type 4b, privy mark crescent	*c.* 1639-43	1.17 g	
191	223	Charles I (1625-49), copper alloy Rose farthing token, Peck 1964 type 2f, Everson 2007 type 4b, privy mark crescent	*c.* 1639-43	0.99 g	
205	223	Charles I (1625-49), copper alloy Rose farthing token, Peck 1964 type 2f, Everson 2007 type 4b, privy mark crescent	*c.* 1639-43	0.98 g	
135	850	Charles I (1625-49), copper alloy Rose farthing token, Peck 1964 type 2f, Everson 2007 type 4b, privy mark uncertain	*c.* 1639-43	1.39 g	

100	236	Charles I (1625-49) copper alloy Rose farthing token, Peck 1964 type 2, Everson 2007 type 4, privy mark uncertain	*c.*1639-43	1.35 g	
198	223	Charles I (1625-49) copper alloy Rose farthing token, Peck 1964 types 1-2, Everson 2007 types 1-4, privy mark uncertain	1636-*c.*1643	1.05 g	
194	223	Charles I (1625-49) copper alloy Rose farthing token, Peck 1964 type 3, Everson 2007 type 5b, privy mark mullet	*c.*1643-4	0.75 g	chipped
208	223	Charles I (1625-49) copper alloy Rose farthing token, Peck 1964 type 3, Everson 2007 type 5b, privy mark mullet	*c.*1643-4	1.00 g	
200	223	Copper alloy farthing token, Oxford, City (the Mayor), dated 1652 (issued 1652-7), Williamson 1889-91 Oxfordshire 112-13	1652-7	0.75 g	
193	223	Copper alloy farthing token, Witney, Ralph Werge, 1653 Williamson 1889-91 Oxfordshire 244	1653/4 [1653 o.s.]	1.19 g	

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

A tiny amount (just under 1.5kg) of material – including residue from soil samples taken on site – was examined by eye and categorised on the basis of morphology. Each slag type in each context was weighed except for smithing hearth bottoms, which were individually weighed and measured for statistical purposes. Quantification data and details are given in Table 26, in which weight (wt.) is shown in grams, and length (len.), breadth (br.) and depth (dp.) in millimetres.

The slag was produced by secondary iron smithing but the quantity is not sufficient to indicate smithing took place on site in any period. It is redeposited from nearby activity or represents material brought onto the site as make-up, backfill or metalling deposits.

Tenement 2 in Phase 4 (pit 472, fill 959) contained some tiny smithing spheres (produced by high-temperature welding to join two pieces of iron) as well as a piece of iron. Pit 282, fill 1280 contained 23g of undiagnostic iron slag. The quantity, however, is tiny and cannot be used to argue the tenement or yard was used for smithing.

In other periods the slag represents disturbance of previous make-up or backfill layers. The two possible fragments of smithing hearth bottom (the plano-convex slag cake that builds up in the smithing hearth) found in pits 370 (Phase 5) and 380 (Phase 7) are fragmentary, probably from disturbance and redeposition. The slag assemblage does not indicate iron working on the site in any period.

Table 26. Quantification of iron slag and related high-temperature debris

cxt	^s^	identification	wt.	len	br.	dp.	comment
219		copper alloy	4				
219		undiagnostic	30				
359		undiagnostic	82				fragment of smithing hearth bottom?
382		charcoal	0.5				
382		iron	2				nail?
382		smithing hearth bottom	80			45	fragment
382		undiagnostic	251				and brick fragment
451	103	heat magnetised residue	4				grit
474	154	ceramic building tile	9				
474	154	heat magnetised residue	1				grit & one tiny iron fragment
515	102	heat magnetised residue	2				
557		burnt coal	8				
595	108	heat magnetised residue	2				tiny stones & grit
740	114	heat magnetised residue	2				tiny stones & grit
743	144	sample residue	1				magnetised grit
774		smithing hearth bottom	687	95	80	50	incomplete
788	122	heat magnetised residue	1				tiny grits, fired clay; one broken hammerscale flake
816	143	undiagnostic	4				
818	140	heat magnetised residue	2				grit & tiny iron rivet
819	145	undiagnostic	4				2 pieces
820	146	undiagnostic	1				tiny fragments
846		undiagnostic	187				with vitrified clay
919		slagged coal	13				laminated type
932	152	iron-rich slag dribble	0.5				
959	153	coal	1				
959	153	heat magnetised residue	2				includes some very tiny hammerscale spheres
959	153	iron	1				
1051	159	cinder	1				
1051	159	heat magnetised residue	1				tiny grit
1051	159	heat magnetised residue	2				grit & tiny stones
1150	166	heat magnetised residue	0.5				grit
1216		iron	7				
1280	165	fired clay	2				
1280	165	undiagnostic	23				
		total	1419				

10 WORKED STONE OBJECTS *BY RUTH SHAFFREY*

The small assemblage of worked stone objects comprises three whetstones, one probable gaming counter and two pieces of marble (possibly decorative, but unphased and not described in detail here). A single unworked fragment of Norwegian Ragstone schist was recovered from well 663 (context 1150; Phase 4). Norwegian Ragstone was the most popular of the medieval whetstone materials and is commonly found on medieval sites both as whetstones and in raw material form, such as that seen here. Two whetstone fragments were recovered from Property 1 (Phase 5). These are made from schist, probably Norwegian Ragstone (pit 821) and a fine-grained sandstone (pit 412). Both are fragments and could be indicative of domestic or industrial activity. A single small circular object made from a flat piece of ironstone was recovered from Property 2E (261, Phase 7). This is almost certainly a gaming counter and could have been used with a multitude of games, for example Nine Men's Morris.

11 FLINT *BY HUGO ANDERSON-WHYMARK*

Three worked flints were recovered. A small fragment of a pressure flaked bifacial tool, probably an arrowhead, was recovered from context 449 (SS 100, 10-4 mm residue). The flint is iron-stained a mid orange colour and exhibits a small area of abraded cortex, suggesting the flint originates from a secondary flint source, such as river gravels. The break exhibits a lighter orange iron-staining than the surface of the artefact, indicting that break occurred in antiquity, but after the artefact had begun to absorb the iron-staining. The surviving fragment measures 21 mm by 8 mm by 2.5 mm thick and represents the edge and point of an artefact. The pressure flaking is relatively regular with good invasive removals. It is probable that this artefact is part of an arrowhead, but it is not possible to determine a form. A broad Neolithic to early Bronze Age date is appropriate for the artefact. This artefact may be added to the increasing corpus of material from Oxford city dating to the Neolithic and Bronze Age.

The two other flints recovered from the site are post-medieval in date. A strike-a-light was recovered from context 223 (SF 275), whilst a large hard hammer flake from context 101 (SF119) probably represents a dressing flake from a flint nodule used in construction. The strike-a-light is manufactured on thick and squat hard hammer flake with limited abrupt retouch along both sides and the distal end. The flint measures 25 mm by 28 mm by 11 mm thick. A thermal fracture runs through the flint and small area of cortex appears slightly abraded. Strike-a-lights are relatively common artefacts in post-medieval assemblages and were mass produced alongside gunflints, for example at Brandon in Suffolk. The poor quality of the flint used for this example is, however, suggestive of more local manufacture.

In addition to the worked flint, a small number of pieces of burnt unworked flint and stone were recovered during the excavations. These pieces were recovered from a number of contexts and are of no archaeological significance.

12 MAMMAL AND BIRD BONE *BY LENA STRID*

Animal bone was recovered from Phases 2 to 8, and following assessment the assemblage from Phases 2 to 6 was analysed.[71] Although the assemblage was in very good condition, particularly for the later part of the period, individual phase assemblages were generally small, with an unusually high component represented by the complete or partially complete articulated remains of single individuals. The analysed assemblage comprised 8930 re-fitted fragments; a total of 6687 fragments (74.9%) were hand collected and 2243 fragments (25.1%) were recovered from sieved bulk samples (Table 27).

Methodology

The bones were identified using a comparative skeletal reference collection, in addition to osteological identification manuals. All animal remains were counted and weighed, and where possible identified to species, element, side and zone. Sheep and goat were identified to species where possible, using Boessneck *et al.* and Prummel and Frisch.[72] They were otherwise classified as 'sheep/goat'. An attempt to distinguish pheasant from domestic fowl on coracoid, femur and tarsometatarsus was carried out using Cohen and Serjeantson and Erbersdobler;[73] nevertheless, no bones could be identified as pheasant. Ribs and vertebrae, with the exception of atlas and axis, were classified by size: 'large mammal' representing cattle, horse and deer; 'medium mammal' representing sheep/goat, pig and large dog; and 'small mammal' representing small dog, cat and hare. Peacock was identified by Joanne Cooper at the Natural History Museum in Tring.

The condition of the bone was graded on a 6-point system (0-5). Grade 0 equating to very well-preserved bone, and grade 5 indicating that the bone had suffered such structural and attritional damage as to make it unrecognisable.

The minimum number of individuals (MNI) was calculated on the most frequently occurring bone for each species, using Serjeantson's and Worley's[74] zoning guide, and taking into account left and right sides. For the calculation of the number of identified fragments per species (NISP) all identifiable fragments were counted, although bones with modern breaks were refitted. The weight of bone fragments has been recorded in order to give an idea of their size and to facilitate an alternative means of quantification.

---

[71] For assessment of the material from Phases 7 and 8 see: L. Strid, 'Animal Bone', in 'Ashmolean Museum, Beaumont Street, Oxford. Post-excavation Assessment and Updated Project Design', unpublished OA report (2009).

[72] J. Boessneck, H.-H. Müller and M. Teichert, 'Osteologische Unterscheidungsmerkmale zwischen Schaf (*Ovis aries* Linné) und Ziege (*Capra hircus* Linné)', *Kühn-Archiv*, Bd 78 (1964); W. Prummel and H-J. Frisch, 'A guide for the distinction of species, sex and body side in bones of sheep and goat', *Journal of Archaeological Science*, 13 (1986), pp. 567-77.

[73] A. Cohen and D. Serjeantson, *A manual for the identification of birdbones from archaeological sites* (London, 1996); K. Erbersdobler, *Vergleichend morphologische Untersuchungen an Einzelknochen des postcranialen Skeletts in Mitteleuropa vorkommender mittelgroßer Hühnervögel*, Inaugural-Dissertation. Ludwig-Maximilians-Universität, München (1968).

[74] D. Serjeantson, 'The animal bones', in *Refuse and disposal at Area 16 east Runnymede. Runnymede Bridge research excavations, Volume 2*, S. Needham and T. Spence (London, 1996), pp. 194-253; F. Worley, 'Animal bones from Northfleet', in P. Andrews, E. Biddulph, A. Hardy and A. Smith, *Settling the Ebbsfleet valley. CTRL excavations at Springhead and Northfleet, Kent - the late Iron Age, Roman, Anglo-Saxon and Medieval landscape. Volume 2: The finds* (2011).

For ageing, Habermehl's[75] data on epiphyseal fusion was used. Tooth wear was recorded using Grant's tooth wear stages,[76] and correlated with tooth eruption.[77] In order to estimate an age for the animals, the methods of Halstead, Payne and O'Connor[78] were used for cattle, sheep/goat and pig respectively. Sex estimation was carried out on cattle pelves, sheep horn cores and pelves, pig and horse canine teeth, and presence/absence of medullary bone in birds and penis bones from dogs, using data from Boessneck *et al*., Prummel and Frisch, Schmid and Vretemark.[79]

Measurements were taken according to von den Driesch,[80] using digital callipers with an accuracy of 0.01 mm. Large bones were measured using an osteometric board, with an accuracy of 1 mm. Withers' height of dog and horse were calculated using Harcourt and May respectively.[81]

Results

The assemblage is dominated by domestic livestock (Table 28), which is typical for medieval and post-medieval urban assemblages.[82] Very few bones could certainly be identified as goat, suggesting that the majority of the sheep/goat bones are from sheep. Other animals which were represented and which were probably eaten include rabbit, fallow deer, roe deer, domestic fowl, goose, duck, pigeon, swan, peafowl, turkey and, possibly, small perching birds (passerines). Domestic fowl was the most commonly represented of these animals; egg-laying hens were probably kept in the tenement backyards. Domestic duck and goose can be difficult to distinguish from their wild relatives, the mallard and the greylag goose. However, domestic duck and goose were common animals in medieval and post-medieval towns and it is therefore more likely that the Ashmolean specimens were domestic.

The assemblage also contained bones from pets and working animals such as horse, dog and cat, while the sieved samples were good sources for commensal fauna, mainly mice and frogs, but also mole, hedgehog and toad. Other commensal fauna include several corvid species and passerines, though these birds may also have been eaten.[83] Articulated and semi-

[75] K.-H. Habermehl, *Die Altersbestimmung bei Haus- und Labortieren.* 2nd ed (Berlin/Hamburg, 1975).
[76] A. Grant, 'The use of toothwear as a guide to the age of domestic ungulates', in *Ageing and sexing animal bones from archaeological sites,* eds B. Wilson, C. Grigson and S. Payne, BAR British Series 109 (1982), pp. 91-108.
[77] Habermehl, *Die Altersbestimmung.*
[78] P. Halstead, 'A Study of Mandibular Teeth from Romano-British Contexts at Maxey', in F Pryor, *Archaeology and Environment in the Lower Welland Valley*, East Anglian Archaeology Report 27 (1985), pp. 219-24; S. Payne, 'Kill-off patterns in sheep and goats: the mandibles from Aşwan Kale', *Anatolian Studies*, 23 (1973), pp. 281-303; T. O'Connor, *Bones from the General Accident site, Tanner Row*. Archaeology of York. The animal bones. Vol. 15/2 (1988).
[79] Boessneck et al., 'Osteologische Unterscheidungsmerkmale'; Prummel and Frisch, 'A guide for the distinction of species'; E. Schmid, *Atlas of animal bones. For prehistorians, archaeologists and quatrenary geologists* (Amsterdam, London, New York, 1972); M. Vretemark, *Från ben till boskap. Kosthåll och djurhållning med utgångspunkt i medeltida benmaterial från Skara,* Skrifter från Länsmuseet Skara, Nr 25 (1997).
[80] A. von den Driesch, *A guide to the measurement of animal bones from archaeological sites* (Harvard, 1976).
[81] Harcourt (1974) and May (1985)
[82] N. Sykes, 'From *Cu* and *Sceap* to *Beffe* and *Motton*: the management, distribution and consumption of cattle and sheep, AD 410-1550', in C. Woolgar, D. Serjeantson and T. Waldron (eds), *Food in Medieval England: History and archaeology* (Oxford, 2006), p. 56.
[83] cf. D. Serjeantson, 'A dainty dish: consumption of small birds in Late Medieval England', in H. Buitenhuis and W. Prummel (eds), *Animals and man in the past. Essays in honour of Dr. A.T.Clason emeritus professor of archaeozoology Rijksuniversiteit Groningen, the Netherlands*, ARC-Publicatie, 41 (2001), pp.263-73.

articulated animal skeletons of sheep/goat, pig, horse, dog, cat, domestic fowl, jackdaw, hedgehog and mouse were recovered from 14 contexts, mainly from Phase 6. These have not been included in the general analysis, but will be discussed separately below.

The excavation area was separated into two or more plots during the entire occupation period, although it was not possible to discern any distinct differences in the animal bone assemblage between the two plots regardless of time period. Contexts including possible industrial waste were not focussed on a particular area, which suggests that any industrial activity taking place on the plots were small scale.

Phase 2

The assemblage from Phase 2 was very small, as is the contemporary assemblage from the Classics Centre.[84] The dominance of cattle, sheep/goat and pig is to be expected, and both adult and juvenile bones were present. However, it is not possible to discuss animal husbandry strategies based on such small sample. The majority of the bones, representing butchery waste as well as kitchen waste, were recovered from a boundary ditch.

Phases 3–6

The remaining four assemblages are also relatively small. Cattle and sheep/goat were both represented by fairly similar numbers of bones in all these phases, while pig is represented by similar numbers of bones to cattle and sheep/goat in Phase 3, but reduces in relative numbers thereafter. However, the numbers of bones are too low to provide useful data regarding changes in livestock abundance.

Ageing

Dental evidence is scant for most phases. The exception is for Phase 4 cattle (n:10) and sheep-goat during Phase 4 (n:8) and Phase 6 (n:7). In these cases there is a majority of adult and old adult cattle and sheep in the 3–6 years age range. Pig were mostly juvenile or immature when slaughtered, but sub-adult and adult pigs are also present in Phase 3 and 4 respectively.

In contrast to the dental evidence, bone fusion data indicate that cattle and sheep/goat were mainly slaughtered as adults or sub-adults in all phases. Unfused cattle bones were far more prevalent than those from caprines, particularly for bones which fall into the early and mid-fusing ranges,[85] which may suggest a greater gain for slaughtering young cattle than young sheep/goat. There is a small increase in late-fusing skeletal elements for sheep in the later phases, whereas the opposite is true for cattle. The preference for mutton is concordant with the expanding wool industry in medieval England: older sheep will yield more clips of wool. One might think that the decrease in late-fusing cattle bones would relate to a change in cattle husbandry in the region, however, the opposite was found for the Classics Centre: over time, more cattle were slaughtered at a younger age. The trend for sheep remained the same in both assemblages.[86] The difference in age preference for cattle may be due to economic differences of the households at the two sites.

[84] K. Poole, 'Animal Remains', in A. Norton and G. Cockin, 'Excavations at the Classics Centre, 65–67 St Giles', Oxford', *Oxoniensia*, 73 (2008), pp. 189–92.
[85] I. Silver, 'The Ageing of Domestic Animals', in D. Brothwell and E. Higgs (eds), *Science in Archaeology* (London, 1969), pp. 283–302.
[86] Poole, 'Animal Remains', p. 190.

Although fusion data was scarce for pig, no bones from the late-fusing phase were fused, suggesting that most pigs were slaughtered before 3.5 years of age. Neonatal and juvenile bones of cattle, sheep/goat and pig are present in all phases, increasing in fragment numbers in the later periods. Juvenile cattle are particularly prevalent in Phase 6, where they comprise slightly over a third of all cattle remains. Almost all horse, dog, deer, hare and rabbit remains came from skeletally mature individuals, whereas a greater proportion of the cats were sub-adult and juvenile. Juvenile fowl were relatively common, particularly in the later two phases, whereas remains from all other bird taxa were adult.

Sexing

Sexable cattle pelves were scarce, females dominating in Phase 3-4 and males in phase 5-6. One cattle metacarpal from phase 5 could be metrically sexed as male. Most of the sheep horn core fragments were from rams and wethers, which is not surprising as the majority of medieval and post-medieval ewes were hornless.[87] One hornless sheep was found in Phase 4 and two in Phase 6. Both male and female goat horn cores are present and the sheep/goat pelves are fairly evenly divided between males and females. The pig teeth are predominantly male, which suggests a selective slaughter of young female pigs, i.e. before the permanent canines erupt at 9–10 months of age,[88] though female pig canines are smaller and so may have been missed during excavation. Sexable fowl bones were rare, although both male and female bones were present. Two of the articulated dog skeletons (773, 815) included penis bones.

Size

Any size increases of domestic mammals which have been observed in archaeological assemblages during the medieval and post-medieval periods[89] were not possible to discern in this assemblage. The few measurable bones of cattle and sheep/goat were, however, within the same size range as contemporary bones from other Oxford sites. Withers' height could be calculated for three horses, ranging from 1.36 m to 1.45 m. Medieval horses usually stood between 1.27–1.52 m,[90] and the Oxford horses would thus be of average size. The measurable dog bones show range in withers' height from 47.4 cm up to 68.4 cm. An unfused dog femur from Phase 4 had an epiphyseal length of 169.5 mm, suggesting that the dog would have a withers' height of over 52 cm when fully grown.

Butchery

Butchery was carried out in a similar manner throughout the last three phases, and while the butchery evidence from the earlier phases (Phase 2 and 3) is scant, there is nothing to suggest a radically different butchery process. Cutmarks at the base of horn cores, on phalanges and at the proximal end and mid-shaft of metapodials indicate skinning of cattle and sheep/goat. There are only ambiguous indications for skinning pigs, as pig feet contain more meat, and cut marks on pig metapodials and phalanges can therefore also derive from filleting. Cleaved

[87] P. Armitage and J. Goodall, 'Medieval horned and polled sheep: The archaeological and iconographic evidence', *Antiquaries Journal*, 57 (1977), pp. 84–5.
[88] S. Sisson and J.D. Grossman, *The Anatomy of the Domestic Animals* (Philadelphia, 1953).
[89] R. Thomas, 'Zooarchaeology, improvement and the British agricultural revolution', *International Journal of Historical Archaeology*, 9 (2005), pp. 71–88.
[90] Animal bone metrical archive project, http://ads.ahds.ac.uk/catalogue/specColl/abmap/index.cfm (2010); D.J. Rackham, 'Physical remains of medieval horses', in J. Clark (ed) *The medieval horse and its equipment c. 1150-c.1450*, Medieval finds from excavations in London, 5 (1995), p. 22.

vertebrae provide evidence that all three species were suspended and their carcasses divided into halves. This practice became common in England after the eleventh century[91] and has been reported from several sites in Oxford.[92] Three sheep/goat skulls were split sagitally, suggesting that the brain was removed for food. Chop marks and cut marks at the limb bone joints were frequent and indicate disarticulation and portioning of the carcasses. Cut marks from filleting were recorded on the long bones, scapula and pelvis. One sheep/goat scapula in Phase 6 had the blade perforated, possibly for hanging the shoulder for smoking or curing.[93] Butchery marks on the avian remains derived from disarticulation and filleting, the former present as chop marks and cut marks at the ends of long bones from goose and swan. Filleting cut marks on bone shafts were recorded on fowl, goose and swan.

Pathology

Pathological conditions were present in Phases 3-6, where they affected cattle, sheep/goat, pig, horse, dog, cat, domestic fowl and crow. Most of the cattle pathologies are associated with infections and joint disorders, possibly related to the use of cattle for traction. Examples of the latter include lipping and exostoses on phalanges and extended medial condyles on two metacarpals and one metatarsal.[94] Other cattle pathologies include one haematoma on a metatarsal. Haematomas are often caused subperiostal bleeding from blunt impacts, which later can ossify. Metapodials are usually more at risk for subperiostal bleeding, since these elements are not covered by muscles which protects the bone.[95] Bone growths, possibly enthesopathies, i.e. ossified muscle attachments, were recorded on two sheep/goat humeri and one sheep/goat metatarsal. Another sheep/goat metatarsal displayed a ridge of bone growth on the proximal part of its anterior side. Similar pathologies have been recorded in a number of medieval and post-medieval assemblages, although the aetiology is unclear. It may be connected to biomechanical stress, such as walking on hard surfaces or rough pastures.[96] Depressions on horn cores occurred in phase 3, 5 and 6 in small numbers. This condition has been associated with environmental stress, malnutrition and hormonal imbalance connected to pregnancies and lactation.[97] Oral pathologies were represented by swelling and bone absorption on the mandibular ramus on three sheep/goat mandibles from Phase 4, and at the mandibular joint surface on one sheep/goat mandible from Phase 5. The former pathologies suggest periodontal disease, possibly connected to food debris being lodged between the

[91] T. O'Connor, *Animal Bones from Flaxengate, Lincoln, c. 870–1500* (1982), p. 16.
[92] e.g. B. Charles, 'Animal Bone', in D. Poore and D.R.P. Wilkinson, *Beaumont Palace and the White Friars: Excavations at the Sackler Library, Beaumont Street, Oxford*, Oxford Archaeological Unit Occasional Paper, 9 (2001), pp. 76–82; M. Maltby, 'Animal Bones', in G. Walker and R. King, 'Early Medieval and Later Tenements at 113-119 High Street, Oxford: Excavations in 1993-5, *Oxoniensia*, 65 (2000), p. 429; F. Worley and E.J. Evans, 'Animal Bone', 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), p. 319.
[93] O'Connor, *Bones from the General Accident site*, 83–4.
[94] B. de Cupere, A. Lentacker, W. Van Neer, M. Waelkens and L. Verslype, 'Osteological evidence for the draught exploitation of cattle: First applications of a new methodology', *International Journal of Osteoarchaeology,* 10 (2000), p. 256.
[95] J. Baker and D. Brothwell, *Animal Diseases in Archaeology* (1980), p. 83.
[96] D. Brothwell, K. Dobney and D. Jaques, 'Abnormal sheep metatarsals: a problem in aetiology and historical geography', in J. Davies, M. Fabiš, I. Mainland, M. Richards and R. Thomas (eds) *Diet and health in past animal populations. Current research and future directions* (Oxford, 2005), pp.75–9.
[97] U. Albarella, 'Depressions on sheep horncores', *Journal of Archaeological Science*, 22 (1995), pp. 699–704.

teeth,[98] whereas the latter suggests an infection. Pig bones were less affected by pathologies, probably due the generally lower age of pigs. Pathologies include bone growth on a distal tibia and bone absorption at the molar row on a mandible, both conditions associated with infection. Minor exostoses around joints, possibly related to damage to ligaments around the joints,[99] were found on one fowl tibiotarsus and one tarsometatarsus, both from Phase 4, and on a cat proximal ulna from Phase 6. One cat femur had a thin layer of bone growth on the proximal part, indicating infection. A small number of healed rib fractures were recorded on medium and large mammals in Phase 4, 5 and 6.

Industrial Activity

There are small numbers of sheep horn cores which have been chopped away from the skull, as well as a number of metapodials with cut marks from pits in Properties 1 and 2 during Phases 3–6. These skeletal elements contain no meat and subsequently do not signify kitchen waste. They may be waste from a butcher's shop or from various industries, such as tanning, bone and horn working. Documents and pictorial sources from the sixteenth century onwards indicate that hides were often sold to tanneries with horns and metapodials intact. Prior to the tanning process, these elements were removed and discarded or sold as raw material to horn and bone workers. The presence of a small-scale butcher, tanner, bone or horn worker in the vicinity has been suggested by Poole, using the over-representation of cattle metapodials, horn cores and mandible from medieval and post-medieval phases at the Classics Centre as evidence.[100] Other animal remains from the present site that may be connected to the tanning industry include a roe deer metatarsal (Phase 3), a cattle skull (Phase 4) and a horse first phalanx (Phase 4), all with cut marks associated with skinning.

Articulated Remains

The assemblage contained 14 articulated or semi-articulated animal remains. Some, like mouse (Phase 4 well 663), jackdaw (Phase 5 pit 815) and hedgehog (Phase 6 latrine 1373), probably represent natural mortalities of commensal species. Gnaw marks were not found on any of the articulated remains, suggesting a rapid and secure disposal of the animals.

An unusual find was the burial of an articulated pig in Phase 4 pit 562 (Fig. 11.8). The pit was truncated by a later wall and only the front half of the pig remained. The skull and mandible was highly fragmented and a dental analysis could not be carried out. However, the proximal humerus was fusing, suggesting the pig was approximately 3.5 years old when it died. As pigs were common food animals, it is very unusual to find adult pigs buried intact in medieval and post-medieval urban assemblages. Extensive exostoses were found on the distal part of the left metacarpals and lesser exostoses on the proximal first phalanges of the left foot. The joint surfaces are not affected, which would rule out septic arthritis. The presence of cloacae on the metacarpals suggests some form of osteomyelitis. However, osteomyelitis normally affects singular bones and not adjacent bones.[101] The aetiology is therefore somewhat uncertain. The infection would probably have been visible, not just from limping but also great swelling of the foot and discharging of pus. The pig may not have been considered suitable for consumption. Minor exostoses also occurred on the distal metaphysis

[98] Baker and Brothwell, *Animal Diseases in Archaeology*, p. 154.
[99] Ibid., p. 127.
[100] Poole, 'Animal Remains'.
[101] Baker and Brothwell, *Animal Diseases in Archaeology*, pp. 63–8, 123–6.

on both left and right radius and ulna. This latter pathology is probably not directly related to the pathologies on the right foot. A similar case of burial of a diseased pig is recorded from post-medieval contexts at the Church Street excavations in Oxford.[102]

An almost complete skeleton of a horse had been deposited in Phase 6 pit 613. The distal femur was fusing, indicating an age at death of 3.5 years. It is very unusual for skeletally immature horses to be slaughtered, as their main worth during this period was as working animals. It may have died of an illness, or have been put down due to aggression. Pathological conditions included an area of woven bone on a distal metatarsal shaft, porosities on two tarsal bones and on one inter-vertebral epiphysis as well as a partially healed fractured rib. With exception of the broken rib, all other pathologies indicate infections. The burial also contained 11 fragments of calcified soft tissue from unknown body parts.

Neonatal and juvenile articulated remains from domestic food animals include one lamb (latrine 1373), two piglets (851, 1043) and one chicken (1045), but the level of articulation was not recorded during excavation for the neonatal animals, rendering it difficult to acertain the possibility of discarded natural mortality versus kitchen waste. However, no cut marks were observed.

Four articulated dog skeletons (558, 773, 814, 1101) were recovered from pits in Phase 4, 5 and 6. No cut marks were noted, suggesting that the dogs represent dead pets rather than tannery waste. Withers' heights of 51.4 cm and 47.4 cm respectively could be calculated for the dogs from contexts 773 and 815, which is within the size range for a border collie. One dog (773) had small lesions on the rib joints of the eleventh and twelfth thoracic vertebrae. The dog from context 814 displayed several pathologies: exostoses around the joint surfaces of left and right distal calcaneus and the right distal radius, lipping at the joint surfaces of the left and right distal humerus and the right proximal ulna, bone growth indicative of infection on the proximal right femur, the distal left tibia and on the second and third left metatarsals, in addition to a healed rib fracture as well as a fractured dorsal process on its 5th thoracic vertebra. Fractures of ribs and vertebral processes are not unusual in historical dog populations and could have been the result of kicks or blows. A complete sub-adult cat from Phase 6 pit 702 and a semi-articulated kitten from Phase 6 latrine 1373 also lack cut marks, and therefore probably represent accidental mortalities or deliberate killings as a method of population control.

Discussion

In many respects, the assemblage is very characteristic of its urban medieval and post-medieval context, and consists largely of kitchen and butchery waste, with possible small-scale industrial waste. The presence of primary butchery waste, particularly lower legs of cattle and sheep/goat, suggests that animals were either slaughtered at or near the site itself, or that entire carcass sections were bought from the butchers. Fragments from skull and mandibles suggest the utilisation of head meat. In Phase 6 (mid sixteenth to seventeenth century), cattle fragments from meat-rich body parts increase sharply in relation to fragments from head and lower legs, whereas there is no difference for sheep/goat or pig. This suggests that cattle butchery was not as common in the vicinity as previously, although whether this is the result of the increased status of the area (hinted at by an increase in high-status bird bone at this time), or whether it reflects the relocation of the butchery trade, is unclear. Both at the

[102] B. Wilson, 'Medieval and Post-Medieval Animal Bones and Marine Shells', in Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 267.

present site and at the Classics Centre cattle were mainly slaughtered as adults, although calves were present in all phases.[103] There was an increase in the number of juvenile cattle bones during the early post-medieval period, which may be connected to an increase in dairy production in the region. Contemporary dental ageing data sets from Ashmolean Forecourt (n:8) and the Classics Centre (n:5) both include a number of mandibles from calves,[104] and an increase in juvenile animals in the post-medieval period appears to be a general trend both in Oxford and elsewhere. Sheep were slaughtered at 3–6 years of age, which suggests a multi-purpose husbandry strategy. The slaughter age pattern for pigs is consistent throughout medieval and post-medieval Oxford: as is expected for an animal with high fecundity and no secondary products, pigs were slaughtered young, with few animals kept for more than 3 years. Deer, rabbit and hare contributed little to the diet, though rabbit, as well as swan (see below), increase noticeably in the two later phases. Rabbit was very expensive in the thirteenth to fourteenth centuries, but prices dropped slightly in the later medieval period and rabbit may have become more accessible to a larger part of the urban population.[105]

Domestic fowl and goose are the most numerous bird species not only in the present assemblage, but on most medieval and post-medieval Oxford sites. Fowl were probably kept in backyards and their eggs and feathers collected, whereas geese could graze on the fields and flood plains outside the city. The recovery of two immature turkey bones from Phase 6 (pit 1143) is noteworthy. The first British record of turkey, a New World species, dates from 1541 and turkey bones have been recovered from several sixteenth and seventeenth century sites in southern and eastern England, such as Norwich, Windsor and Hill Hall.[106] The only other Oxford sites with turkey are from the late sixteenth century at Jesus College, the seventeenth century at the former Greyfriars and the late seventeenth century at Corpus Christi College.[107] There is a small chance that the turkey bones may be from an immature peafowl, the bones from the two species being similar in size and shape. Peafowl is a rare bird in archaeological assemblages and associated with a high-status diet, whether from castles, manor houses, abbeys or wealthy urban households.[108] The single bone in Phase 5 that is positively identified as peafowl came from pit 815, which also contained a jeton dated to 1500–25. If the bone was contemporary with its context, it therefore probably came from a bird consumed on Property 1. The marked increase of swan, particularly in Phase 6, is interesting. Swan was associated with a high-status ideal during most of the medieval period and was very expensive to buy. During the late-medieval period the presence of swan increases markedly in urban assemblages, and it has been suggested that swanneries sold an increasing proportion of their birds to the urban market. Documents indicate that while

[103] Poole, 'Animal Remains'.
[104] Ibid.; S. Hamilton-Dyer, 'The Animal Bone', in P. Andrews and L. Mepham, 'Medieval and Post-Medieval Extra-Mural Settlement on the Site of the Ashmolean Museum Forecourt, Beaumont Street, Oxford', *Oxoniensia*, 62 (1997), pp. 212–16.
[105] E.M. Veale, 'The Rabbit in England', *Agricultural History Review*, 5 (1957), pp. 89–90.
[106] B. Fothergill, 'The Husbandry, Perception and Improvement of Turkeys in Britain, 1500–1900', *Post-Medieval Archaeology*, 48 (2014), pp. 207–28; S. Hamilton-Dyer, 'Animal Bones', in S. Preston (ed.) *Reading and Windsor, Old and New*, TVAS Monograph, 7 (2005), p. 126.
[107] L. Strid, 'Animal Bone', in R. Bashford and B.M. Ford, 'Eleventh-Century, Later-Medieval and Early Post-Medieval Evidence from Investigations at Jesus College and Market Street, Oxford', *Oxoniensia*, 79 (2014), pp. 229–31; B. Wilson, 'Medieval and Post-medieval Animal Bones and Marine Shells', in Hassall et al., 'Excavations at St Ebbe's, Part 2', p. 267; L. Broderick, 'Animal Bone', in 'Corpus Christi College, Oxford, New Sub-Main Works, Archaeological Watching Brief Report', unpublished OA report (2016), available via OA Library.
[108] D. Serjeantson, *Birds* (2009), p. 311.

expensive, swan may not have been exclusively connected to the urban rich, but also the aspiring middle classes.[109] The increase of bird taxa and number of unidentifiable bird bones in Phases 5 and 6 is consistent with a general increase in bird bones on archaeological sites from this period.[110]

Table 27. Number of hand-collected and sieved animal bone fragments from Phases 2–6

Phase	Period	Hand-collected fragments	Sieved fragments	Total number of fragments
2	11th century	44	83	127
3	12th century	530	345	875
4	13-14th century	1944	512	2456
5	14-15th century	961	1234	2195
6	16-17th century	3208	69	3277
TOTAL		6687	2243	8930

*Table 28 (overleaf). Animal bone, identified species by phase. MNI (minimum number of individuals) in brackets. *a: articulated pig (133 fragments); *b: articulated dog (78 fragments); *c: articulated mouse (10 fragments); *d: one articulated dog (104 fragments); *e: articulated jackdaw (7 fragments); *f: articulated neonatal sheep/goat (7 fragments); *g:*

[109] N. Sykes, 'The Dynamic of Status Symbols: Wildfowl Exploitation in England AD 410–1550', *Antiquity*, 161 (2004), pp. 91–3.
[110] D. Serjeantson, 'Birds: Food and a Mark of Status', in C. Woolgar et al. (eds.), *Food in Medieval England: History and Archaeology* (2006), pp. 134–6.

*two articulated neonatal pigs (41, 46 fragments); *h: articulated horse (912 fragments); *i: two articulated dogs (7, 13 fragments); *j: articulated cat and kitten (58, 142 fragments); *k: articulated fowl (13 fragments); *l: articulated hedgehog (33 fragments)*

	Phase				
Species	**2**	**3**	**4**	**5**	**6**
Cattle	9 (1)	54 (2)	317 (9)	142 (4)	259 (10)
Sheep/goat	7 (1)	57 (4)	208 (12)	131 (9)	207 (12)*f
Sheep	2	6	17	20	24
Goat			2		1
Pig	4 (1)	58 (3)	216 (4)*a	53 (5)	137 (4)*g
Horse		7 (1)	9 (1)	7 (1)	917 (2)*h
Deer sp.				4	
Fallow deer					1 (1)
Roe deer		1 (1)			
Dog		20 (2)	84 (2)*b	122 (3)*d	32 (3)*i
Cat		3 (1)	7 (2)	9 (2)	208 (4)*j
Rabbit			1 (1)	9 (2)	8 (2)
Hare		2 (1)			
Lagomorph		1			
Rodent					
Domestic fowl		3 (1)	28 (6)	14 (2)	36 (3)*k
Goose	1 (1)	3 (2)	1 (2)	7 (2)	9 (2)
Duck			4 (1)		8 (2)
Swan			1 (1)	4 (1)	12 (2)
Turkey					2 (1)
Peafowl				1 (1)	
Pigeon sp.			1 (1)		
Wood pigeon				2 (1)	
Raven			1 (1)		
Crow				4 (1)	
Rook					
Jackdaw				7 (1)*e	
Magpie				1	
Corvid (crow/rook size)				3	
Corvid (jackdaw/magpie size)				2	
Passerine			1	1	2
Indet. bird	2	16	44	65	273
Mouse			10 (1)*c		
Rodent				1	
Hedgehog					33 (1)*l
Mole			1 (1)		
Frog		2 (1)	1 (1)	12 (3)	20 (6)
Toad					7 (1)
Amphibian	2	5	2	17	27
Microfauna		1		1	
Small mammal	1		7	9	16
Medium mammal	8	89	202	194	257
Large mammal	10	94	392	253	275
Indeterminate	81	453	890	1100	506
Total fragment count	**127**	**875**	**2456**	**2195**	**3277**
Total weight (g)	**1223**	**6399**	**27,207**	**16,212**	**30,584**

13 FISH REMAINS *BY REBECCA NICHOLSON*

The fish remains discussed here were recovered predominantly from selected soil samples taken during the excavations in 2006. Unlike the mammal and bird bone which was in good condition in all phases, the fish remains from Phases 2–5 were only moderately, or in some cases poorly preserved, suggesting the possibility that significant amounts of fish bone have been lost through post-depositional decay. Apart from sample 155, the cesspit samples (e.g. thirteenth to fourteenth century pit fill 959) contained surprisingly few fish remains. By contrast, the bones from sample 155 (from the primary fill of Phase 6 latrine 1373) were extremely numerous and in very good condition; in some cases, bones were encrusted in cess. The condition and abundance of tiny bones and mineralised seeds is consistent with a primary cesspit fill. In most other samples a small proportion of the bones were burnt, indicating a component of kitchen waste and/or rubbish disposal.

The identified fish remains from each phase are set out in Table 29. The great majority came from deposits of Phase 6, late sixteenth to mid seventeenth century, most notably from primary deposit 1024 within latrine 1373. Around 1500 identifiable bones came from only half of the 4–2 mm residue in the case of sample 155 from this deposit. Species included the ubiquitous herring (in this case probably accompanied by sprat) and eel, together with abundant cyprinids, particularly dace but also chub, gudgeon and roach, bullhead, stickleback and, much less commonly, small pike, flatfish, rays and whiting. Measurements on the eel cleithrum suggest fish of 20–35 cm.[111] Fish bone preservation in this sample was extremely good and many bones were distorted in a manner consistent with chewing. Some of the larger bones were stained dark brown, possibly from cooking. A minimum of 87 individual cyprinids were represented by the robust and diagnostic pharyngeal bones in the sorted portion of 4–2 mm residue alone. While head bones and vertebrae were present for most of the commonly represented fish, clupeid head bones were almost completely absent, suggesting that in this case beheaded fish were cooked and eaten. A small number of smelt bones were also identified. The cessy deposit also included mineralised seeds, mineralised pupae, small crustacean fragments and tiny pieces of mineralised cloth, which probably represent the remains of wipes. Similar kinds of remains have been discovered in samples taken from Roman primary drain fills at Herculaneum (pers. observation). One eighth of the 0.5–2 mm residue from this sample was also sorted. This was not quantified but comprised very large quantities of tiny bones, mainly from fish already identified in the larger material: cyprinids, bullhead and clupeids (probably sprat). Occasional tiny ray dermal denticles were also present.

Despite its position, about as far away from the sea as it is possible to be in Britain, it is clear that sea fish were brought into Oxford on a fairly regular basis from at least the eleventh century (for example at Oxford Castle).[112] The fact that the fish represented in the early phases at the present site were herring and eel is no surprise, as these fish are typical for medieval and post-medieval inland sites, for example they were common at Eynsham

[111] J. Coy, 'The Provision of Fowls and Fish for Towns', in D. Serjeantson and T. Waldron (eds.) Diet and Crafts in Towns. The Evidence of Animal Remains from the Roman to the Post-Medieval Periods, BAR BS, 199 (1989), pp. 25–40.
[112] R. Nicholson, 'Fish Bone', in Munby et al., Oxford Castle.

abbey.[113] Herrings are likely to have been salted or pickled in brine and were widely traded in the early medieval period.[114] Both herrings and eels were relatively cheap, and commonly, but by no means only, eaten by the poorer sections of society in medieval times.

The sixteenth- to seventeenth-century samples, particularly sample 155, demonstrate the significance of riverine fishing in particular. Together with eels, small cyprinids, bullheads and pike would have been caught in local rivers and streams. Smelt are inshore migratory fish which enter rivers in winter, to spawn in spring. They were common in the lower reaches of the Thames during the seventeenth and eighteenth centuries and were probably sold as salted or pickled fish.[115] In almost all cases the fish represented in sample 155 were under 15 cm, and in the case of the freshwater and migratory fish, were probably caught in fish traps or weirs laid across rivers.

Small pike were usually recorded as 'pickerel' in later medieval documents, while these tiny cyprinids were probably included with other small freshwater fish in the term 'minnows'. These small fish would have been sold together, cheaply. The fact that they were so very common in cess deposit 1024 suggests that the household of Property 2W ate considerable quantities of these small fish, together with small and tiny sprats and herrings; all were possibly cooked together as a type of whitebait. Since fish remains do not readily survive the human digestive process,[116] it is likely that the sample includes table waste as well as cess. Fish remains were also abundant in sixteenth to seventeenth century deposits from Merton College, although a wider range of fish were represented including several gadids, cyprinids, pike, salmon, smelt, flatfishes, gurnards and sea bream in addition to the ubiquitous herring and eel. At the Classics Centre, a very much smaller late-medieval and post medieval assemblage included herring, eel, small freshwater fish and flatfish. A very similar assemblage to that recovered from sample 155 has been recorded from medieval cesspits at Abingdon West Central.[117]

[113] K. Ayres et al., 'Phases 2f-4a: The Medieval Abbey: Food Consumption and Production', in Hardy et al., Aelfric's Abbey, pp. 360–406.
[114] J.H. Barrett et al., 'Dark Age Economics Revisited – The English Fish Bone Evidence AD 600–1600', Antiquity, 78: 301 (2004), pp. 618–36.
[115] A. Wheeler, The Tidal Thames: A History of a River and its Fishes (1979).
[116] R.A. Nicholson, 'An Investigation into the Effects on Fish Bone of Passage through the Human Gut: Some Experiments and Comparisons with Archaeological Material', Circaea, 10 (1993 for 1992), pp. 38–51.
[117] R. 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; R. Nicholson, 'Fishbone', in A. Norton and G. Cockin, 'Excavations at the Classics Centre, 65–67 St Giles', Oxford', *Oxoniensia*, 73 (2008), pp. 192–3; R. A. Nicholson, 'Fish Remains', in K. Brady and A. Smith 'Excavations at Abingdon West Central Redevelopment: Iron Age, Roman, Medieval, and Post-Medieval Activity in Abingdon', *Oxoniensia*, 72 (2007), pp. 187–90.

Table 29. Numbers of identified fish remains, by phase

	Phase					
	2	**3**	**4**	**5**	**6**	**Total**
Shark/Ray (Elasmobranchii)					3	3
Ray (Rajidae)					5	5
cf. Skate (*Raja batis*)					3	3
Thornback ray (*Raja clavata*)			1	1		2
Eel (*Anguilla anguilla*)	4	2	1	6	332	345
Conger eel (*Conger conger*)			1			1
Clupeid (Clupeidae)	1	3	6		495	505
Herring (*Clupea harengus*)	1		5	5	41	52
Smelt (*Osmerus eperlanus*)					13	13
Pike (*Esox lucius*)					10	10
Cyprinid (Cyprinidae)				1	286	287
Dace/Chub (*Leuciscus* sp.)					36	36
Dace (*Leuciscus leuciscus*)					101	101
Chub (*Leuciscus cephalus*)					3	3
Roach (*Rutilus rutilus*)					2	2
Gudgeon (*Gobio gobio*)					2	2
Gadid (Gadidae)			2		7	9
Cod (*Gadus morhua*)			2		9	11
Cod/Whiting					1	1
Whiting (*Merlangius merlangus*)				1	3	4
Gurnard (Triglidae)					2	2
cf. Perch/ruffe			1			1
Perch (*Perca fluviatilis*)					1	1
Bullhead (*Cottus gobio*)					116	116
3-spined Stickleback (*Gasterosteus aculeatus*)					26	26
Flatfish			1			1
Right-eyed flatfish (Pleuronectidae)				3	3	6
Plaice (*Pleuronectes platessa*)					2	2
Unidentified/unidentifiable fragments		7	19	59	392	477
Total	**6**	**12**	**39**	**76**	**1894**	**2027**

14 CHARRED AND MINERALISED PLANT REMAINS *BY WENDY SMITH*

Following assessment,[118] eight samples were selected for full analysis. These were all from Property 2, with the exception of the twelfth century pit sample 119, which is from Property 1 and the sixteenth/seventeenth century latrine 1373 (sample 155) which is from Property 2W.

Methodology

Samples were processed at Oxford Archaeology using a modified Siraf-style flotation machine. The resulting flot (the material which floats) was sieved to 0.25 mm and the heavy residue (the material which does not float) was sieved to 0.5 mm. The dried heavy residue was sorted by eye for charred and/or mineralised plant remains, along with other ecofacts (e.g. animal bone, charcoal, molluscs) and artefacts.

The author sorted charred plant remains from flots and from unsorted heavy residue fractions using a low-power binocular microscope at magnifications between x12 and x35. Heavy residues were scanned for plant macrofossils, but only the heavy residue fractions associated with the mineralised latrine fill (sample 155, context 1024) were productive and these have been sorted for plant macrofossils as well. Where samples were particularly rich, a representative sub-sample of the flot and/or heavy residue fractions was made following the method of van der Veen and Fieller.[119] In general, quantification was based on the embryo. However, where plant remains were fragmented, estimate counts were based on reconstruction of a whole plant part and this is indicated in the tables with an E after the score (e.g. N^E).

Identification of plant remains was made by direct comparison to the Oxford Archaeology reference collection, as well as standard identification keys.[120] Nomenclature for the plant remains follows Stace for indigenous species and Zohary and Hopf for cultivated species.[121] The traditional binomial system for the cereals is maintained here, following Zohary and Hopf.[122]

Results

Table 31 presents the results for samples primarily collected for charred plant remains and Table 32 presents the result for the primarily mineralised latrine fill sample 155. Low levels of mineralised plant remains, however, were also recovered from some of the samples listed in Table 31. The plant macrofossils were primarily from pits, but also included a well, a ditch and a sixteenth/seventeenth century latrine fill. These are all features into which waste materials regularly might be dumped and, indeed, the results from these features are characteristic of domestic refuse.

---

[118] W. Smith, 'Assessment of the Charred Plant Remains and Charcoal', in 'Ashmolean Museum, Beaumont Street, Oxford. Post-excavation Assessment and Updated Project Design', unpublished OA report (2009).
[119] M. van der Veen and N. Fieller, 'Sampling seeds', *Journal of Archaeological Science,* 9 (1982), pp. 287–98.
[120] e.g. R.T.J. Cappers, R. M. Bekker and J.E.A. Jans, *Digital Seed Atlas of the Netherlands* (Groningen, 2006).
[121] C. Stace, *New Flora of the British Isles*, 2nd edn (Cambridge, 1997); 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* (Oxford, 1994).
[122] Zohary and Hopf, *Domestication of Plants in the Old World*, p. 28, table 3; p. 65, table 5.

Phase 2 ditch 514 (sample 102, context 515, Property 2)

Sample 102 was not particularly rich, with just over 5 seeds per litre of sediment sampled generated. The majority of identifications (N = 139 or 69.2% of the charred assemblage) were of charred free-threshing wheat (*Triticum* spp.) grains, but a few barley (*Hordeum* spp.) and rye (*Secale cereale* L.) grains were also identified. Three secure common vetch (*Vicia sativa* L.) seeds and an estimate of five possible common vetch seeds were identified. The absence of hila (the point where a pea/bean attaches to a pod) on these vetch seeds means that it was not possible to securely identify these as a crop (most likely a fodder crop) rather than a weedy variety. Of course, the low levels of these vetch remains may also reflect residual crops growing with the wheat (as may the barley) or possibly inadvertent mixing in storage. Low levels of charred cereal grains suggest small-scale food processing of whole grain to make other edible cereal products such as groats (cracked wheat, similar to today's bulgur wheat, but can also be made for oat and barley grains), possibly parching grain before hand-milling/grinding in a mortar and pestle.[123] Lost grain dishes, such a frumenty (or frumente) a form of gelatinized porridge made from non-roasted whole grain is also a well-recorded dish from Anglo-Saxon and medieval times requiring whole grain (including wheat grain).[124] Possibly whole grain was used as a staple for pottages/ porridges in the way hominy grits (based on maize) are in southern US cookery or polenta (now based on maize, but previously chestnut (*Castanea sativa* Mill.) flour) or farro (any hulled wheat, but in this case emmer *Triticum dicoccum* Schübl.) might be used traditionally in Italian cooking.[125]

Phase 3 pit 704 (Group 738 – sample 119, context 738, Property 1)

Sample 119, like sample 102, was not particularly rich, with just over 3 seeds per litre of sediment recovered. This sample also was dominated by charred free-threshing wheat (*Triticum* spp.) grain and small quantities of barley (*Hordeum* spp.) grain were also present. Smaller sized vetch/vetchling (*Vicia* spp./*Lathyrus* spp.) seeds were recovered from this sample along with a range of common weeds of cereal crops such as black bindweed (*Fallopia convolvulus* (L.) Á. Löve), stinking chamomile (*Anthemis cotula* L.) and scentless mayweed (*Tripleurospermum inodorum* (L.) Sch. Bip.). In general this sample is similar to that from sample 102; however, with just 127 identifications for this sample, it is not completely certain that this charred plant assemblage is truly representative of the deposit.[126]

Charred and mineralised Phase 4 pit and well samples (samples 1, 118, 164, 165 and 170, Property 2)

Four samples from pit features 55, 494, 480 and 1280 (samples 1, 118, 164 and 165 respectively) and one sample from well 1309 (sample 170, context 1314) were analysed. All of the samples contained mixtures of charred cereal grain and accompanying weeds of crop, but the relative proportions of these were highly variable. Cereal grain was only dominant in pit sample 164 (N = 382 or 68.7%) and weed/ wild plants were only dominant in pit sample 165

[123] A. Hagen, *Anglo-Saxon Food and Drink: Production, Processing, Distribution and Consumption* (Hockwold cum Wilton, 2006), p. 295.

[124] e.g. Hagen, *Anglo-Saxon Food and Drink*, p. 295; C. B. Hiett and S. Butler, *Curye on Inglish: English Culinary Manuscripts of the Fourteenth-Century (Including the Forme of Cury)* (London and Oxford, 1985).

[125] e.g. C. Papa, 'The 'farre de Montelione': landrace and representation', in S. Padulosi, K. Hammer and J. Heller (eds) *Hulled Wheat: Proceedings of the First International Workshop on Hulled Wheats (21-22 July 1995, Castelvecchio, Pascoli, Tuscany, Italy)* (Rome, 1996), pp. 154–71.

[126] e.g. van der Veen and Fieller, 'Sampling seeds'.

(N = 163 or 55.9%). The three remaining samples were more even mixtures of grain and weed/ wild plants with the pit samples (samples 1 and 118) having roughly two thirds as much cereal grain to weed/wild plants and well sample 170 having two thirds as much weed/ wild plants as cereal grain.

Free-threshing wheat (*Triticum* spp.) remains continue to dominate the cereal remains and several compact (i.e. small-sized) cereal grains were noted as well. In addition to free-threshing wheat, barley (*Hordeum* sp.) and rye (*Secale cereale* L.) grain are present in low numbers. Cereal chaff was only recovered in limited quantities (ranging from 0.3% to 9.5% of the charred assemblage) and often was too poorly preserved to be identified to species level. Notably, it appears that barley and rye rachis nodes often were more frequently recovered than wheat rachis nodes, which does not agree with the grain data. This may suggest that barley and rye chaff was in use for other reasons (e.g. as thatch, matting, kindling, floor litter, bedding) and were coming into contact with fire and subsequently entering the pit/well deposits through the disposal of hearth sweepings or other domestic refuse.

Charred flax seeds/linseed (*Linum usitatissimum* L.) were recovered from pit sample 165 and well sample 170. Low levels of mineralised remains were recovered from sample 1, 118 and 170; suggesting that some cess may have also been deposited into these features. The collection of 'night soil' and emptying of pits must have been a frequent activity in urban areas in the past (e.g. thirteenth/fourteenth century records of purchase of night soil from Norwich),[127] and there is the likelihood that these features were used repeatedly to conveniently dispose of domestic waste and cleaned out as and when they were full in order to resume that process again.

Pit samples 1 and 118 were not as productive as the other samples, with less than 5 seeds recovered per litre of sediment sampled and generating assemblages of less than 150 identifications. Pit samples 164 and 165 and well sample 170 were much richer, with 222.4 seeds/L, 16.2 seeds/L and 72 seeds/L and all producing samples with over 300 identifications. Nevertheless, the basic pattern of mixtures of charred cereal grain and accompanying weeds of crop is observed for all samples of this period. Again, like the earlier eleventh and twelfth century samples, it seems likely that these remains represent cereal processing regularly taking place in the nearby properties, such as hand-cleaning grain possibly before hand-milling or cooking. This suggests that the properties were still directly engaged in processing their cereal-based foodstuffs, rather than buying in fully processed cereal flour for example. Whether this reflects the receipt of unprocessed cereals (possibly as tithes or rent) at these properties or some form of cooking tradition requiring heating of whole grain (such as parching grain before milling, pearling barley or making groats) is not clear.

Mineralised and charred remains from Phase 6 latrine 1373 (sample 155, context 1024, Property 2W)

Mineralised plant remains were recovered from all fractions of the heavy residue and from the flot of sample 155. The sample was so rich that only a sub-sample of one eighth of the flot and the various heavy residue fractions was analysed. Only a small quantity (N = 4) of charred plant remains were recovered from the flot, the majority of remains (N = 347 or 98.9% of all identifications came from the 1/8th sub-sample of the residue of sample 155). A great deal of unquantifiable amorphous mineralised concretions were recovered from the <10mm, 4–2 mm

[127] B. Campbell, 'Progress in Medieval England: Some evidence from eastern Norfolk', *Economic History Review*, 36 (1983), p. 34.

and 2–0.5 mm heavy residue fractions and the flot; cereal bran fragments were also recovered from the 4–2 mm and 2–0.5mm heavy residue fractions and flot. In general, fruit stones/pips were most frequently observed, with fig (*Ficus carica* L.) and wild strawberry (*Fragaria vesca* L.) most abundant. Other fruit taxa recovered include apple (*Malus* sp.), bramble/blackberry (*Rubus* section Rubus), elder/elderberry (*Sambucus nigra* L.), grape (*Vitis vinifera* L.), hawthorn (*Crataegus monogyna* Jacq.), indeterminate pear/apple (*Pyrus* sp./*Malus* sp.) and quince (*Cydonia oblonga* Mill.). In total, fruit remains account for 79.5% (N = 276) of all mineralised identifications made in the one eighth sub-sample of sample 155. The bias toward fruit stones/pips is likely to reflect the fact that many of these taxa have thick seed coats; however, certain taxa are frequently preserved in situations of mineralisation (e.g. fig and wild strawberry) and therefore may be more likely to survive than others.[128]

Small quantities of non-fruit foodstuffs were also noted, including wheat (*Triticum* sp.) grain and garden pea (*Pisum sativum* L. – identified from mineralised detached hilum). In addition to plant remains, mineralised insect remains were frequently noted, especially flies (Diptera – indet., *Thoracochaeta zosterae* (Hal.) and *Fannia scalaris* (L.)), woodlice (Isoposa of the suborder Oniscidea.) and millipedes (*Julid* spp.). All of these are frequently associated with mineralised cess deposits.

Charred and mineralised remains from Phase 7 pit 1034 (sample 156, context 1037, Property 2)

This sample was a fairly even mix of charred cereal grain (N = 43.9%) and charred weed/ wild plants (N = 65 or 43.9% of all charred identifications). Most of the cereal grain that could be identified to genus level was identified as barley (*Hordeum* sp.), nine of which were clearly germinated. Several detached sprouts (coleoptiles) were also noted. There are only small quantities of germinated/sprouted grain, so it is not possible to definitely state that malting was taking place, although they occurred in the same context as numerous fragments of oast or malting kiln tiles. It is as likely that these are slightly spoiled grains, possibly discarded during hand cleaning of grain.

One mineralised internal structure of a daisy family (Asteraceae) achene (most likely *Anthemis* sp./*Tripleurospermum* sp.) was also observed. The internal structure of the achene was clearly mineralised. It is not clear whether this represents seventeenth/eighteenth century cess or is intrusive, possibly from earlier deposits at Property 2.

Comparison with Other Oxford Sites

The eleventh- to twelfth-century deposits from the present site compare favourably with other results from Oxford. Charred free-threshing wheat (*Triticum* spp.) grain dominated many of the samples recovered at Merton College, although barley (*Hordeum vulgare* L.) strongly dominated one of the samples.[129] The charred plant remains dating from the eleventh century onward at the Classics Centre site immediately adjacent to the Ashmolean Museum were also

[128] e.g. W. Carruthers, 'The Plant Remains: Comparing and Contrasting the Assemblages' in V. Birbeck et al. (eds.), The Origins of Mid-Anglo-Saxon Southampton: Excavations at the Friends Provident St Mary's Stadium 1998–2000 (2005), pp. 183–5; A.R. Hall, 'A Brief History of Plant Foods in the City of York: What the Cesspits Tell Us', in E. White (ed.) Feeding a City – York: The Provision of Food from Roman Times to the Beginning of the Twentieth Century (2000), pp. 22–41.

[129] R. Pelling, 'Charred and Waterlogged Plant 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. 322–38.

dominated by cereal grain, especially barley and wheat.[130] They appear to be entirely consistent with the more substantial 11th century deposits studied at Lincoln College, where again free-threshing wheat grains (often 'short' grains) dominate.[131] Results from the nearby Sackler Library dating to the eleventh/twelfth centuries also are strongly dominated by cereal grain, especially free-threshing wheat (*Triticum* spp.).[132]

The data tabulated from the Ashmolean Forecourt excavations show that thirteenth/fourteenth century samples were again strongly dominated by cereal grain, especially bread wheat type (*Triticum* cf. *aestivum* L.), with very few cereal chaff fragments identified (4 bread wheat internode fragments and 1 barley rachis internode from sample 504, oven 166; and only 1 barley rachis internode from sample 501, oven 167).[133] Hinton interprets the data as the use of the ovens 'for baking of bread'. Baking bread, however, is more likely to utilise flour, rather than whole grain and, therefore, the possibility that grain was regularly parched before hand-milling, or regularly prepared in some way, possibly as groats, should also be considered.

The thirteenth/fourteenth century samples from the present excavations show continuity with the preceding eleventh/twelfth century results in that cereal grain frequently dominates these samples. The results do, however, markedly differ from the two ovens previously sampled at the Ashmolean Forecourt[134] in that the five thirteenth/fourteenth century samples have a significant charred weed/wild component. This does not necessarily mean the new data contradicts previous results. The grain-rich Ashmolean Forecourt ovens are primary deposits, whereas the refuse deposits sampled from the pits and well in the present excavation include a significant component of non-edible weed/wild plant remains, which most likely were contaminants of the cereal crop and clearly were subsequently burned. The possibility that this may reflect small-scale domestic acts of crop cleaning carried out repeatedly, probably in advance of parching or some other preparation of the grain (e.g. groats), seems the most likely explanation for the data pattern observed in this area of Oxford.

Plant remains from the fifteenth century are not represented at these recent Ashmolean excavations; however, a fruit-rich mineralised deposit from a latrine fill (sample 155, context 1373) which dates to the late sixteenth century to seventeenth century was recovered. This single sample was much richer and more diverse than the thirteenth/fourteenth century indeterminate mineralised/waterlogged plant remains from garderobes sampled at Merton College[135] or the sixteenth/seventeenth century mineralised remains collected from Abingdon West Central[136] and is so far fairly unique for this area of Oxford. Abundant finds of wild strawberry at Merton College and fig at both Merton College and Abingdon West Central are in

[130] R. Pelling, 'The Charred and Mineralised Plant Remains', in A. Norton and G. Cockin, 'Excavations at the Classics Centre, 65–67 St Giles', Oxford', *Oxoniensia*, 73 (2008), p. 193.
[131] R. Pelling, 'The Charred Plant Remains', in Z. Kamash et al., 'Late Anglo-Saxon and Medieval Occupation: Evidence from Excavations at Lincoln College, Oxford 1997–2000', *Oxoniensia*, 67 (2002), pp. 261–71.
[132] R. Pelling, 'Charred Plant Remains', in Poore and Wilkinson, Beaumont Palace, pp. 82–4.
[133] P. Hinton, 'The Charred Plant Remains from Ovens 166 and 167', in in P. Andrews and L. Mepham, 'Medieval and Post-Medieval Extra-Mural Settlement on the Site of the Ashmolean Museum Forecourt, Beaumont Street, Oxford', *Oxoniensia*, 62 (1997), p. 217, table 7.
[134] Ibid.
[135] Pelling, 'Charred and Waterlogged Plant Remains', in D. Poore et al., 'Excavations at No. 4a Merton St', table 12.
[136] R. Pelling, 'Charred, mineralized, and waterlogged plant remains', in K. Brady and A. Smith, 'Excavations at Abingdon West Central Redevelopment: Iron Age, Roman, Medieval and Post-medieval activity in Abingdon', *Oxoniensia,* 72 (2007), pp. 190–202.

common with the results from latrine 1022 at the Ashmolean Museum. Such remains are frequently recovered in 'cess' deposits along with fragments of cereal bran;[137] and, indeed, unquantifiable fragments of cereal bran also were abundant in the Ashmolean latrine backfill sample.

All of the fruit taxa recovered, with the exception of quince (*Cydonia oblonga* Mill), were also recovered from the Merton College and Abingdon West Central garderobe deposits, but not in such abundance. One major difference between the Merton College and the Ashmolean Museum mineralised remains is that plum (*Prunus domestica* L.), smaller plums/bullace/greengage/damson (*Prunus domestica* ssp *insititia* (L.) Bonnier & Layens) and sloe (*Prunus spinosa* L.) were recovered in the thirteenth/fourteenth century garderobe but are entirely absent in the sixteenth/seventeenth century Ashmolean Museum latrine deposit. Whether this suggests that such fruits regularly have their stones removed before consumption by the sixteenth/seventeenth century or reflects a genuine absence of plums/bullace/damson and sloes in the general diet of this later period in Oxford is not clear. Regardless, it seems unlikely that such fruit stones would not survive if present, since they are readily recovered from mineralised deposits elsewhere, as at Southampton and York.[138]

[137] e.g.; A. Hall, A. Jones and H. Kenward, 'Cereal bran and human faecal remains from archaeological deposits – some preliminary observations', in B. Proudfoot (ed.) *Site, Environment and Economy,* Symposium of the Association of Environmental Archaeology 3/British Archaeological Reports International Series 173 (1983), pp. 85–104.

[138] Carruthers, 'The Plant Remains: Comparing and Contrasting the Assemblages'; Hall, 'A Brief History of Plant Foods in the City of York'; F. Green, 'Phosphatic mineralization of seeds from archaeological deposits', *Journal of Archaeological Science*, 6 (1979), pp. 279–84.

Table 30. Charred plant remains

Sample Number	102	119	1	118	164	165	170	156	
Context Number	515	738	56	494	480	1280	1314	1037	
Feature Number	514	704	55	493	477	1282	1309	1034	
Group Number	514	738		494	480	1280		1037	
Property Number	2	1	2	2	2	2	2	2W	
Feature Type	Ditch	Pit	Pit	Pit	Pit	Pit	Well	Pit	
Phase	Phase 2 (Mid-Late 11C)	Phase 3 (12C)	Phase 4 (13/14 C)	Phase 4 (13/14 C)	Phase 4 (13/14 C)	Phase 4 (13/14 C)	Phase 4 (13/14 C)	Phase 7 (L17-18C)	
Sample Volume (L.)	40	40	40	40	39	40	10	10	
Flot Volume (ml)	35	100	140	38	200	85	200	18	
Proportion Flot/ HR sorted	100% Flot only	100% Flot only	100% Flot only	50% Flot only	1/16th Flot only	50% Flot only	50% Flot only	100% Flot only	
Seeds per litre of sediment (combined CPR & MPR)	5.1	3.2	4.3	3.0	222.4	16.2	72.0	14.9	
LATIN BINOMIAL									**ENGLISH COMMON NAME**
CHARRED PLANT REMAINS									
Cereal Grain									
Hordeum spp. - hulled	-	-	1	-	2	-	-	-	indeterminate hulled barley
Hordeum sp. - hulled germinated	-	1	-	-	4	-	-	9	sprouted hulled barley
Hordeum spp. - indeterminate	9	3	1	2	-	6[E]	-	19	indeterminate barley
cf. *Hordeum* spp. - indeterminate	4	-	-	-	-	-	2	6	possible barley
Triticum spp. - free-threshing type, small compact	-	2	10	7	-	-	-	-	free-threshing compact (small-sized) wheat
Triticum spp. - free-threshing type	42	10	9	11[E]	45[E]	18	8	4	free-threshing wheat
Triticum spp. - indeterminate	-	-	-	-	11	-	-	-	wheat
Triticum spp./ *Secale cereale* L.	-	-	-	-	-	-	15[E]	-	indeterminate wheat/ rye
Secale cereale L.	2	-	1	-	4	3	11	-	rye
cf. *Secale cereale* L.	-	-	1	1	-	2	-	-	possible rye

Table 30 continued: Charred plant remains

Sample Number	**102**	**119**	**1**	**118**	**164**	**165**	**170**	**156**	
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**	
Cereal Grain									
Cereal - indeterminate	66 E	28 E	25 E	18 E	20 E	10	6	10 E	indeterminate cereal
Cereal/ POACEAE - indeterminate	15 E	17 E	23 E	9 E	17 E	18 E	18 E	6 E	indeterminate cereal/ large grass
Cereal/ POACEAE - indeterminate, germinated	-	1	-	-	-	-	-	-	sprouted indeterminate cereal/ large grass
Cereal/ POACEAE - indeterminate, detached embryo	1	-	2	-	1		3	2	indeterminate cereal/ large grass
Cereal/ POACEAE - indeterminate, detached coleoptile	-	5	-	-	19	2	7	4	indeterminate cereal/ large grass sprout
cf. Cereal/ POACEAE - indeterminate, detached small coleoptile	-	-	-	-	259	-	-	5	possible indet. cereal/ large grass sprout
Cereal Chaff									
Hordeum spp. - rachis node	-	-	-	-	-	-	1	-	barley
Hordeum spp./ *Secale cereale* L. - indeterminate rachis node	-	1	3	-	12	-	7	-	barley/ rye
Triticum spp. - free-threshing type rachis node	-	-	5	2	3 E	-	8	-	free-threshing wheat
Triticum sp. - indeterminate rachis node	-	1	-	-	-	-	-	-	indeterminate wheat
cf. *Triticum* sp. - basal rachis node	-	-	-	-	-	-	1	-	possible wheat
Triticum spp./ *Secale cereale* L. - awn fragments	-	-	-	-	++++	-	+++	-	
Triticum sp./ *Secale cereale* L./ *Avena* spp. - glume fragment	-	-	-	-	1	-	++	1	wheat/ rye/ indet. cultivated/ wild oat
Secale cereale L. - rachis node	-	2	6	1	12	-	12	-	rye
Cereal - indeterminate basal rachis node	-	3	-	2	-	-	-	-	cereal
Cereal - indeterminate rachis internode	-	1	-	1	1	-	-	-	indeterminate cereal
Cereal/ POACEAE - culm node	-	-	-	-	3 E	1	5	1	cereal/ large grass
FRUIT/ NUT									
cf. *Picea* sp./ *Larix* sp. - indeterminate	-	-	-	-	-	1	-	-	possible pine/ larch
Corylus avellana L. - nutshell frags. (est whole nut)	-	1	1 E	1	1	-	1	-	hazel nutshell
cf. *Corylus avellana* L. - nutshell frags (est whole nut)	-	-	-	1	-	-	-	-	possible hazel nutshell
Sambucus nigra L.	-	-	-	-	-	-	3	-	elder/ elderberry

Table 30 continued: Charred plant remains

Sample Number	102	119	1	118	164	165	170	156	
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**	
PULSES									
Vicia sativa L.	3	-	2	1	-	-	-	-	common vetch (4-8mm / frag w/ hilum)
cf. *Vicia sativa* L.	5 [E]	-	8 [E]	1	-	-	-	-	cf. common vetch (<4mm or fragmented)
OIL CROP									
Linum usitatissimum L.	-	-	-	-	-	3	6	-	linseed/ flax
cf. *Linum usitatissimum* L.	-	-	-	-	-	1 [E]	2	-	possible linseed/ flax
Weed/ Wild Taxa									
Ranunculus acris L./ *repens* L./ *bulbosus* L.	-	-	-	-	-	1	-	-	meadow/ creeping/ bulbous buttercup
Ranunculus subgenus RANUNCULACEAE	-	-	-	-	-	2	1	-	buttercup
Papaver rhoeas L./ *dubium* L.	-	-	1	-	1	-	-	-	common/ long-headed poppy
Fumaria spp.	-	-	-	-	-	1	1	-	fumitory
Urtica urens L.	-	-	-	-	-	3	-	-	small nettle
cf. *Urtica* spp. - indeterminate, internal structure	-	-	-	-	-	2	-	-	possible nettle
Chenopodium spp.	-	-	2	1	4	5	6	-	goosefoot
Chenopodium spp./ *Atriplex* spp. - indeterminate internal structure	1	-	-	-	8	1	1	-	goosefoot/ orache
Atriplex spp.	-	-	-	-	-	3	5	2	orache
CHENOPODIACEAE/ CARYOPHYLLACEAE - indet. internal structure	-	-	-	-	12	1	-	-	Pink Family/ Goosefoot Family
cf. *Stellaria* spp.	-	-	-	-	-	1	-	-	possible stitchwort
Cerastium sp.	-	-	-	-	1	-	-	-	mouse-ear
Spergula arvensis L.	-	-	-	-	2	2	-	-	corn spurrey
Silene spp. - <2mm seed	1	-	-	-	-	-	-	-	campion
cf. *Agrostemma githago* L.	-	-	-	-	-	-	1	-	possible corncockle
cf. *Agrostemma githago* L. - seed coat fragment	-	-	-	-	1	-	-	-	possible corncockle
cf. *Agrostemma githago* L. - calyx	-	-	1	1	1	-	-	-	possible corncockle
CARYOPHYLLACEAE - unidentified, small-sized	-	-	1	-	-	-	-	-	Pink Family
CARYOPHYLLACEAE - unidentified, medium-sized	-	-	-	-	1	-	-	-	Pink Family

Table 30 continued: Charred plant remains

Sample Number	**102**	**119**	**1**	**118**	**164**	**165**	**170**	**156**	
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**	
Weed/ Wild Taxa									
CARYOPHYLLACEAE - unidentified, seed coat fragment	-	-	1	-	-	-	-	-	Pink Family
CARYOPHYLLACEAE - unidentified, internal structure	-	2	-	1	-	-	-	-	Pink Family
Fallopia convoluvls (L.) Á. Löve	-	-	-	-	-	-	1	-	black bindweed
Persicaria sp.	-	-	1	-	-	-	-	-	knotweed
Polygonum aviculare L.	-	2	-	-	-	1	1	-	knotgrass
cf. *Polygonum* sp. - indeterminate, highly encrusted	-	-	-	-	-	1	-	-	possible knotgrass
Polygonum sp./ *Rumex* sp./ *Carex* sp. - internal structure	-	-	-	1	1	2	-	-	knotgrass/ dock/ sedge
cf. *Rumex acetosella* L.	1	-	-	-	3 [E]	-	-	-	possible sheep's sorrel
Rumex spp.	-	2	-	2	3	1	-	2	docks
cf. *Thlaspi arvense* L. - internal structure with partial seed coat	-	-	-	-	-	2	-	-	possibe field penny-cress
Brassica cf. *nigra* (L.) W. D. J. Koch	-	-	-	-	5	1	-	4	possible black mustard
Raphanus raphanistrum L. - capsule segment	-	-	-	1	1	-	-	-	wild radish
Anagallis arvensis L.	-	-	-	-	-	-	-	2	scarlet pimpernel
Aphanes arvensis L.	-	-	-	-	-	1	-	-	parsley-piert
Lotus sp./ *Melilotus* sp./ *Medicago* sp./ *Trifolium* sp.	-	-	1	-	3	-	-	-	bird's-foot-trefoil/ melilot/ medick/ clover
cf. *Vicia hirsuta* (L.) Gray	-	1	-	-	-	-	-	-	possible hairy tare
Vicia spp./ *Lathyrus* spp. - large-sized (>2mm)	5 [E]	3	-	5 [E]	3	3	2	-	vetch/ vetchling
Vicia spp./ *Lathyrus* spp. - small-sized (<2mm)	4 [E]	3	-	3 [E]	2	10	1	4	vetch/ vetchling
cf. *Vicia* spp./ *Lathyrus* spp. - fragments	5 [E]	-	-	-	-	-	-	-	possible vetch/ vetchling
Melilotus spp./ *Medicago* spp./ *Trifolium* spp.	1	-	2	1	16	8	4	1	melilot/ medick/ clover
Medicago lupulina L.	-	-	-	-	1	-	-	-	black medick
cf. *Scandix pecten-veneris* L.	-	-	-	-	1	-	-	-	possible shepherd's-needle
Apium graveolens L.	-	-	-	-	-	-	1	-	wild celery
cf. *Apium graveleons* L. - internal structure	-	-	-	-	-	-	2	-	possible wild celery
APIACEAE - unidentified, medium-sized mericarp	1	-	-	-	2	-	-	-	Carrot Family
Lithospermum arvense L.	-	-	-	-	2	-	1	1	corn gromwell
Plantago major L.	-	-	-	-	-	1	-	3	greater plantain

Table 30 continued: Charred plant remains

Sample Number	**102**	**119**	**1**	**118**	**164**	**165**	**170**	**156**	
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**	
Weed/ Wild Taxa									
cf. *Plantago major* L.	-	-	-	-	-	1	-	-	possible greater plantain
Veronica hederifolia L.	-	-	-	-	1	-	-	-	ivy-leaved speedwell
Euphrasia spp./ *Odontites* spp.	-	1	3	-	4	-	2	2	eyebright/ bartsia
Galium spp.	1	3	-	-	-	2	5	-	cleaver
Valerianella dentata (L.) Pollich.	-	-	-	-	-	1	-	-	narrow-fruited cornsalad
cf. *Knautia arvensis* (L.) Coult. - fragment	-	-	-	-	-	-	-	1	possible field scabious
? *Knautia arvensis* (L.) Coult. - internal structure	-	1	-	-	-	-	-	-	tentative identification of field scabious
Lapsana communis L.	-	-	-	-	-	-	-	1	nipplewort
Anthemis cotula L.	1	4	2	2	17	10	3	35	stinking chamomile
Chrysanthemum segetum L.	-	-	-	-	1	-	-	1	corn marigold
cf. *Leucanthemum vulgare* Lam.	-	-	-	-	-	1	-	-	possible oxeye daisy
Tripleurospermum inodorum (L.) Sch. Bip.	-	1	-	-	-	-	-	-	scentless mayweed
Centaurea spp.	-	1	1	1	-	1	3	-	cornflower/knapweed
ASTERACEAE - *Anthemis*/ *Tripleurospermum* type internal structure	2	2	1	-	6	1	2	2	stinking chamomile/ scentless mayweed type
ASTERACEAE - unidentified, medium-seeded	-	-	-	-	-	1	-	-	Daisy Family
Lemna sp.	-	-	-	-	-	1	-	-	duckweed
Eleocharis palustris (L.) Roem. & Schult./ *uniglumis* (Link) Schult.	-	-	-	-	1	2	1	-	common spikerush
Schoenoplectus spp.	-	-	-	-	2	-	-	-	club-rush
Carex spp. - 2-sided	-	-	-	-	-	-	2	-	sedge
Carex spp. - 3-sided	-	-	1 [E]	-	-	3	11	-	sedge
CYPERACEAE - unidentified	-	-	-	2	-	-	-	-	Sedge Family
Lolium sp.	1	-	-	-	-	-	-	-	rye-grass
cf. *Lolium* sp. - rachis node	-	-	-	-	-	-	-	1	possible rye-grass
Cynosurus cristatus L.	-	-	-	-	1	-	-	-	crested dog's-tail
Avena cf. *sativa* L. - floret bases (broken high)	-	-	-	-	-	-	3	-	possible cultivated oat
Avena cf. *fatua* L.	-	-	1	-	-	-	-	-	wild-oat
Avena spp.	1	-	1	-	1	15	5	-	indeterminate cultivated/ wild oat

Table 30 continued: Charred plant remains

Sample Number	**102**	**119**	**1**	**118**	**164**	**165**	**170**	**156**	
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**	
Weed/ Wild Taxa									
Avena sp. - floret base (broken high)	-	-	1	-	-	-	-	-	indeterminate cultivated/ wild oat
Avena sp. - awn	-	-	-	-	1	-	-	-	indeterminate cultivated/ wild oat
cf. *Avena* spp.	-	-	-	-	-	66 E	50 E	-	possible indeterminate cultivated/ wild oat
cf. *Avena* sp. - germinated	-	1	-	-	-	-	-	-	possible sprouted indet cultivated/ wild oat
cf. *Avena* sp. - glume fragment	-	-	1	-	-	-	-	-	possible indeterminate cultivated/ wild oat
Avena spp./ *Bromus* spp.	7	4	7 E	1	4	3	30 E	-	indet. cultivated wild oat/ brome grass
POACEAE - unidentified, large-sized caryopsis	-	10	-	5	5 E	10	14	2	Grass Family
POACEAE - unidentified, medium-sized caryopsis	-	3	5	-	3	-	-	-	Grass Family
POACEAE - unidentified, small-sized caryopsis	3	3	5	1	8	8	-	-	Grass Family
POACEAE - culm node	-	1	-	-	-	2	4	-	Grass Family
Unidentiifed - amorphous nodule	10	-	2	19	4	20	57 E	14	-
Unidentified - seed capsule fragment	-	1	-	-	-	-	-	-	-
Unidentified - stalk	-	-	-	1	-	-	-	-	-
Unidentified - thorn	-	1	-	-	-	-	-	-	-
Unidentified	2	1	3	7	5	16	16	3	-
Indeterminate	7	-	7	6	3	42	7	-	-
OTHER REMAINS									
Unidentified - fungal body	2	-	5	1	-	-	-	-	-
Unidentified - metallic, round nodule	-	-	3	-	-	-	-	-	-
Coal	-	-	-	-	-	-	-	+++	-
Ashy concretions (? 'cinder')	-	-	-	-	+	-	-	++	-
Charred rodent droppings	-	-	-	-	+	-	-	-	

Table 30 continued: Charred plant remains

Sample Number	**102**	**119**	**1**	**118**	**164**	**165**	**170**	**156**	
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**	
MINERALISED PLANT REMAINS									
CEREAL GRAIN									
Cereal - unidentified bran fragments (unquantified)	-	-	+++	-	-	-	-	-	cereal bran
FRUIT									
cf. *Ficus carica* L. - internal structure	-	-	1	-	-	-	-	-	possible fig
cf. *Fragaria vesca* L. - internal structure	-	-	3	-	-	-	-	-	possible wild strawberry
Sambucus nigra L. (? mineralised)	-	-	4	-	-	-	-	-	elder/ elderberry
WEED/ WILD									
cf. *Chenopodium* sp./ *Atriplex* sp. - internal structure	-	-	1	-	-	-	-	-	possible goosefoot/ orache
Geranium sp. (? mineralised/ ?modern)	1	-	1	1	-	-	-	-	crane's-bill
LAMIACEAE - *Lamium* type	-	-	3	-	-	-	-	-	dead-nettle type
ASTERACEAE - *Anthemis*/ *Tripleurospermum* type internal structure	-	-	-	-	-	-	-	1	stinking chamomile/ scentless mayweed type
Sagittaria sagittifolia L./ *Alisma* spp. - internal structure (? mineralised)	-	-	2	-	-	-	-	-	arrowhead/ water-plantain
cf. *Carex* spp. - 3-sided, internal structure	-	-	1	1	-	-	-	-	possible sedge
Unidentified	-	-	8	-	-	-	-	-	-
Unidentified - stalk fragments	-	-	+	-	-	-	-	-	-
Unidentified - straw fragments	-	-	+	-	-	-	-	-	-
Unidentified - mineralised concretion	-	-	+	-	-	-	1	-	-
OTHER MINERALISED REMAINS									
Isoposa of the suborder Oniscidea - indeterminate, fragments	-	-	+	-	-	-	-	-	woodlouse
Julid spp. - fragments	-	-	+++	+	-	-	-	-	millipede
Coleoptera - unidentified, fragments	-	-	+	-	-	-	-	-	beetle

Table 30 continued: Charred plant remains

Sample Number	102	119	1	118	164	165	170	156
Context Number	**515**	**738**	**56**	**494**	**480**	**1280**	**1314**	**1037**
TOTAL IDENTIFICATIONS								
Charred Cereal Grain	139	67	73	48	382	59	70	65
Charred Cereal Chaff	0	8	14	6	32	1	34	2
Charred Fruit/ Nut	0	1	1	2	1	1	4	0
Charred Pulses	8	0	10	2	0	0	0	0
Charred Oil Crop	0	0	0	0	0	4	8	0
Charred Weed/ Wild	35	48	39	28	129	181	163	64
Charred Unident/ Indet	19	3	12	33	12	78	80	17
TOTAL CHARRED	**201**	**127**	**149**	**119**	**556**	**324**	**359**	**148**
Mineralised Cereal Grain	0	0	0	0	0	0	0	0
Mineralised Fruit	0	0	8	0	0	0	0	0
Mineralised Weed/ Wild	1	0	8	2	0	0	0	1
Mineralised Unident/ Indet	0	0	8	0	0	0	1	0
TOTAL MINERALISED	**1**	**0**	**24**	**2**	**0**	**0**	**1**	**1**
PROPORTIONS OF PLANT REMAINS								
Charred Cereal Grain	**69.2%**	**52.8%**	49.0%	40.3%	**68.7%**	18.2%	19.5%	43.9%
Charred Cereal Chaff	0.0%	6.3%	9.4%	5.0%	5.8%	0.3%	9.5%	1.4%
Charred Fruit/ Nut	0.0%	0.8%	0.7%	1.7%	0.2%	0.3%	1.1%	0.0%
Charred Pulses	4.0%	0.0%	6.7%	1.7%	0.0%	0.0%	0.0%	0.0%
Charred Oil Crop	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	2.2%	0.0%
Charred Weed/ Wild	17.4%	37.8%	26.2%	23.5%	23.2%	**55.9%**	45.4%	43.2%
Charred Unident/ Indet	9.5%	2.4%	8.1%	27.7%	2.2%	24.1%	22.3%	11.5%
TOTAL CHARRED	**99.5%**	**100.0%**	**86.1%**	**98.3%**	**100.0%**	**100.0%**	**99.7%**	**99.3%**
Mineralised Cereal Grain	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Mineralised Fruit	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Mineralised Weed/ Wild	100.0%	0.0%	33.3%	100.0%	0.0%	0.0%	0.0%	100.0%
Mineralised Unident/ Indet	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	100.0%	0.0%
TOTAL MINERALISED	**0.5%**	**0.0%**	**13.9%**	**1.7%**	**0.0%**	**0.0%**	**0.3%**	**0.7%**

Key: + = <5 items, ++ = 5 - 25 items, +++ = 25 - 100 items, ++++ = 100 - 300 items, +++++ = >300 items.

Table 31. Mineralised plant remains from a late 16th century – middle 17th century cesspit/cellar backfill feature 1022
(scores tabulated both for individual sample fractions and in combination – combined score is shaded grey)

Sample Number	**155**	**155**	**155**	**155**	**155**	**155**	
Context Number	**1024**	**1024**	**1024**	**1024**	**1024**	**1024**	
Feature Number	**1022**	**1022**	**1022**	**1022**	**1022**	**1022**	
Group Number	**1373**	**1373**	**1373**	**1373**	**1373**	**1373**	
Property Number	**2W**	**2W**	**2W**	**2W**	**2W**	**2W**	
Feature Type	**backfill cellar/ ?cesspit**	**backfill cellar/ ?cesspit**	**backfill cellar/ ?cesspit**	**backfill cellar/ ?cesspit**	**backfill cellar/ ?cesspit**	**backfill cellar/ ?cesspit**	
Phase	**Phase 6 (L16-M17C)**	**Phase 6 (L16-M17C)**	**Phase 6 (L16-M17C)**	**Phase 6 (L16-M17C)**	**Phase 6 (L16-M17C)**	**Phase 6 (L16-M17C)**	
Sample Volume (L.)	**38**	**38**	**38**	**38**	**38**	**38**	
Flot Volume (ml)					**85**	**85**	
Proportion Flot/ HR sorted (combined CPR & MPR)*	**1/8 >10mm HR**	**1/8th 10-4mm HR**	**1/8th 4-2mm HR**	**1/8th 2-0.5mm HR**	**1/8th flot (10% fully sorted/ 90% rapid scan)**	**COMBINED 1/8 flot & >10 - 0.5mm HR fractions**	
Seeds per litre of sediment	**0.0**	**0.2**	**9.5**	**24.4**	**39.6**	**73.9**	
LATIN BINOMIAL							**ENGLISH COMMON NAME**
CHARRED PLANT REMAINS							
Cereal Grain							
Triticum spp. - free-threshing type	-	-	-	-	1	1	free-threshing wheat
Weed/ Wild Taxa							
Vicia spp./ *Lathyrus* spp. - small-sized (<2mm)	-	-	-	-	1	1	vetch/ vetchling
Unidentified - seed coat	-	-	-	-	1	1	-
Unidentified - stalk	-	-	-	-	1	1	-
Indeterminate	-	-	-	-	++	++	-

** results presented here are only for the 1/8th sub-sample sorted and are NOT factored back up to 100% of the sample.*

Table 31 continued: Mineralised plant remains from a late 16th century – middle 17th century cesspit/cellar backfill feature 1022

Sample Number	**155**	**155**	**155**	**155**	**155**	**155**	
Context Number	**1024**	**1024**	**1024**	**1024**	**1024**	**1024**	
Proportion Flot/ HR sorted	**1/8 >10mm HR**	**1/8th 10-4mm HR**	**1/8th 4-2mm HR**	**1/8th 2-0.5mm HR**	**1/8th flot (10% fully sorted/ 90% rapid scan)**	**COMBINED 1/8 flot & >10 - 0.5mm HR fractions**	
MINERALISED PLANT REMAINS							
CEREAL GRAIN							
cf. *Triticum* sp.	-	-	1	-	-	1	possible wheat
Cereal - unidentified bran fragments (unquantified)	-	-	++++	++++	+++++	+++++	cereal bran
PULSES							
Pisum sativum L. - detached hilum	-	-	-	1	-	1	garden pea
FRUIT							
Ficus carica L.	-	-	-	25	87	113	fig
Ficus carica L. - internal structure	-	-	6	-	-	6	fig
Rubus section Rubus	-	-	-	-	3[E]	3[E]	blackberry/ bramble
Fragaria vesca L.	-	-	2	66	47	115	wild strawberry
Cydonia oblonga Mill.	-	1[E]	-	-	1	2[E]	quince
cf. *Cydonia oblonga* Mill. - internal structure	-	-	2	-	1[E]	3[E]	possible quince
cf. *Cydonia oblonga* Mill. - fragments (unquantified)	-	-	++	-	-	++	possible quince
Pyrus sp./ *Malus* sp. - indeterminate internal structure	-	-	6	-	-	6	pear/ apple
cf. *Pyrus* sp./ *Malus* sp. - indeterminate	-	-	-	-	1	1	possible pear/ apple
cf. *Pyrus* sp./ *Malus* sp. - indeterminate mericarp	-	-	1	-	-	1	possible pear/ apple pith
Malus sp.	-	-	1	-	-	1	apple
Crataegus monogyna Jacq.	-	-	-	-	1	1	hawthorn
Vitis vinifera L. - internal structure	-	-	8	-	-	8	grape
cf. *Vitis vinifera* L. (estimate from fragments)	-	-	-	-	5[E]	5[E]	possible grape
Sambucus nigra L. (? mineralised)	-	-	-	2	8	10	elder/ elderberry
Indeterminate nutshell/ fruit stone fragment	-	-	-	-	1	1	-

Table 31 continued: Mineralised plant remains from a late 16th century – middle 17th century cesspit/cellar backfill feature 1022

Sample Number	**155**	**155**	**155**	**155**	**155**	**155**	
Context Number	**1024**	**1024**	**1024**	**1024**	**1024**	**1024**	
Proportion Flot/ HR sorted	**1/8 >10mm HR**	**1/8th 10-4mm HR**	**1/8th 4-2mm HR**	**1/8th 2-0.5mm HR**	**1/8th flot (10% fully sorted/ 90% rapid scan)**	**COMBINED 1/8 flot & >10 - 0.5mm HR fractions**	
WEED/ WILD							
Papaver somniferum L. (?MPR)	-	-	-	-	2	2	opium poppy
CARYOPHYLLACEAE - unidentified large-seeded	-	-	-	1	-	1	Pink Family
cf. *Malva* sp. - internal structure	-	-	-	1	-	1	possible mallow
cf. *Brassica* spp. - internal structure	-	-	2	-	-	2	possible mustard
Geranium sp. (? mineralised/ ?modern)	-	-	-	-	1	1	crane's-bill
LAMIACEAE - Lamium type	-	-	-	-	1	1	dead-nettle type
cf. *Sagittaria sagittifolia* L./ *Alisma* spp.	-	-	-	-	1	1	possible arrowhead/ water-plantain
Juncus spp.	-	-	-	-	15	15	rush
Carex spp. - 3-sided	-	-	1	1	4	6	sedge
POACEAE - small-sized caryopsis	-	-	-	1	-	1	Grass Family
Unidentified	-	-	14	18	2	34	-
Unidentified - bark/ leaf fragments	-	-	-	-	1	1	-
Unidentified - stalk fragments	-	-	1	-	2	3	-
Unidentified - mineralised concretion	++	-	++++	++++	+++++	+++++	-
OTHER MINERALISED REMAINS							
Thoracochaeta zosterae (Hal.)	-	-	+++	-	++++	++++	the 'seaweed fly'
Fannia scalaris (L.)	-	-	+	-	+	+	the 'latrine fly'
Diptera - unidentified puparia	-	-	+++	-	+++	+++	indeterminate flies
Isoposa of the suborder Oniscidea - indeterminate, fragments	-	-	++	-	++	++	woodlouse
Julid spp. - fragments	-	-	-	-	+++	+++	millipede
Coleoptera - unidentified, fragments	-	-	-	-	+	+	beetle
Insect - unidentified, fragments	-	-	-	-	+	+	-
Animal dropping (?rodent)	-	-	5	-	-	5	-
?Crustacean shell fragments	-	-	++	++	-	++	indeterminate possible crab/ crayfish

Table 31 continued: Mineralised plant remains from a late 16th century – middle 17th century cesspit/cellar backfill feature 1022

Sample Number	155	155	155	155	155	155	
Context Number	1024	1024	1024	1024	1024	1024	
Proportion Flot/ HR sorted	1/8 >10mm HR	1/8th 10-4mm HR	1/8th 4-2mm HR	1/8th 2-0.5mm HR	1/8th flot (10% fully sorted/ 90% rapid scan)	COMBINED 1/8 flot & >10 - 0.5mm HR fractions	
TOTAL IDENTIFICATIONS							
Charred Cereal Grain	0	0	0	0	1	1	
Charred Weed/ Wild Plants	0	0	0	0	1	1	
Charred Unident/ Indet	0	0	0	0	2	2	
TOTAL CHARRED	**0**	**0**	**0**	**0**	**4**	**4**	
Mineralised Cereal Grain	0	0	1	0	0	1	
Mineralised Pulses	0	0	0	1	0	1	
Mineralised Fruit	0	1	26	93	155	276	
Mineralised Weed/ Wild Plants	0	0	3	4	24	31	
Mineralised Unident/ Indet	0	0	15	18	5	38	
TOTAL MINERALISED	**0**	**1**	**45**	**116**	**184**	**347**	
TOTAL PROPORTIONS							
Charred Cereal Grain	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	
Charred Weed/ Wild Plants	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	
Charred Unident/ Indet	0.0%	0.0%	0.0%	0.0%	50.0%	50.0%	
TOTAL CHARRED	0.0%	0.0%	0.0%	0.0%	2.1%	1.1%	
Mineralised Cereal Grain	0.0%	0.0%	2.2%	0.0%	0.0%	0.3%	
Mineralised Pulses	0.0%	0.0%	0.0%	0.9%	0.0%	0.3%	
Mineralised Fruit	0.0%	100.0%	57.8%	80.2%	84.2%	**79.5%**	
Mineralised Weed/ Wild Plants	0.0%	0.0%	6.7%	3.4%	13.0%	8.9%	
Mineralised Unident/ Indet	0.0%	0.0%	33.3%	15.5%	2.7%	11.0%	
TOTAL MINERALISED	0.0%	100.0%	100.0%	100.0%	97.9%	98.9%	

Key: + = <5 items, ++ = 5 - 25 items, +++ = 25 - 100 items, ++++ = 100 - 300 items, +++++ = >300 items. Bold typing in double line border box indicated dominant mineralised plant category.

15 SOIL MICROMORPHOLOGY, CHEMISTRY AND MAGNETIC SUSCEPTIBILITY *BY RICHARD I MACPHAIL AND JOHN CROWTHER*

Introduction

Seven 0.50-m long soil monoliths from medieval and post-medieval contexts were received. These monoliths were from a variety of contexts (buried soil, 'garden soil', pit and ditch fills). After assessment, four thin section and six bulk samples were taken from monoliths 136, 150 and 151 for analysis of medieval soils.

Samples and methods

Four thin sections and six associated bulk samples were analysed (Tables 32 and 35):

Thin section M136 (bulk samples 278, 887);
Thin section M906 (bulk sample 906);
Thin section M905 (bulk sample 905); and
Thin section M904 (bulk samples 903 and 904).

Chemistry and magnetic susceptibility. Analysis was undertaken on the fine earth (i.e. < 2 mm) fraction of the samples. Phosphate-P_i (inorganic phosphate) and phosphate-P_o (organic phosphate) were determined using a two-stage adaptation of the procedure developed by Dick and Tabatabai[139] in which the phosphate concentration of a sample is measured first without oxidation of organic matter (P_i), using 1N HCl as the extractant (after a slight excess of HCl has been added to remove the carbonate present); and then on the residue following alkaline oxidation with sodium hypobromite (P_o), using 1N H_2SO_4 as the extractant. Phosphate-P (total phosphate) has been derived as the sum of phosphate-P_i and phosphate-P_o, and the percentages of inorganic and organic phosphate calculated (i.e. phosphate-P_i:P and phosphate-P_o:P, respectively). LOI (loss-on-ignition) was determined by ignition at 375ºC for 16 hours[140] – previous experimental studies having shown that there is normally no significant breakdown of carbonate at this temperature.

In addition to χ (low frequency mass-specific magnetic susceptibility), determinations were made of χ_{max} (maximum potential magnetic susceptibility) by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. χ_{conv} (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, viz: (χ/χ_{max}) x 100.0.[141] In

[139] W.A. Dick and MA Tabatabai, 'An alkaline oxidation method for the determination of total phosphorus in soils', *Journal of the Soil Science Society of America*, 41 (1977), pp. 511-14.
[140] D.F. Ball, 'Loss-on-ignition as an estimate of organic matter and organic carbon in non-calcareous soils', *Journal of Soil Science*, 15 (1964), pp. 84-92.
[141] M.S. Tite, 'The influence of geology on the magnetic susceptibility of soils on archaeological sites' *Archaeometry*, 14 (1972), pp. 229-36; I. Scollar, A. Tabbagh, A. Hesse and I. Herzog, *Archaeological prospecting and remote sensing* (Cambridge, 1990).

many respects this is a better indicator of magnetic susceptibility enhancement than raw χ data, particularly in cases where soils have widely differing χ_{max} values.[142] A Bartington MS2 meter was used for magnetic susceptibility measurements. χ_{max} was achieved by heating samples at 650°C in reducing, followed by oxidising conditions. The method used broadly follows that of Tite and Mullins,[143] except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment. [144]

Soil micromorphology. The four thin section subsamples (M136, M904, M905 and M906) were impregnated with a clear polyester resin-acetone mixture; samples were then topped up with resin, ahead of curing and slabbing for 75 x 50 mm-size thin section manufacture by Spectrum Petrographics, Vancouver, Washington, USA.[145] Thin sections were further polished with 1,000 grit papers and analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were described, ascribed soil microfabric types (MFTs) and microfacies types (MFTs) (Tables 33 and 34), and counted according to established methods.[146]

Results: Chemistry and magnetic susceptibility

The results are presented in Table 33.

'Natural' brickearth (context 887). As noted in the footnote to Table 32, this context has been 'contaminated' to some extent with burrowed material from context 278. Nonetheless, the sample analysed is distinguished by having a slightly lower LOI and phosphate-P concentration than the samples from the other contexts, and also a higher χ_{max}.

Garden soil contexts. These contexts all appear to be broadly similar in character. Although the levels of organic matter recorded are not especially high (LOI, range: 3.17–3.83%), it should be recognised that there will inevitably have been subject to some degree of post-burial decomposition – i.e. originally these contexts are likely to have had a substantially higher organic matter content. The phosphate-P concentrations recorded are all high (range, 3.25–4.78 mg g^{-1}), which is likely attributable to enrichment through the application of manures and/or other waste materials.

---

[142] J. Crowther, 'Potential magnetic susceptibility and fractional conversion studies of archaeological soils and sediments', *Archaeometry*, 45 (2003), pp. 685-701; J. Crowther and P. Barker, 'Magnetic susceptibility: distinguishing anthropogenic effects from the natural', *Archaeological Prospection*, 2 (1995), pp. 207-15.
[143] M.S. Tite and C.E. Mullins, 'Enhancement of magnetic susceptibility of soils on archaeological sites', *Archaeometry*, 13 (1971), pp. 209-19.
[144] I.D.G. Graham and I. Scollar, 'Limitations on magnetic prospection in archaeology imposed by soil properties', *Archaeo-Physika*, 6 (1976), pp. 1-124; Crowther and Barker, 'Magnetic susceptibility'.
[145] P. Goldberg and R.I. Macphail, *Practical and Theoretical Geoarchaeology* (Oxford, 2006); C.P. Murphy, *Thin Section Preparation of Soils and Sediments* (Berkhamsted, 1986).
[146] P. Bullock, N. Fedoroff, A. Jongerius, G. Stoops and T. Tursina, *Handbook for Soil Thin Section Description* (Wolverhampton, 1985); M.A. Courty, 'Microfacies analysis assisting archaeological stratigraphy', in P. Goldberg, Holliday, V.T., and Ferring, C.R., eds., *Earth Sciences and Archaeology* (New York, 2001), pp. 205-39; M.A. Courty, P. Goldberg and R.I. Macphail, *Soils and Micromorphology in Archaeology*, 1st Edition (Cambridge, 1989); Goldberg and Macphail, *Practical and Theoretical Geoarchaeology*; R.I. Macphail and G.M. Cruise, 'The soil micromorphologist as team player: a multianalytical approach to the study of European microstratigraphy', in Goldberg, P., Holliday, V., and Ferring, R., eds., *Earth Science and Archaeology* (New York, 2001), pp. 241-67; G. Stoops, *Guidelines for Analysis and Description of Soil and Regolith Thin Sections* (Madison, Wisconsin, 2003).

The contexts all appear to be naturally quite Fe-rich, and this is reflected in the very high χ_{max} values recorded (range, 4560–5230 x 10^{-8} m^3 kg^{-1}). The fact that these are somewhat lower than the 'natural' probably reflects a 'dilution' of the Fe content in the garden topsoils as a result of the addition of materials (e.g. manures) with a lower Fe content. Although the χ values are quite high (range, 101–211 x 10^{-8} m^3 kg^{-1}), the χ_{conv} values (range 2.20–4.63%) are less than the 5.00% threshold that is often taken to indicate enhancement through burning in archaeological contexts. Certainly, there is no evidence to suggest that there has been *in situ* burning. This does not, however, preclude the possibility that substantial amounts of burnt material with a low Fe-content (e.g. ash from a hearth) may have been incorporated. Indeed, the chances of such burning being masked in this way are more likely in circumstances such as these where the soil matrix is Fe-rich. Of the five contexts, 905 would seem to be the most likely to contain burnt material.

Interpretation. Because of the absence of a sample of uncontaminated natural, and particularly of a sample of topsoil from the vicinity that is known not to have been affected by anthropogenic inputs, it is impossible on present evidence to quantify the extent to which these garden soils have been modified through human activity. However, it would seem reasonable to assume that the high phosphate concentrations recorded are the result of some form of enrichment, e.g. through animal manuring or waste application (bone and latrine waste found in thin sections, see below). In view of the Fe-rich nature of the soils, the lack of evidence of magnetic susceptibility enhancement does not necessarily mean that ashes and similar burnt wastes have not been incorporated in the soils.

Results: Soil micromorphology

Soil micromorphology data are presented in Tables 35 and 36. Associated SEM/EDAX analyses on thin sections M136, 903 and M906 are found in Table 34. Seventeen soil micromorphological characteristics were noted (Table 35). The report is supported by a CD-Rom archive with illustrations.

Buried soil – Section 252, Monolith 136 below wall 235

Contexts 278-887 (thin section M136): This is a moderately heterogeneous soil, with mixed but similar weakly humic and charcoal-rich SMT 1a1 and 1a2 soil material. Both are weakly calcitic (ashy). Large amounts of coarse ironstone/ferruginous oolite and oolitic limestone and shelly limestone clasts occur. Small amounts of fine-size burned mineral material, coprolitic bone and burned bone occur. High levels of biological activity are recorded by total excremental fabric and very abundant thin organo-mineral excrements. Bulk analyses found high phosphate but no supportive magnetic susceptibility evidence of iron-working. SEM/EDAX confirmed the base rich nature of the fine soil and ferruginous nature of weathered and little weathered ironstone (50.0-55.5% FeO; Table 34).

Contexts 278 and 887 cannot be differentiated because of soil mixing by biological activity, including that by earthworms. All soil materials are a moderately anthropogenic soil and natural soil mixture, and contain ash residues, and small amounts of coprolitic bone and burned bone. High levels of biological activity suggest that the soil is probably a moderately amended 'garden' soil developing in possibly truncated natural subsoil.

Garden soil – Section 257; Monoliths 150–151

Context 906 (monolith 151, M906): This is a weakly humic, ashy and biologically worked soil (excremental fabric with earthworm granules), containing occasional charcoal, coprolitic and burned bone, and examples of (Ca-P - ~hydroxyapatite) phosphatised tufa (9.75% P_2O_5), phosphate (cess?) nodules (26.4-36.2% CaO and 12.3-15.2% P_2O_5) (Table 34). There are also possible iron traces(?)(61.3% FeO). Bulk analyses found high phosphate (second highest amount at the site) but no supportive magnetic susceptibility evidence of iron-working.

This is a biologically worked soil enriched in ash and phosphate-rich waste (burned bone, coprolitic bone, phosphate nodules and phosphatised tufa – possibly from cess pits). Trace amounts of iron(?) may derive from domestic hearth waste. This garden soil was strongly amended.

Context 905 (monolith 151, M905): This is a heterogeneous humic and poorly humic soil, with various concentrations of very fine charcoal and ash(?) residues, and showing partial biological homogenisation. Earthworm granules of different preservation occur ('fresh' and 'weathered'). Burned ferruginous sandstone clasts are present. Occasional fragments of mortar tempered with ferruginous oolite and calcareous silty 'plaster/mortar' occur, alongside small amounts of charcoal and bone/coprolitic bone. Phosphate levels are lower than in 906 below and 904 above, but the soil has the highest χ_{conv} at the site (Table 33).

Context 905 is a partially biologically homogenised and burrowed constructed garden soil, formed from anthropogenic debris dumping, including that of building waste (mortar and calcareous mortar/cob?). Burned mineral material has raised the magnetic susceptibility of the soil. Different 'subsoil' and 'topsoil' materials have been burrow mixed (hence variously preserved earthworm granules); the latter from overlying context 904.

Context 904 (Monolith 150, M904): This overlying soil is similar to 905 below, but is a more homogeneous moderately humic and ash- and fine charcoal-rich soil (SMT 2a2). It also includes a few more coarse charcoal and bone fragments. Earthworm granules appear to be all similarly well-preserved. Bulk analyses show the highest phosphate and organic matter content (LOI) at the studied sequences at the site.

Context 904 is a moderately homogenised garden soil strongly enriched in anthropogenic waste. There is possibly a clearly topsoil formed at this level, within the garden soil sequence.

Context 903 (Monolith 150, M904): This is an ash-, fine charcoal- and moderately phytolith-rich soil, with coarse inclusions of stones and mortar; bone is also present. An example of a probable lead droplet fused in ash was noted (it includes 'lead carbonate' and 'pure lead', and a trace of lead oxide; Professor Thilo Rehren, Institute of Archaeology, UCL, pers. comm.; EDAX: 'pure lead': 85.5% PbO; ashy 'lead carbonate': 5.29-5.61% P_2O_5, 5.25-5.40% CaO, 68.6-69.7% PbO) (Table 34). Similar examples of ash-embedded lead has been recorded in late Roman dark earth contexts at Leicester.[147]

Context 903 records renewed garden soil construction through dumping of constructional debris (stones, mortar and lead droplet) and burned grass/dung ash and phytolith-rich waste, over the more humic and phosphate-rich 'established' garden soil horizon of context 904.

[147] R.I. Macphail and J. Crowther, *Freeschool Lane and Vine Street, Leicester: soil micromorphology, chemistry and magnetic susceptibility* (Leicester, 2007), Leicester University Archaeological Service, p. 68

Discussion

The medieval garden soils are generally ferruginous because of the high amount of Jurassic ironstone and ferruginous oolitic rock fragments that they contain. These can have up to 60% FeO (Table 34), and this high natural iron content is reflected in the χ_{max} data (see Table 33 and earlier discussion). In addition, there are both Jurassic oolitic and shelly limestone rock fragments. Tufa fragments are also present, but may be of much more recent (Quaternary) origin.

At Property 1 and below the wall at section 252, there is no bulk or soil micromorphological evidence that context 887 is a purely natural deposit. Rather it appears to be mixed with anthropogenic inclusions, such as fine charcoal and ash residues, as well coarse charcoal, coprolitic bone and burned bone, and appears little different from context 278. The latter includes both unweathered ferruginous oolite and weathered ironstone, but no evidence of industrial activity. These two contexts can therefore be best interpreted as moderately amended garden soils, as also indicated by the high amount of biological activity of small mesofauna such as earthworms.[148] Medieval garden soils are not unusual in urban areas. For example, historical records showed that the amended garden soils below eleventh- to twelfth-century monastery buildings at St Julien, Tours had been used to grow vines.[149] Medieval garden/horticultural soils are also recorded from Leicester and Canterbury (see below).

At Property 2, the garden soils at section 257 show greater inputs of anthropogenic materials compared to the Property 1 soils. This raised both phosphate and organic matter levels. Phosphate was added by manuring with kitchen (e.g., burned bone and trace of burned eggshell) and latrine (coprolitic bone, phosphate – cess – nodules) waste; constructional debris (mortar, 'cob'? and stones) were also added. Ash and fine charcoal hearth debris also probably added potassium (Table 34), although generally little burned material was found or indicated by magnetic susceptibility analyses. SEM/EDAX studies also found no heavy metals that may be related to industrial dumping, although one enigmatic lead fragment was found in 903. The detection levels for heavy metals using EDAX is, however, less sensitive compared to wet chemistry. Contexts 906, 905 and 904 show the construction of thick garden soils by the importation of anthropogenic soils enriched in fine charcoal and ashes. The high levels of biological activity show that these soils were fertile, and were likely intended for horticultural use. The reworking of different soil material/occupation soils is evidenced by the presence of weathered and unweathered earthworm granules. This indicates previously formed and now-weathering occupation soils (cf dark earth) were being incorporated into these garden soils. It is also important to note that the waste debris seems to be of domestic (e.g., kitchen and latrine) origin; no obvious dung or strongly burned industrial waste was noted.

[148] L. Bal, *Zoological ripening of soils* (Wageningen, 1982); Courty et al., *Soils and Micromorphology in Archaeology*; R.I. Macphail, 'A reply to Carter and Davidson's "An evaluation of the contribution of soil micromorphology to the study of ancient arable agriculture"', *Geoarchaeology*, 13 (1998), pp. 549-64; I.A. Simpson, 'Relict properties of anthropogenic deep top soils as indicators of infield land management in Marwick, West Mainland, Orkney', *Journal of Archaeological Science*, 24 (1997), pp. 365-80.

[149] H. Galinié, E. Lorans, R.I. Macphail, J. Seigne, M. Fondrillon, A. Laurent and A. Moreau, 'Chapter 53. La fouille du square Prosper-Mérimée. The excavation in Prosper-Mérimée Square', in Galinié, H., ed., *Tours, antique et médiéval. Lieux de vie Temps de la ville*, *Volume 30th Supplément: spécial de la collection Recherches sur Tours* (Tours, 2007), pp. 171-80.

Interestingly, context 904 seems to record a period of non-accumulation and the development of a garden topsoil, perhaps formed over several years. In addition to the micromorphological evidence, this horizon records the highest LOI and phosphate levels.

Context 904 was buried by renewed dumping of anthropogenic waste (context 903), essentially composed of building debris (stones and mortar), latrine waste and ash-rich residues. Amongst these materials a lead droplet/fragment was found embedded in ash. Rather than indicating industrial activity, however, this probably more likely records use of lead, in lead piping constructions for example. Overall, the garden soils seem to have been amended with domestic materials, namely: kitchen, hearth, latrine and constructional waste, all perhaps consistent with household activities.

As comparisons, ash and phosphate-rich latrine waste were employed as manure at St Julien, Tours, whereas at Whitefriars, Canterbury dung was also added to domestic and industrial waste inputs in the medieval garden soils; here phosphate levels were higher than those recorded at Oxford.[150] It can also be noted that at the Ashmolean Museum site, latrine waste in the form of liquid cess was not *directly* applied as manure, as found sometimes at St Julien.

Table 32. Soils; details of samples

Sample/ Context	Monolith	Description
278	136	Soil amendment/waste disposal
887	136	Natural brickearth*
903	150	Garden soil – manuring/waste disposal?
904	150	Garden soil – manuring/waste disposal?
905	151	Garden soil – manuring/waste disposal?
906	151	Garden soil – manuring/waste disposal?

* Although identified as 'natural' it includes some material from context 278 as a result of burrowing – i.e. it is not pure uncontaminated natural

[150] Galinié et al., 'La fouille du square Prosper-Mérimée'; R.I. Macphail and J. Crowther, *Whitefriars, Canterbury: Soil micromorphology, chemistry and magnetic susceptibility* (Canterbury, 2007), p. 43.

Table 33. Soils; chemical and magnetic susceptibility data

Sample	LOI (%)	Phosphate -P_i (mg g^{-1})	Phosphate -P_o (mg g^{-1})	Phosphate -P (mg g^{-1})	Phosphate -P_i:P (%)	Phosphate-P_o:P (%)	χ (10^{-8} m^3 kg^{-1})	χ_{max} (10^{-8} m^3 kg^{-1})	χ_{conv} (%)
278	3.34	3.10	0.442	3.54	87.5	12.5	198	5230	3.79
887	3.05	2.58	0.415	3.00	86.1	13.9	144	5730	2.51
903	3.43	2.96	0.292	3.25	91.0	9.0	101	4600	2.20
904	3.83	4.48	0.303	4.78	93.7	6.3	129	4700	2.74
905	3.17	3.49	0.360	3.85	90.6	9.4	211	4560	4.63
906	3.49	4.24	0.410	4.65	91.2	8.8	174	4720	3.69

Table 34. Soils: SEM/EDAX (%; analysed areas and spots – see archive)

	NaO	Mg0	MnO	Al_2O_3	SiO_2	K_2O	CaO	P_2O_5	SO_2	F	TiO	FeO	PbO
M136 (278-887)													
Weathered ironstone (anal. 1)		0.43		4.91	7.36	0.82	4.45	1.1				50.2	
Weathered ironstone (anal. 2)				5.82	8.17	0.81	1.55	0.59			0.40	51.6	
Soil (weakly ashy)		0.45		7.54	27.7		6.67	0.90				8.89	
Soil (weakly ashy)		0.68		7.99	24.7	1.95	9.53	1.23				9.64	
Oolitic ironstone				5.23	7.18		0.75	0.56			0.61	55.5	
Oolite inclusion		0.60		6.77	10.4	0.62	1.00	0.59				50.0	
Soil (weakly ashy)		0.92		9.73	23.5	2.12	6.93	0.61			0.48	11.4	
Soil (weakly ashy)		0.60		6.19	31.0	1.52	4.72	0.86				8.29	
M906 (906)													
Tufa (with phosphatisation – Ca-P)		0.42		1.65	5.74	0.51	40.4	9.75	0.33			2.75	
Phosphate (cess?) nodule (anal. 1)	0.40			0.92	2.31	0.38	36.2	15.2		4.02		2.21	
Phosphate (cess?) nodule (anal. 2)				2.09	5.58	0.99	26.4	12.3				13.8	
Phosphate (cess?) nodule (qtz sand inclusion)					47.4								
Ironstone/iron fragment		0.65		3.79	3.72	0.43	0.90	1.0			0.48	61.3	
Soil (weakly ashy)		0.54		5.55	28.6	1.57	8.84	0.97			0.57	7.73	
Soil (weakly ashy)		0.56		7.58	24.5	2.41	12.5	1.02				7.64	
M903 (903)													
Lead fragment ('pure lead')		0.07		2.10	1.10		0.43				0.14	0.95	85.5
'Impure lead'	0.07	0.02	0.01	11.3	1.10	0.18	0.28					0.81	69.2
Ashy 'lead carbonate'	0.06	0.04			0.82	0.03	5.25	5.29			0.13	1.26	69.7
Ashy 'lead carbonate'	0.04	0.13		0.15	0.62	0.11	5.40	5.61			0.08	1.62	68.6

Table 35. Soils: soil micromorphology counts

Thin section Sample	Depth	Context	Bulk sample	MFT	SMT	Voids	Gravel	Weathered Ironstone	Mortar	Bone	Charcoal	Ash traces
Monolith 136												
M136	240-315mm	278-887	278+887	A1	1a1, 1a2	45%	fff	a*		a	aa	aa
Monolith 150												
M904	160-200 mm	903	903	B4	2a3	60%	fff	a*	aaa	aa	aa	aaaaa
M904	200-235 mm	904	904	B3	2a2	60%	fff	a*	a	a	aa	aaa
Monolith 151												
M905	100-175 mm	905	905	B2	2a1, 2a2, 3a1	60%	fff	a*	aa	a	a	aaa
M906	280-350 mm	906	906	B1	2a1	40%	fff	a*		aa	aaa	aaa

Table 35 continued

Thin section Sample	Context	Ca-P nodule	Burned mineral	Lead droplet	2ndary P	broad burrows	Thin excr.	Broad excr.	Total excr. fab.
Monolith 136									
M136	278-887		a				aaaaa	aaa	aaaaa
Monolith 150									
M904	903		a	a-1			aaaa	aaaaa	
M904	904		a				aaaa	aaaaa	
Monolith 151									
M905	905		aa			aaa	aaa	aaaaa	
M906	906	a-1	a		a*		aaaa	aaaa	aaaaa

* - very few 0-5%, f - few 5-15%, ff - frequent 15-30%, fff - common 30-50%, ffff - dominant 50-70%, fffff - very dominant >70%

a - rare <2% (a*1%; a-1, single occurrence), aa - occasional 2-5%, aaa - many 5-10%, aaaa - abundant 10-20%, aaaaa - very abundant >20%

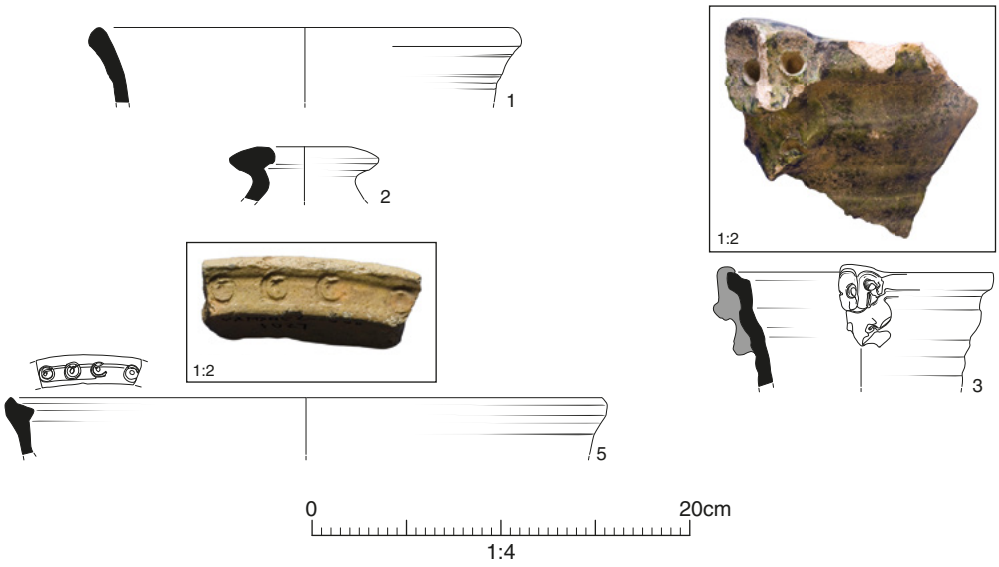
Table 36. Soils: Soil Micromorphology (Descriptions and preliminary interpretations)

Microfacies type (MFT)/Soil microfabric type (SMT)	**Sample No.**	**Depth (relative depth) Soil Micromorphology (SM) SEM/EDAX (EDAX)**	**Preliminary Interpretation and Comments**
			Buried soil – Section 252, Monolith 136 below Friary wall (235)
MFT A1/SMT 1a1, 1a2	**M136**	240-315mm SM: Moderately heterogeneous with mixed SMT 1a1 and 1a2; *Microstructure*: fine subangular blocky forming poorly developed fine prisms, 45% voids, simple and complex packing voids, poorly accommodated planar voids; *Coarse Mineral*: C:F (Coarse:Fine limit @ 10 µm), 65:35; very poorly sorted coarse silt, fine to very coarse sand-size quartz, feldspar, tufa, oolitic and shelly limestone and ferruginous oolite (ironstone) and flint, with tufa and shell; common rounded gravel and small stone size ironstone and limestone (20mm+) clasts; *Coarse Organic and Anthropogenic*: occasional charcoal (0.5mm) with an example of charcoal twigwood section (1mm), 2mm-size iron-rich fragment (weathered ironstone?); example of embedded ironstone in yellow matrix; trace of earthworm granules; rare bone (coprolitic) and dark brown burned bone (200 µm); possible example of human coprolite – but which is no longer autofluorescent under BL; rare rubified (burned) mineral including ironstone; *Fine Fabric*: SMT 1a1: dark reddish brown (PPL), isotropic with scattered moderately high (close porphyric, undifferentiated and crystallitic b-fabric, XPL), reddish orange (OIL), relict humic staining and amorphous OM, with occasional very fine charcoal; SMT 1a2: as SMT 1a1, but brownish orange (OIL); *Pedofeatures*: *Excrements*: total excremental fabric (with many abundant broad (1-2mm)	278-887 Moderately heterogeneous soil, with mixed similar weakly humic and charcoal-rich SMT 1a1 and 1a2. Both are weakly calcitic (ashy). Large amounts of coarse ferruginous oolite and oolitic limestone and shelly limestone clasts occur. Small amounts of fine-size burned mineral material, coprolitic bone and burned bone occur. High levels of biological activity are recorded from total excremental fabric and very abundant thin organo-mineral excrements. Bulk analyses found high phosphate but no supportive magnetic susceptibility evidence of iron-working. *Moderately anthropogenic soil and natural soil mixture, containing ash residues, and small amounts of coprolitic bone and burned bone. High levels of biological activity suggest that the soil is probably a moderately amended 'garden' soil.*

		organo-mineral excrements); very abundant thin organo-mineral excrements. EDAX: weathered and unweathered ironstone are strongly ferruginous (50.0-55.5% FeO); soil is moderately base-rich with Ca, K, Mg and P, including ash (see Table 34).	
			Garden soil – Section 257; Monoliths 150-151
MFT B3/MFT 2a3 over MFT B2/SMT 2a2	**M903**	160-235 mm SM: Heterogeneous, SMT 2a2, with SMT 2a3 becoming dominant upwards; *Microstructure*: fine subangular blocky and crumb; 60% voids, simple and complex packing voids, poorly accommodated planar voids; *Coarse Mineral*: C:F, 65:35, very poorly sorted, as below, with common gravel and small stones (eg. 35mm-size quartzite pebble); *Coarse Organic and Anthropogenic*: many lime mortar fragments with (quartz, ironstone, limestone) sand temper (4mm); occasional bone and coprolitic bone, example of strongly burned calcined bone (5mm); rare earthworm granules; occasional charcoal; example of 4mm long probable lead droplet fused within ash (lead carbonate coating); *Fine Fabric*: SMT 2a3: speckled brown (PPL), high interference colours (close porphyric, crystallitic b-fabric, XPL), pale brownish orange (OIL), many fine charcoal and (humified, ferruginised) amorphous organic matter, very abundant ash with phytoliths present; *Pedofeatures*: *Excrements*: abundant thin and very abundant broad excrements. EDAX (903): 'Pure lead': 85.5% PbO; ashy 'lead carbonate': 5.29-5.61% P_2O_5, 5.25-5.40% CaO, 68.6-69.7% PbO.	903 (monolith 150) Ash-, fine charcoal- and moderately phytolith-rich soil, with coarse inclusions of stones and mortar; bone is also present. An example of a probable lead droplet fused in ash, was noted ('lead carbonate' and 'pure lead'). *Garden soil construction is renewed through dumping of constructional debris (stones, mortar and lead droplet) and burned grass/dung ash and phytolith-rich waste.* 904 Similar to 905 below, but homogeneous moderately humic and ash and fine charcoal-rich SMT 2a2, and with a few more coarse charcoal and bone fragments. Earthworm granules appear to be all similarly preserved. Bulk analyses show highest phosphate and organic content (LOI). *Moderately homogenised garden soil enriched in anthropogenic waste. Possibly a clear topsoil formed at this level.*
MFT B2/SMT 2a1, 2a2 and 3a1	**M905**	100-175 SM: very heterogeneous, with common SMT 2a1 and 2a2 and few 3a1; *Microstructure*: poorly developed prisms, 50% voids, simple and complex packing voids, poorly accommodated planar voids; *Coarse Mineral*: as 906, with 10mm-size (burned) rounded fine sandstone; *Coarse Organic and Anthropogenic*: rare earthworm granules showing good to poor preservation (ie some partially weathered); rare	905 (monolith 151) Heterogeneous humic and poorly humic soils, with various concentrations of very fine charcoal and ash(?) residues, and showing partially biological homogenisation. Earthworm granules of different preservation. Occasional fragments of mortar tempered with ferruginous oolite and calcareous silty ‘plaster/mortar’ occur alongside small

		charcoal (max 3mm); many fragments of mortar and mortar like fragments (lime mortar with ironstone temper, and calcareous silty mortar traces (SMT 3a); rare coprolitic bone/coprolite; two strongly burned (rubefied) ferruginous sandstone gravel; *Fine Fabric*: SMT 2a2: dusty and dotted dark brown (PPL), moderate interference colours (close porphyric, crystallitic b-fabric, XPL), brownish orange (OIL), humic staining with relict amorphous OM, abundant fine charred OM, occasional probable ash; SMT 3a: cloudy yellowish brown (PPL), high interference colours (close porphyric, crystallitic b-fabric, XPL), yellow (OIL); *Pedofeatures*: *Fabric*: many broad burrows; *Excrements*: many thin and very abundant broad excrements.	amounts of charcoal and bone/coprolitic bone. Phosphate levels are lower than in 906 below and 904 above, but the soil has the highest χ_{conv} at the site. *Partially biologically homogenised and burrowed constructed garden soils formed from anthropogenic debris dumping, including that of building waste (mortar and calcareous mortar/cob?). Burned mineral material has raised the magnetic susceptibility of the soil. Different 'subsoil' and 'topsoils' have been burrow mixed.*
MFT B1/SMT 2a1	**M906**	280-350 mm SM: Homogeneous; *Microstructure*: fine subangular blocky forming poorly developed fine prisms, 40% voids, simple and complex packing voids, poorly accommodated planar voids; *Coarse Mineral*: C:F, 50:50, very poorly sorted, as M136with dominant small stone-size flint, tufa, oolitic and shelly limestone (gravel and 8-15mm)(fewer rounded ferruginous oolite here cf. 136); *Coarse Organic and Anthropogenic*: occasional charcoal (max 4mm) and bone (coprolitic and burned; varying low to very BL autofluorescence – burning and coprolitic effects)(max 4mm); rare earthworm granules; rare burned mineral grains; examples of phosphatised limestone clasts (BL); examples of burned eggshell, Ca-P (cess?) nodules and iron/ iron nodules (see EDAX); *Fine Fabric*: SMT 2a1: dusty darkish brown (PPL), low interference colours (close porphyric, crystallitic b-fabric, XPL), orange (OIL); *Pedofeatures*: *Crystalline*: rare traces of phosphatisation of limestone (autofluorescent BL); *Excrements*: total excremental fabric; abundant broad (1-2mm) organo-mineral excrements, abundant thin excrements.	906 (monolith 151) Weakly humic, ashy and biologically worked soil (excemental fabric with earthworm granules), containing occasional charcoal, coprolitic and burned bone, and examples of (Ca-P - ~hydroxyapatite) phosphatised tufa and phosphate (cess?) nodules, and iron traces(?). Bulk analyses found high phosphate (2nd highest amount) but no supportive magnetic susceptibility evidence of iron-working. *Biologically worked soil enriched in ash and phosphate-rich waste (burned bone, coprolitic bone, phosphate nodules and phosphatised tufa – possibly from cess pits)*

		EDAX: (Ca-P) phosphate (cess?) nodules with 26.4-36.2% CaO and 12.3-15.2% P_2O_5; phosphatised tufa (9.75% P_2O_5); iron/ironstone fragment (61.3% FeO)	



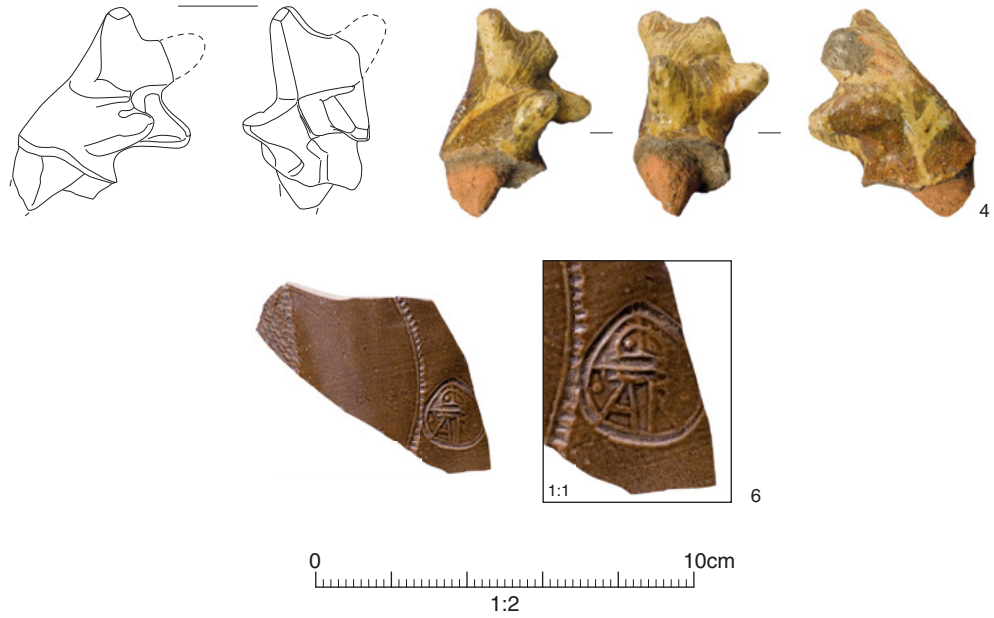


Figure 11.15: Pottery

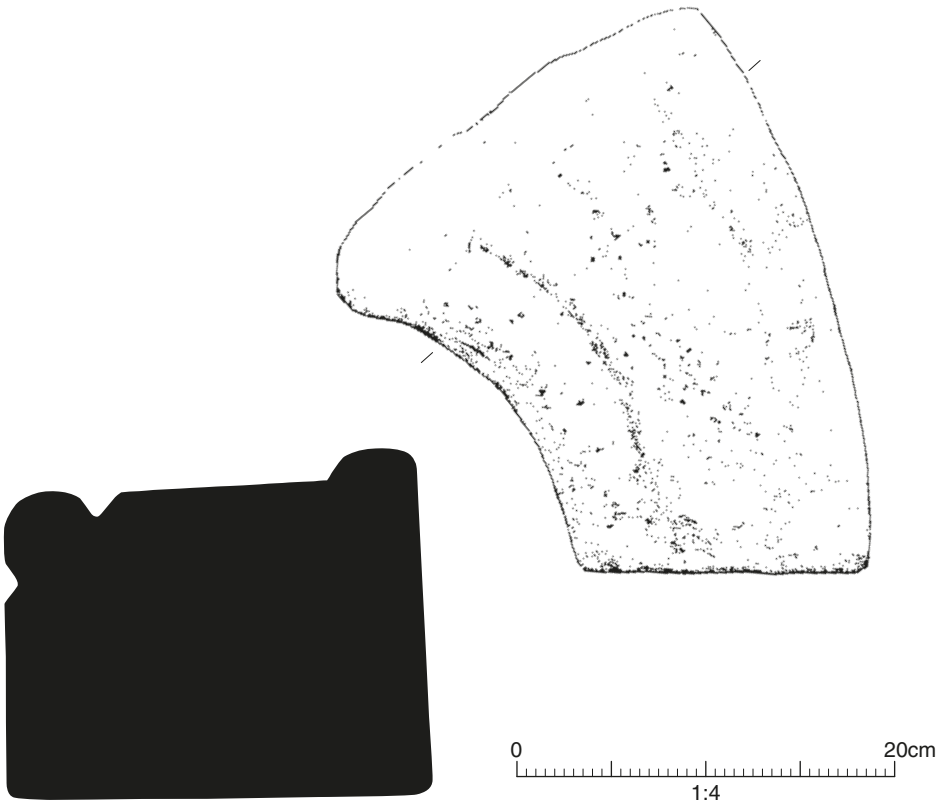


Figure 11 .16: Limestone tympanum fragment

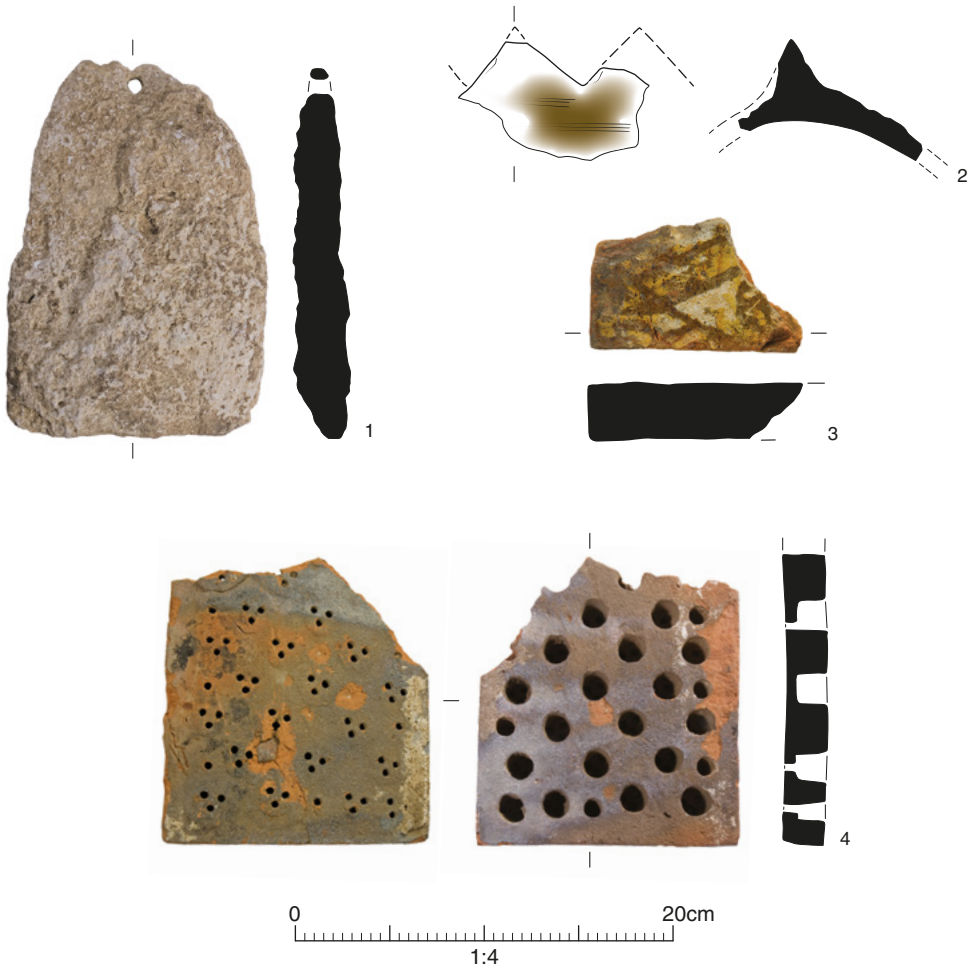


Figure 11 .17: Ceramic and stone tiles

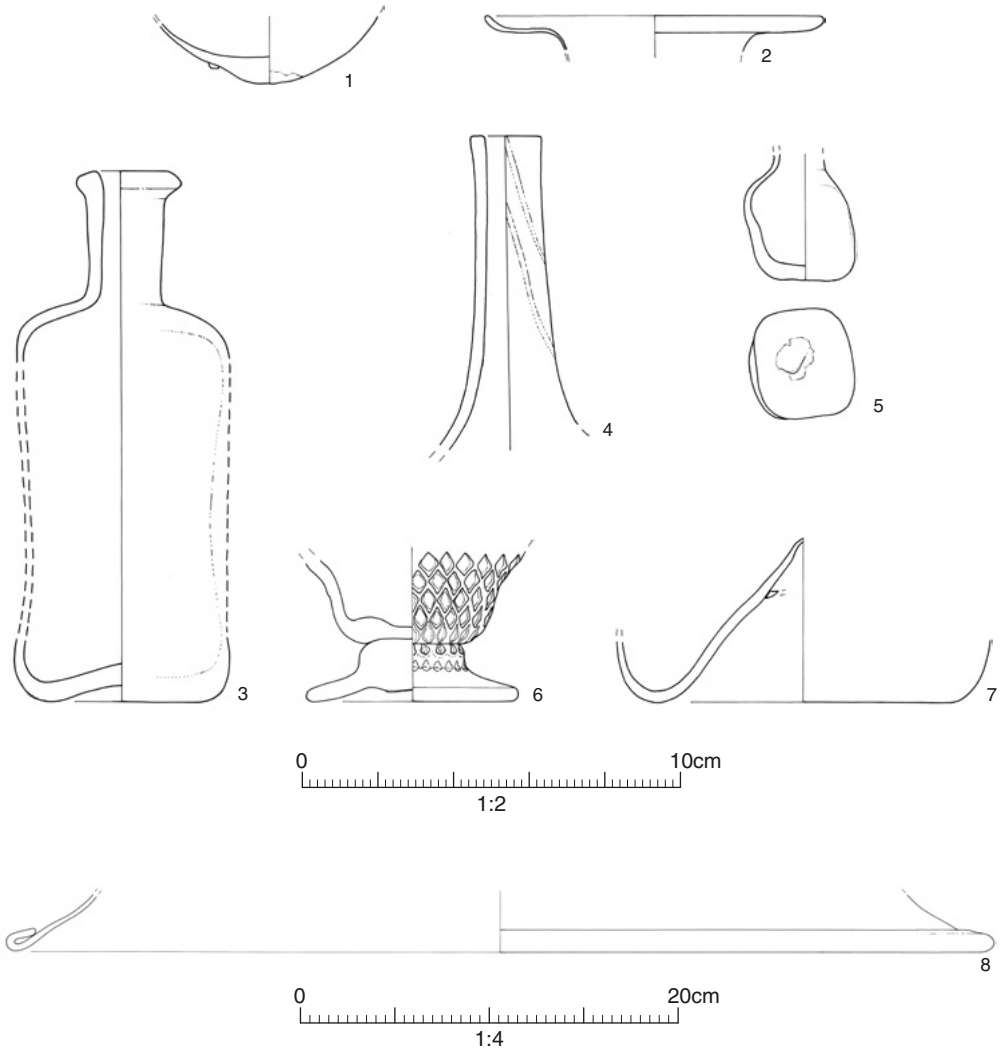


Figure 11.18: Vessel glass

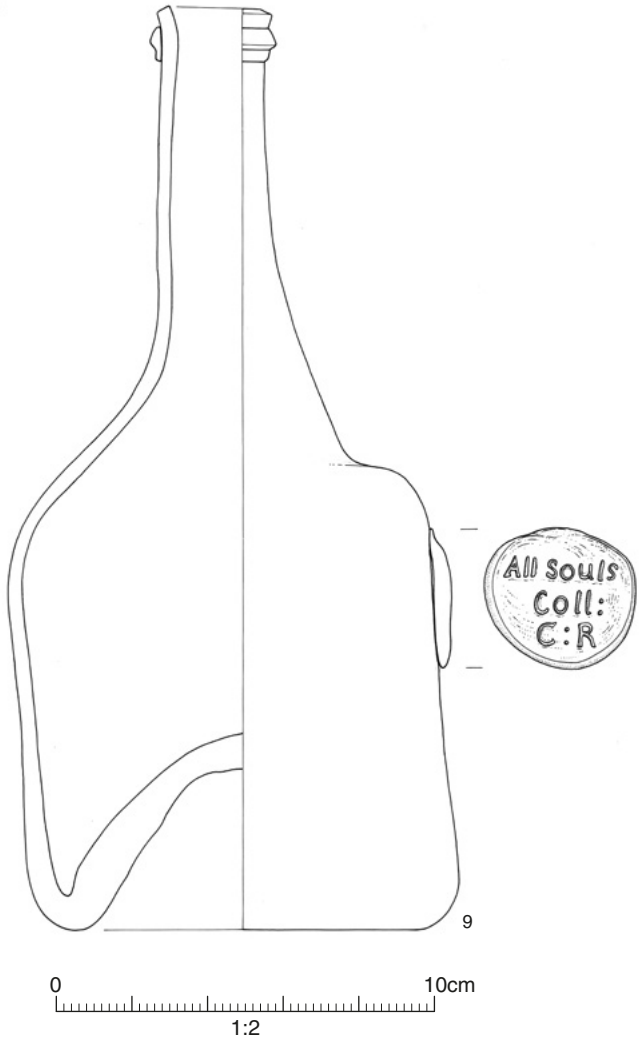


Figure 11.19: Mallet wine bottle with seal of All Souls College

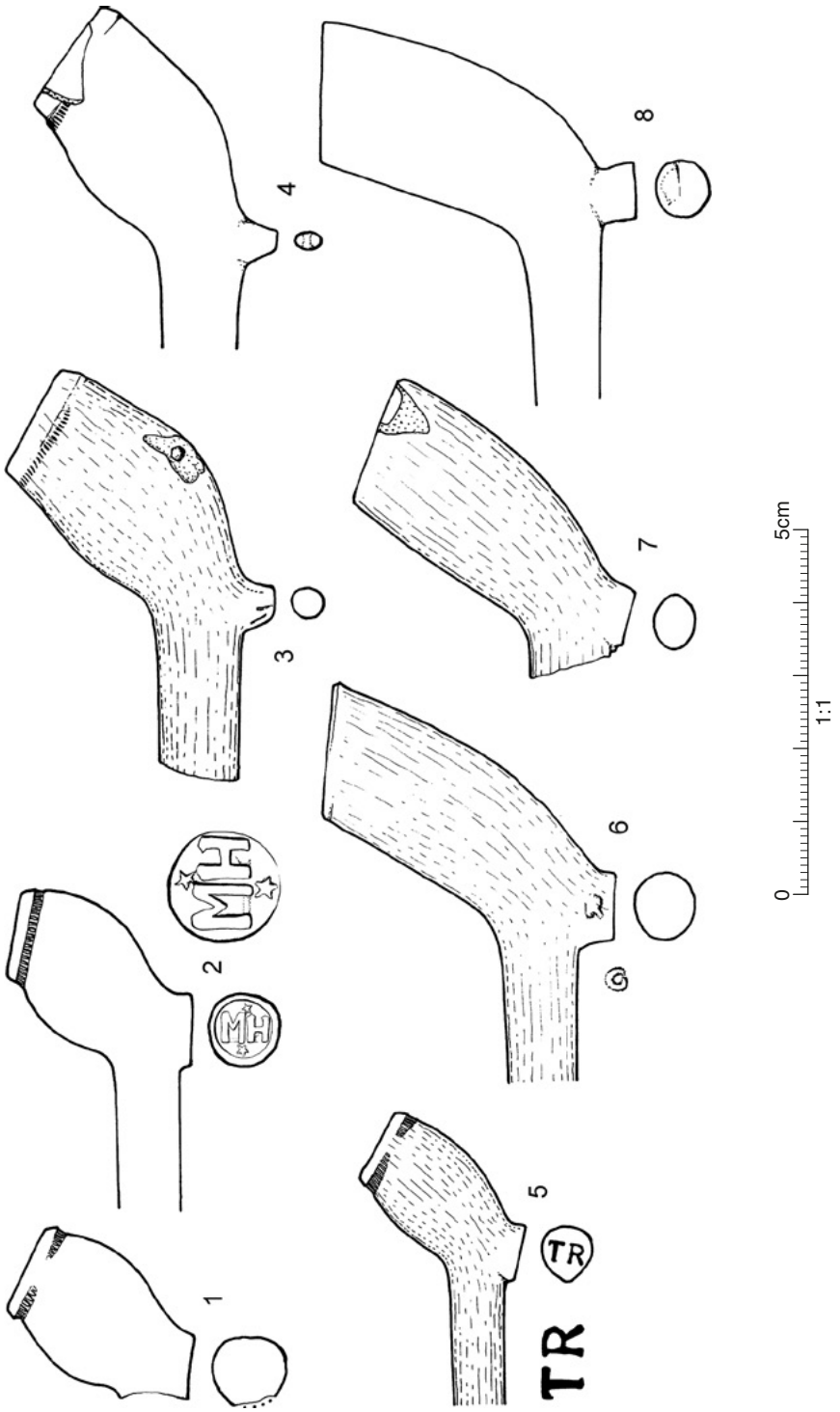


Figure 11 .20: Clay tobacco pipes, nos. 1–8. Relief marks are shown in outline and incuse marks in solid black. Burnished surfaces are indicated using a light broken line and damaged areas with a stippled finish. A complete outline is used if the entire fragment is shown, with a heavier line marking the profile and a lighter line the broken edges. Where a stem has been shortened to accommodate the page layout, the truncated end has been left open. Drawings by David A. Higgins

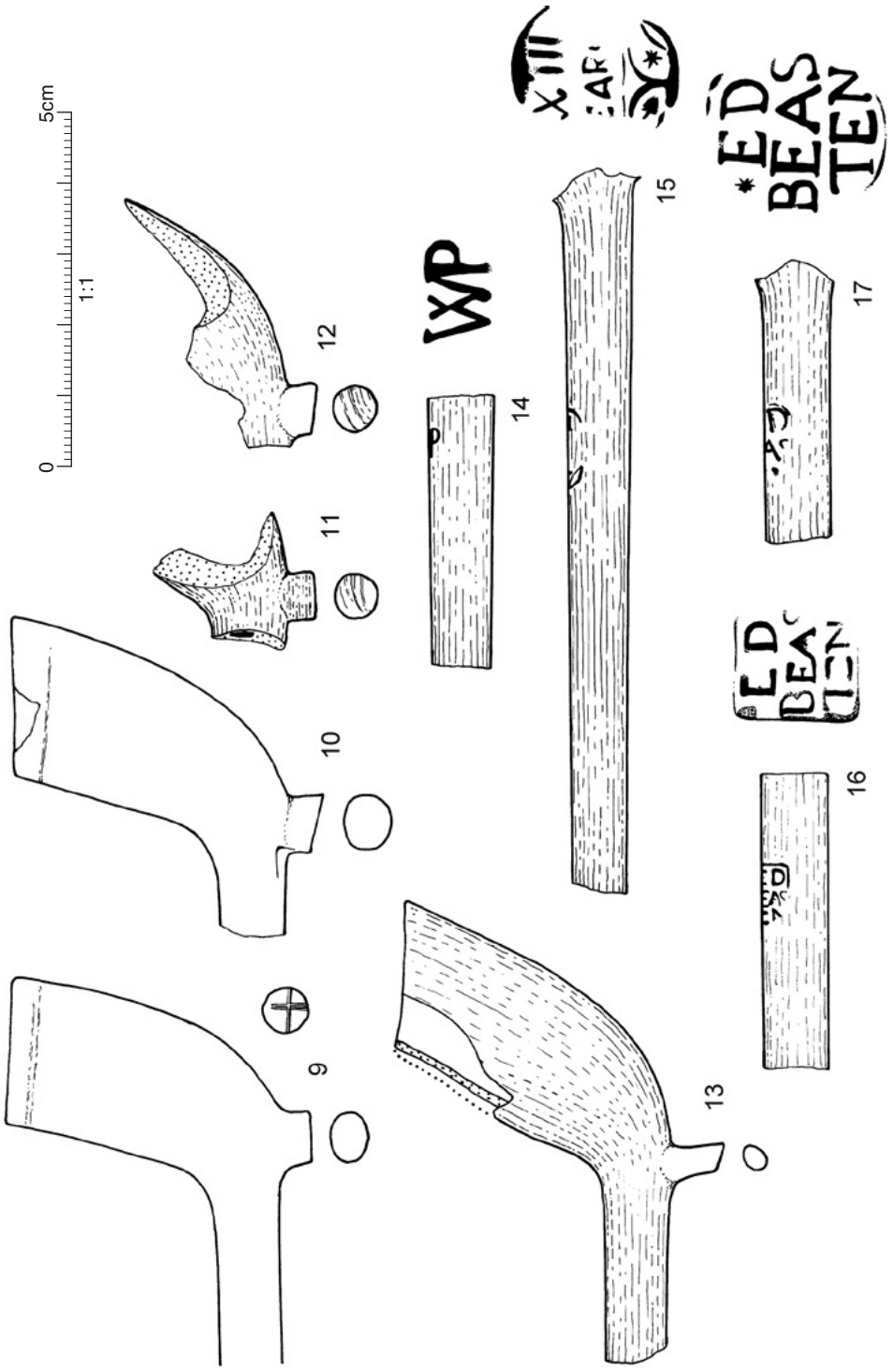


Figure 11 .21: Clay tobacco pipes, nos. 9–17. Drawings by David A. Higgins

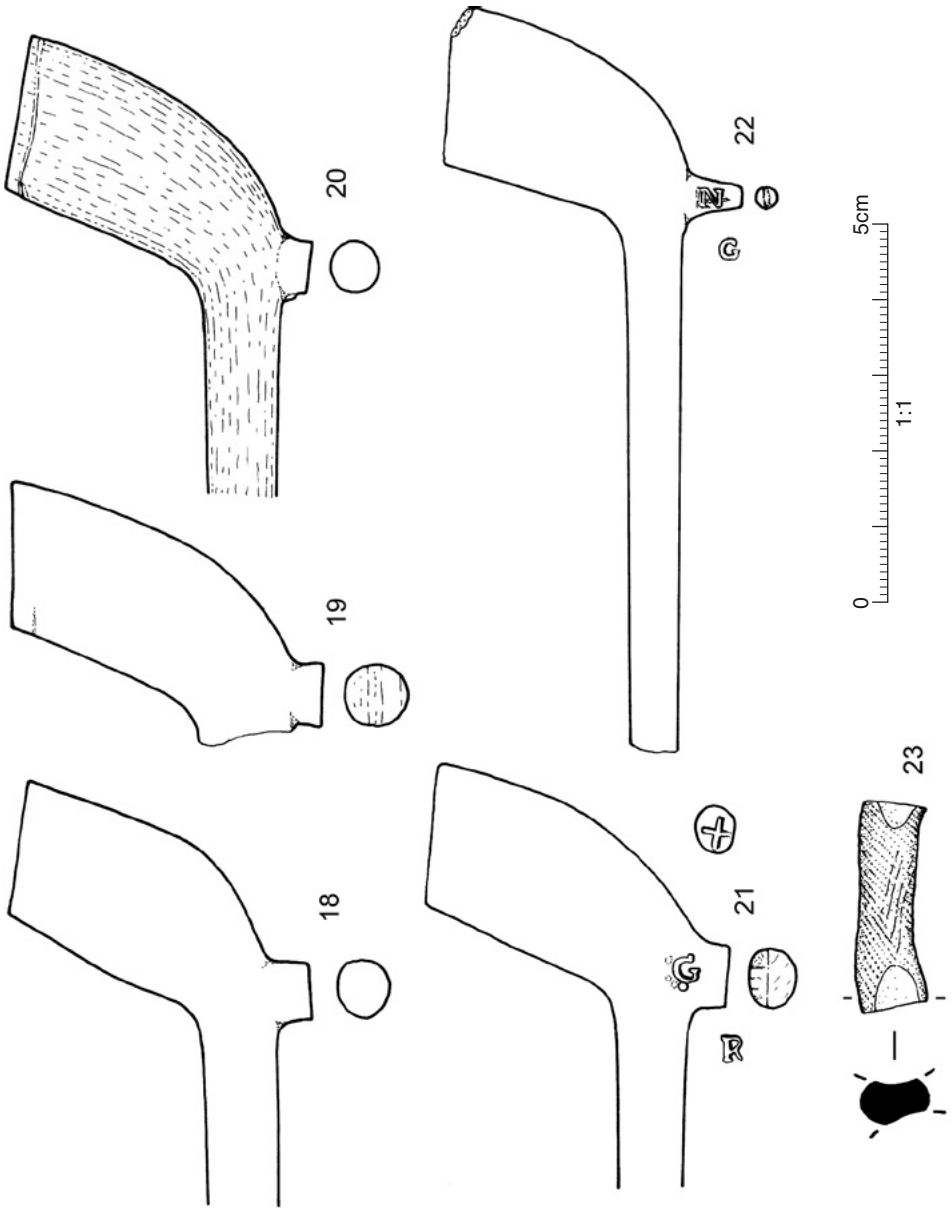


Figure 11 .22: Clay tobacco pipes and kiln furniture, nos. 18–23. Drawings by David A. Higgins

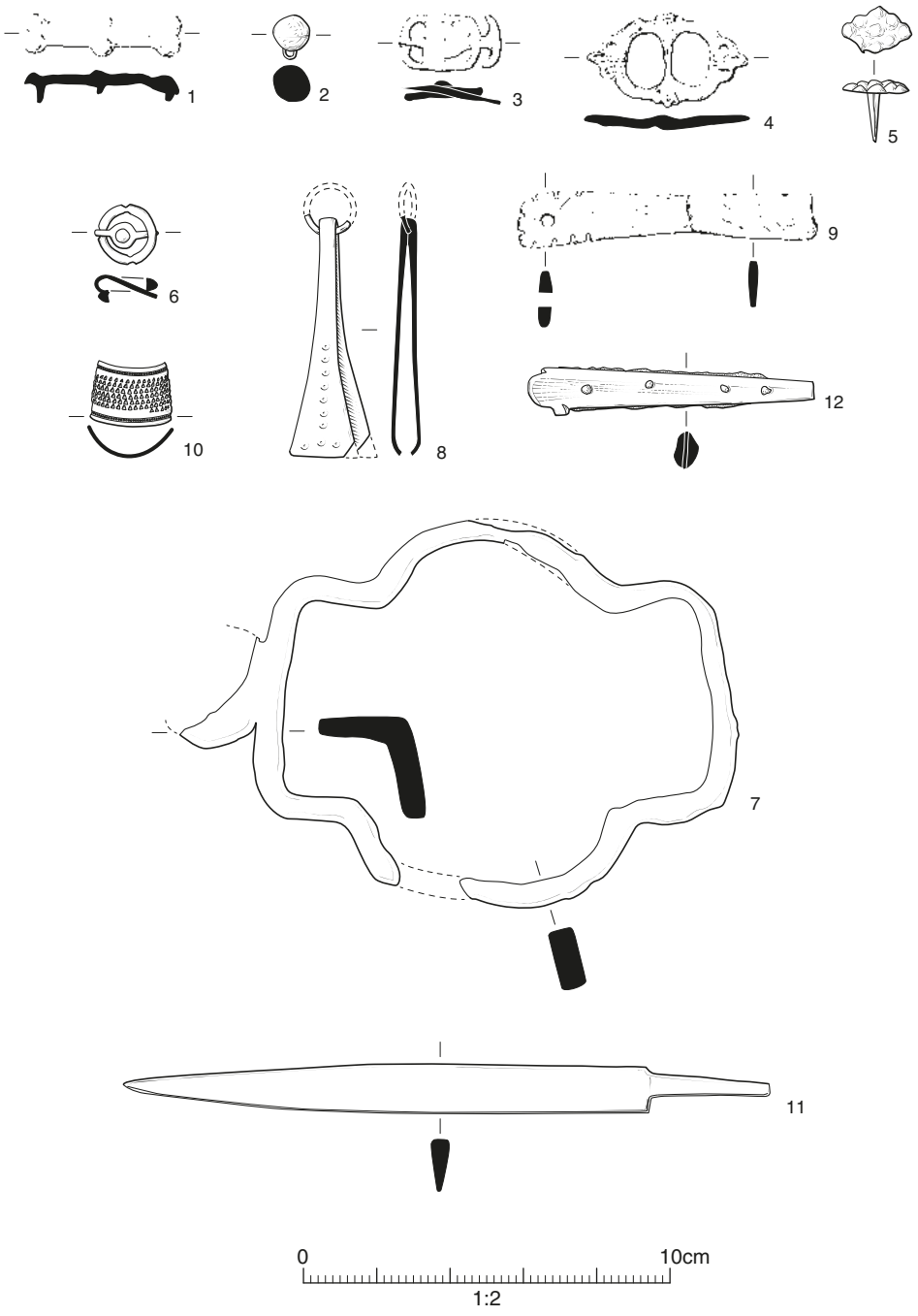


Figure 11.23: Metalwork and worked bone, nos. 1–12

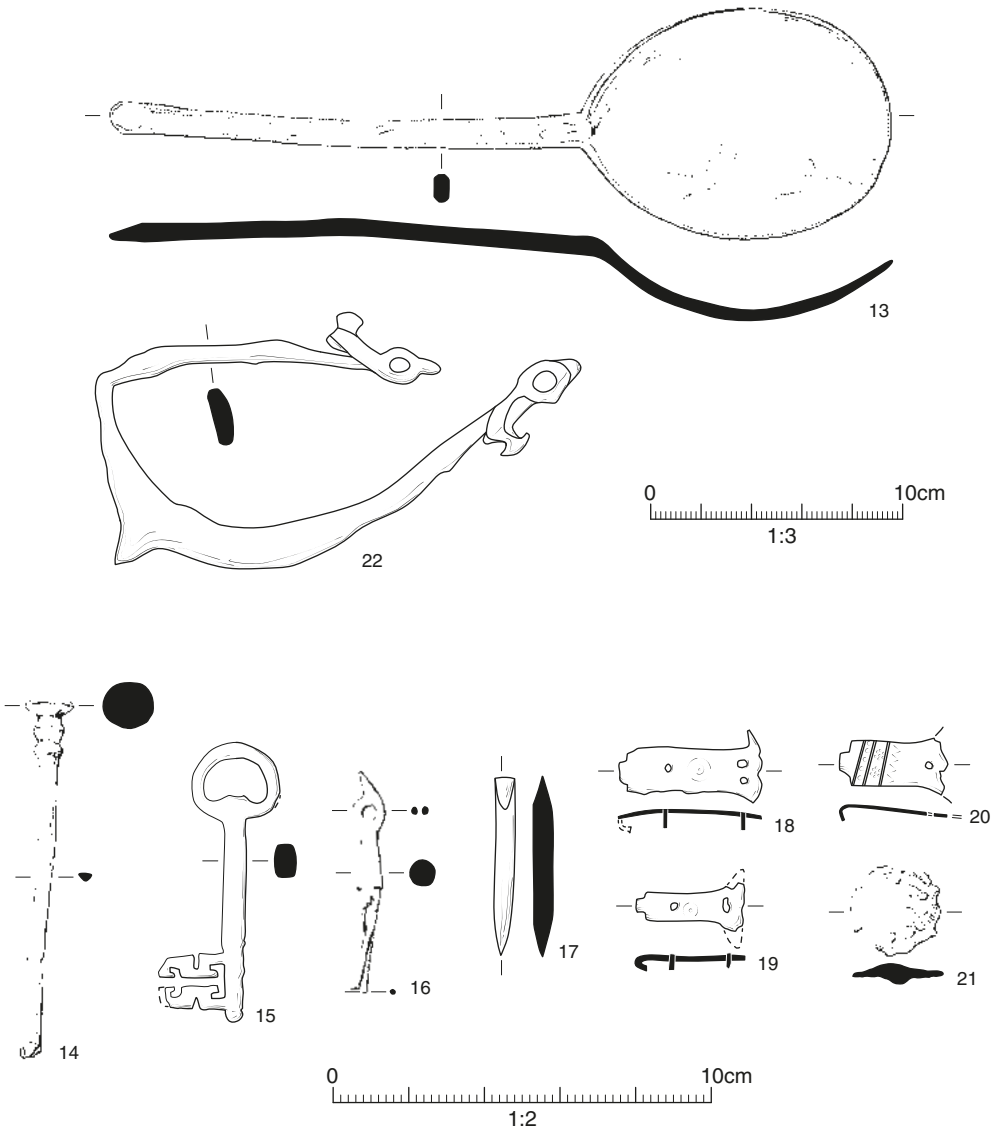


Figure 11.24: Metalwork, nos. 13–22

oxfordarchaeology

Head Office/Registered Office/ OA South

Janus House
Osney Mead
Oxford OX2 0ES

t: +44 (0) 1865 263 800
f: +44 (0) 1865 793 496
e: info@oxfordarchaeology.com
w: http://oxfordarchaeology.com

OA North

Mill 3
Moor Lane
Lancaster LA1 1QD

t: +44 (0) 1524 541 000
f: +44 (0) 1524 848 606
e: oanorth@oxfordarchaeology.com
w: http://oxfordarchaeology.com

OA East

15 Trafalgar Way
Bar Hill
Cambridgeshire
CB23 8SQ

t: +44 (0) 1223 850500
e: oaeast@oxfordarchaeology.com
w: http://oxfordarchaeology.com