

# ◆ The medieval hospital of St Nicholas, Lewes, East Sussex

EXCAVATIONS 1994

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*During the spring/summer of 1994 excavations were undertaken at the former site of the medieval hospital of St Nicholas, Lewes, East Sussex prior to redevelopment works. Two areas were excavated but little structural evidence for the hospital buildings was located. One area revealed part of the hospital cemetery and 103 burials were excavated. Also within this area were two large quarries thought to have been dug during a construction phase at the hospital, probably in the twelfth century. The second area contained yet another quarry, used for the disposal of large quantities of domestic refuse, particularly pottery, in the early thirteenth century. This area also contained the remains of a sill wall for a timber-framed building, which may have served the hospital.*

## THE FINDS

**THE POTTERY** by Luke Barber with Simon Stevens, incorporating comments by Mark Gardiner (Figs 7–10)

### Introduction

The excavations produced 17,218 sherds of pottery weighing just over 365 kg from 98 different contexts. This material spans the late eleventh/twelfth to the nineteenth centuries. All the pottery was divided into broad fabric groups based on a visual examination, using a hand-lens where necessary, of tempering, inclusions and manufacturing technique. All the fabric groups were numbered, those of the Transitional and post-medieval periods being prefixed with TR or PM respectively. Each fabric was subsequently quantified by sherd count and weight for each context. This information was recorded on pottery summary sheets which are housed with the archive. Quantification based on Estimated Vessel Equivalents (EVEs) was undertaken only for the larger assemblages in Quarry 7, Area B.

The main aim of the current report is to give an indication of the range of fabrics and forms present in order to facilitate dating and to give an idea of pottery usage at the site. The post-medieval pottery is not present in large quantities and, as a result, with the exception of some of the material in Contexts 52 and 54 (Area A), none has been described in any detail for the present report. The medieval pottery is present in much larger quantities, although, with the exception of the quarry in Area B, no large groups are present. Nonetheless the whole assemblage is of great interest in the study of local ceramics. Although large quantities of medieval pottery have previously been excavated in Lewes, these have been subjected to little detailed study and so the forms and fabrics are generally not well dated (Gardiner 1992). This is an unfortunate situation, particularly when one considers the importance of the town. The ceramic chronology of towns such as Winchelsea (Orton forthcoming) and areas such as the Adur valley (Gardiner 1990) are better established. The fabrics in these established chronologies, however, make up only a small percentage of assemblages from Lewes.

### The fabric groups

#### Medieval wares

#### Fabric 1

Abundant coarse angular multicoloured flint c. 1 mm across with occasional shell and rare very fine quartz sand. Hackly or laminar fracture with coarse surfaces. Colours usually range from dull brown to orange, frequently with grey cores. Recognizable forms consist of cooking pots. Decoration is limited to occasional incised lines and thumb cordons. An eleventh- to twelfth-century fabric.

Cat. No.: 21.

#### Fabric 2

Rare coarse angular multicoloured flint (1 mm), abundant finer angular flint <1 mm often with moderate shell and rare very fine sand quartz. Hackly fracture with medium coarse surface. Colours usually consist of various shades of dull brown orange, frequently with grey cores. Recognized forms include cooking pots, some with handles, and occasionally jugs. Decoration is limited to some incised lines, particularly on jugs, and thumb 'pie-crust' rims on cooking pots. A mid twelfth- to thirteenth-century fabric. Fabrics 3 to 7 are likely to be of a similar date.

Cat. Nos: 10, 24, 34, 36.

#### Fabric 3

Abundant coarse quartz sand, though finer than Fabric 5, with sparse to frequent shell and common fine multicoloured flint sand. Hackly fracture with rough surfaces. Colours as Fabric 2. Recognized forms consist of cooking pots. Decoration consists of some thumb impressions on the top of rims and a few 'pie-crust' forms.

Cat. Nos: 7, 8, 9, 12.

#### Fabric 4

Medium to coarse irregular multicoloured angular flint and medium quartz sand, and occasional chalk/shell to 1 mm. Hackly fracture with rough surfaces. Colours are as Fabric 2. Forms include cooking pots (some handled), bowls, skillets/frying pans (with tubular or solid handles) and jugs.

Decoration is limited but consists of occasional incised lines, stabbing, 'pie crust rims' and thumbed bases. A few vessels have a thin patchy green glaze.

*Cat Nos:* 15, 16, 18, 19, 22, 28, 29, 38.

#### Fabric 5

Medium to coarse sand, moderate coarse angular multicoloured flint (to 1 mm), rare to moderate medium shell. Hackly fracture with fairly sandy surfaces. This fabric is very similar to Fabric 3 and could easily be grouped with it. Colours are as Fabric 2. Forms include cooking pots (some with handles), bowls, skillets and jugs. A single curfew is also present. All the chimney pots from the site are in this fabric. Decoration is again rare but includes some stabbing, thumb impressions, particularly on the shoulder and 'pie-crust' rims. Although all vessels in Fabrics 1 to 7 appear to be hand-made and wheel-finished, those in this fabric show more signs of this in frequently having draw marks near the shoulder running obliquely across the pot's body.

*Cat Nos:* 2-6, 11, 13, 14, 17, 26, 27, 30-33, 35, 40-43, 46.

#### Fabric 6

Abundant medium sand, common flecks of shell and rare large (<2 mm) pieces of rounded chalk. The fabric has a hackly fracture and sandy surfaces. Colours range from light grey to orange brown, frequently with grey cores. Decoration consists of incised lines, stabbing and some 'pie-crust' rims. Forms include cooking pots, bowls/skillets and jugs.

*Cat Nos:* 1, 23, 44.

#### Fabric 7

Moderate medium sand with rare angular multicoloured flint inclusions (<2 mm) and rare to moderate rounded iron oxide inclusions (<3 mm). The fabric has a hackly fracture and sandy/rough surfaces. Colours range from grey to dull orange brown, with a grey core. Only one sherd was present in the assemblage. This was from a crude jug with stabbed rod handle.

#### Fabric 8

Sparse fine to medium sand with moderate rounded iron oxide/grog inclusions to c. 3 mm. The fabric has a rough fracture with smooth to slightly rough surfaces. Colours are usually a dull red often with grey cores. The only recognized forms consist of jugs with small stabbed strap handles. Some vessels have a patchy dull olive green glaze. Probably a thirteenth- to fourteenth-century fabric.

#### Fabric 9

Common white, occasionally multicoloured, sub-angular flint (<1 mm) with sparse to common chalk/shell flecks (<1 mm). The fabric has a rough break with smooth, but sometimes pitted, surfaces. Colours are usually a dull orange, usually with grey cores. Recognized forms include jugs, cooking pots and bowls. Decoration consists of a patchy dull green glaze on jugs, occasionally over incised lines. This fabric may be related to Fabrics 1-7. Some sherds, however, appear to be from the Ringmer industry.

*Cat No.:* 45.

#### Fabric 10

Abundant medium to coarse sand with sparse angular flint (white) inclusions to 5 mm.

Rough fracture with sandy surfaces. Colours are usually light grey throughout. The only recognised forms consist of jugs with a patchy dull green glaze, occasionally over incised line decoration.

#### Fabric 11

Moderate fine sand with some small grey sand inclusions <0.5 mm. This fabric has a smooth to concoidal fracture with slightly rough surfaces. Colours vary from light tan to cream throughout or light brown with grey cores. The only recognized forms consist of jugs. One vessel is decorated with applied vertical red clay strips, glazed brown on a thin light yellow green body glaze. It is probable this fabric is imported, although no parallels have been found.

#### Fabric 12

Abundant medium sand, angular translucent quartz and occasionally, very rare flecks of shell/chalk. The fabric has a hackly to rough break with sandy surfaces. Colours range from light brown to dull orange, often with grey cores. Most sherds appear to be from jugs although cooking pots are also present. Decoration includes incised lines and thumbed bases on jugs. The jugs are frequently patchily glazed dull green or pale orange. Some of the sherds in this group may be from Ringmer finewares.

*Cat. Nos:* 20, 25, 37, 39.

#### Fabric 13

Abundant fine sand with rare grog inclusions to c. 1 mm. The fabric has a smooth to rough fracture with fairly smooth surfaces. Throwing marks are common on the vessels in this fabric. Colours are usually orange throughout. Only jugs were recognized. These are frequently decorated with a good even, slightly mottled dark green glaze. Applied strips and pellets are also sometimes present. Some vessels in this fabric group are undoubtedly from Rye.

#### Fabric 14

Moderate very fine sand. Occasional very rare grog/iron oxide inclusions to 1 mm. Smooth break with smooth to slightly rough surfaces. Colours are usually a dull orange to red orange, occasionally with grey cores. The only recognized form are jugs with rod handles. Most vessels are decorated with a well-applied mottled green/olive green or green-brown glaze. Some have an internal white slip on the neck. Bases are usually thumbed and incised line, stabbing and occasionally rouletting decoration is present. This group is likely to be from the Rye industry although similar fine jugs were also produced at Ringmer (D. Gregory pers. comm.).

#### Fabric 15

Abundant medium sand with vary rare iron oxide/grog inclusion to 1 mm. This fabric has a slightly rough fracture with smooth to slightly rough surfaces. Colours consist of various shades of orange but some light grey examples are also present. Cores are occasional grey. No recognizable forms are present. All sherds are undecorated.

#### Fabric 16

Winchelsea Black-type ware (Orton forthcoming; Barton 1979). Some cooking pots and bowls are present in the current assemblage.

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Fabric 17

Fine white fabric with abundant very fine quartz sand and some grog to <1 mm. This is an imported fabric, probably of north French origin. Jugs represent the only forms present. These usually have a patchy green glaze or dull red slip painted decoration.

Fabric 18

Fine white powdery fabrics with no visible inclusions and a laminar to irregular break. Jugs are the only forms present. These are decorated with a light green, spotted with dark green, glaze. Saintonge ware.

*Transitional wares*TR1

Moderate to abundant very fine sand. Some sherds have very rare grog inclusions (<1 mm). Medium to high-fired with smooth to rough breaks and fine sandy surfaces. Colours consist of various shades of orange, sometime with grey cores. Forms include cooking pots/jars. Some have splashes of red brown glaze. A fifteenth- to early sixteenth-century fabric.

TR2

High-fired earthenware with rare fine sand inclusions. Colours consist of various shades of orange-brown, sometimes with grey cores. The only form recognized is a chafing dish. A mid fifteenth- to mid sixteenth-century fabric.

TR3

Hard-fired earthenware as TR2 but with reduced surfaces (dark grey). Details as TR2.

TR4

Reduced hard-fired sandy earthenware. Moderate medium sand. Some sherds have very rare iron oxide inclusions (>1 mm). Sherds have sharp breaks with rough surfaces. Colours are variable. Cores range from grey to maroon; inner surfaces are grey to dull orange and outer surfaces are various shades of grey. Forms include jugs and pitchers. A later fifteenth- to later sixteenth-century date is likely for this fabric.

TR5

Oxidized hard-fired sandy earthenware. As TR4 but with dull orange oxidized outer surfaces. Forms include jars/cooking pots and bunghole pitchers. Details as TR4.

TR6

Moderate to abundant fine sand with rare iron oxide inclusions to c. 1 mm. Sharp breaks with relatively smooth surfaces. Colours usually consist of grey cores, dull orange margins and mid-dark grey surfaces. Forms include jars/cooking pots, tripod pipkins and jugs. Decoration is rare but usually consists of white painted slip on exterior surfaces, sometimes under a patchy dull green glaze. A fifteenth- to mid sixteenth-century fabric.

TR7

Tudor Green-type ware. Very fine white fabric with sparse very fine sand. Thin-walled vessels with smooth break and surfaces. Only cups were present in the current assemblage. Most vessels have a good thick bright dark green glaze both internally and/or externally. This fabric is described by Pearce

and Vince (1988) and the dating considered by Holling (1977) and Moorhouse (1979).

*Post-medieval wares*PM1

Sussex ware (light red/brown glaze). Both this fabric and its variant PM2 have been described elsewhere (Manwaring Baines 1980a; 1980b). Various storage vessels, jars, chamber pots, bowls and dishes/plates and mugs are present in the assemblage. Most vessels are only glazed internally although some also have external glaze. Some of the large storage vessels have banded rouletted decoration on their exterior.

*Cat Nos:* 47–58.

PM2

Sussex ware variant (dark red/brown glaze). Details as PM1.

PM3

Slipped earthenware. Red earthenware with internal white slip, sometimes with iron staining/brown streaks, under a clear glaze. Forms usually consist of bowls. A late eighteenth- to nineteenth-century fabric.

*Cat. Nos:* 60, 61.

PM4

Staffordshire combed slipware.

PM5

Trailed slipware. A slightly sandy red earthenware with trailed white slip under clear glaze. The unslipped body glazes to red-brown. Bowls and dishes are present. A seventeenth- to mid eighteenth-century fabric.

*Cat:* 59.

PM6

Creamware.

PM7

Chinese porcelain (hand-painted).

PM8

Transfer-printed white earthenware.

PM9

Tin-glazed earthenware. Mainly plates and bowls decorated in blue, black and yellow.

PM10

White salt-glazed stoneware.

PM11

Westerwald stoneware. A single chamber pot is present.

PM12

Colonge/Frechen stoneware.

PM13

Brown salt-glaze English stoneware (1700–1900).

PM14

Borderware. Both yellow and green glazed examples are present.

Table 1. Area A, pottery quantification by fabric.

Fabric type	Number of sherds	Weight of sherds (g)
1	313	2719
2	241	2957
3	179	1653
4	2	12
5	37	501
12	13	165
13	1	5
14	3	12
TR1	42	349
TR2	34	217
TR3	2	13
TR4	31	275
TR5	11	182
TR6	14	178
PM1	83	6088
PM2	6	272
PM3	8	310
PM4	3	84
PM5	1	82
PM6	20	180
PM7	2	10
PM8	25	222
PM9	14	260
PM10	1	10
PM11	1	65
PM12	2	37
PM13	34	147
PM14	7	26
PM15	15	231
PM16	1	2
PM17	15	165
PM18	1	8
PM19	7	142
PM20	2	10
PM21	3	129
PM22	2	18
OTHERS	20	183
<b>TOTAL</b>	<b>1196</b>	<b>17,919</b>

**PM15**

Green-glazed earthenware. This fabric group ranges in date from the mid sixteenth century to the early eighteenth century.

**PM16 and 17**

PM17 is certainly a late eighteenth- to nineteenth-century Staffordshire yellow glazed earthenware fabric, sometimes with blue painted decoration. PM16 may be a coarser variant or may be a Borderware derivative.

**PM18**

Yellow-glazed earthenware. A slightly sandy off-white earthenware with internal yellow glaze speckled with brown iron-staining. Possibly a variant of fabric PM14.

**PM19**

Red/brown glazed earthenware. A diverse group consisting of all red/brown glazed earthenwares which do not fit into PM1 or 2. Most are likely to be the precursors to proper 'Sussex Ware'. The group spans the mid fifteenth to eighteenth centuries.

**PM20**

Staffordshire brown glazed earthenware. Fabric as P17 but with thick all-over brown glaze.

**PM21**

Green-glazed sandy earthenware with moderate to abundant black sand/iron oxide inclusions. A late sixteenth- to seventeenth-century fabric.

**PM22**

Unglazed earthenware.

**Discussion***The Pottery from Area A*

A total of 1196 sherds of pottery were recovered from Area A (Table 1). The majority of these are in Fabrics 1 and 2 and suggest an early date for activity in this area. Fabrics 3, 4, 5, 12, 13 and 14 are also present but in smaller quantities. They are likely to represent activity spanning the thirteenth to fourteenth centuries. Transitional wares dating from the fifteenth to sixteenth century are moderately represented, as are the later post-medieval fabrics. The lack of actual rubbish pits/middens in Area A is interesting, considering the rich deposits in Area B. The general sherd size of the medieval pottery from Area A is small and this would strongly suggest the material is a general scatter in the area rather than deliberate rubbish disposal. Having said this, however, the date range of the sherds covers both the use of the site as a hospital and subsequent occupation.

*The quarries*

The quarries produced very little pottery, most of which was in the form of small relatively abraded sherds. This is not surprising, considering the short period in which most of the redeposited chalk rubble fills are likely to have been deposited. Unfortunately none of the lowest fills contained pottery. The earliest fill to produce pottery from Quarry 75 was Context 397. The 11 sherds recovered from this context were of Fabric 1 (6 sherds) and Fabric 2 (5 sherds). The same fabrics, along with some Fabric 3, are present in Context 394. Context 392 contained similar sherds, but also included intrusive seventeenth-century sherds. It is probable that post-medieval reworking or features cut into the quarry fill were not isolated during excavation and are the source of this late material.

A similar situation is in evidence in Quarry 443, where only two sherds were recovered from the entire quarry fill (Context 441). These are both of Fabric 1. Slightly more material is present from Quarry/Cut 433 (Contexts 434 and 435). Both these contexts produced Fabrics 1, 2 and 3. Although Fabric 1 is dominant in both contexts, Fabric 2 has increased its percentage in 435, suggesting a chronological development.

With the absence of diagnostic rim forms it is difficult to date the quarry deposits with certainty based on fabric alone. The presence of Fabrics 1 and 2 in particular, however, would indicate an early date falling somewhere between the late eleventh and twelfth centuries. Fabric 2 may be slightly later in date, but is likely to span a similar period. It is interesting to note the absence of the later fabric, Fabric 5, which is so common in the quarry pit in Area B. It is impossible to be certain which of the two quarries (75 and 443) was cut and backfilled first, based on the ceramic evidence. Although 443 contained only F1 sherds, suggesting an earlier date, too little material is present to draw firm conclusions. It is quite possible both were infilled at the same time, although one is more likely to have been used as a depository for waste from the other.

#### Pottery from the burials

The majority of burials were located in the soil deposited over the partially infilled quarries. Although only representing one stratigraphic unit, it was excavated in spits (Contexts 76, 328 and 376) and the pottery bagged separately. The nature of this deposit was such that, despite careful searching, no grave cuts could be discerned and as a result pottery was bagged separately from the immediate vicinity of each burial. The assemblage recovered from these homogeneous deposits is therefore problematic, as it is virtually impossible to be certain of the degree of residuality and intrusiveness brought about by grave-digging and later activity. As such the ceramics cannot be used to date individual burials in this area with any certainty. However, the assemblage from this deposit may be tentatively viewed as reflecting the general burial trend and as such is worth considering briefly.

The majority of the sherds are of twelfth- to early thirteenth- century date and generally reflect the fabrics located in the underlying quarry fills. Undoubtedly some of this material is from pre-cemetery deposits, but the quantity present suggests that it is not derived solely from this source and that material was being incorporated into this deposit during burial activity. On this assumption, the main period of burials is likely to have been in the twelfth to thirteenth centuries. Continued activity in the fourteenth and fifteenth centuries is suggested by further sherds, although they are far less numerous than the earlier material. This may reflect less burial in this area during this period or, more probably, represent the lack of pottery present as a general scatter in the possible vicinity. A number of sherds of post-medieval pottery are also present in these deposits. Some sixteenth-century pieces may relate to the latest burials on the site, but this cannot be ascertained. These sherds are more noticeable in the eastern part of the cemetery, particularly around Skeletons 183, 186 and maybe 355 and 356. However, some of these burials are in an area of later disturbance. Most of the post-medieval ceramics, however, are of a much later date and relate to the former terrace of cottages.

Unfortunately many of the fills of discrete graves cut into the chalk did not produce pottery. These are obviously far more likely to produce a better indication of burial date, as intrusive material should be less. Having said this, intrusive material of later sixteenth- to seventeenth-century date was present in the graves associated with Skeletons 355, 356 and 265. The degree of residuality, however, cannot be assessed with certainty. Of the discrete graves, six produced small quantities of pottery. These are as follows: Skeleton 197

Table 2. Area B, pottery quantification by fabric.

Fabric type	Number of sherds	Weight of sherds (g)
1	98	2257
2	80	1203
3	43	1669
4	7123	150,029
5	6901	157,852
6	82	2114
7	1	98
8	4	158
9	277	5995
10	11	187
11	5	150
12	706	15,715
13	7	53
14	72	902
15	40	984
16	2	106
17	7	179
18	2	73
TR1	146	1751
TR2	79	1230
TR3	63	852
TR4	99	1293
TR5	53	1232
TR6	27	439
TR7	14	53
PM1	18	205
PM2	3	30
PM4	1	16
PM5	2	20
PM8	2	16
PM9	7	136
PM10	2	13
PM11	1	3
PM12	1	8
PM13	6	50
PM14	17	189
PM15	9	132
PM16	1	10
PM17	2	20
PM19	7	128
PM21	1	8
<b>TOTAL</b>	<b>16,022</b>	<b>347,458</b>

(thirteenth century), 265 (early thirteenth century), 268 (early thirteenth century), 283 (mid thirteenth to mid fourteenth century), 362 (mid twelfth to mid thirteenth century) and 355/356 (thirteenth to fourteenth century).

Pottery from Contexts 52 and 54

Contexts 52 and 54 were layers/fills of an apparent cut close to the northeast corner of Area A. These deposits were noted during the evaluation but were removed by machine during the main excavation in order to reach the underlying medieval deposits. However, during their removal pottery was collected and this resulted in a small but important group of late post-medieval ceramics. The date of the group appears to span the end of the eighteenth century to the mid nineteenth century, and as such is probably derived from the terrace of cottages which stood on the site at this time. The vast majority of this assemblage consists of Sussex Ware bowls, jars and storage vessels. Although Sussex Ware has been the subject of detailed study (Manwaring Baines 1980a; 1980b) this has not generally been concentrated on the utilitarian vessels. For this reason a number of vessels from this group have been illustrated in the catalogue. Other fabrics present include residual German stonewares as well as slipwares and small quantities of transfer-printed china. A number of fragments from a tin-glazed earthenware bowl are probably from an old vessel still in use at the end of the eighteenth century. Full details of this group are housed with the archive.

The pottery from Area B

Area B produced the largest assemblage of pottery (16,022 sherds weighing just over 347 kg; Table 2). The majority of this was from the quarry (see below). The remaining assemblage consists of a mixture of medieval and post-medieval sherds, in a number of different fabrics, spanning the twelfth to nineteenth centuries. No large groups are present in this assemblage, but the layers sealing the southern end of the quarry produced 565 sherds (Contexts 18 and 19). These groups contain much residual medieval material as well as transitional wares dating to between the mid fifteenth and mid sixteenth centuries. A small assemblage dating to the seventeenth century was recovered from the infilled cellar (Context 14).

The pottery from the quarry

The fills of Quarry 7 produced a substantial assemblage of pottery (Table 3). This was subjected to a full quantification by sherd count, weight and estimated vessel equivalent (EVE) by fabric and form. Although cooking pots and jugs were generally easily identifiable from rim sherds, it proved impossible to separate out the bowls/dishes from skillets unless traces of a handle were evident. For this reason some skillets, which are known to exist in the assemblage from handles, are likely to be present under the bowl form category. Full details are housed with the archive and only the quantifications for the two largest groups have been included here (Tables 4 and 5).

The lowest fills of Quarry 7 (Contexts 41, 33 and 28) did not produce any pottery. The first fills to do so were Contexts 29, 32 and 43. These appear to have been deposited at the same time and produced an assemblage dominated by Fabrics 4 and 5 (91 and 126 sherds respectively). These, where discernible, are mainly from plain cooking pots (Cat. no. 27) although handled cooking pots, shallow bowls and skillets are also present (nos 28–30). The only other fabrics in this combined assemblage are Fabrics 2, 8 and 9 (2, 8 and 1 sherds respectively), most of which appear to be from jugs (Cat. no. 24). The date of this group is likely to span the late twelfth or early thirteenth century and is similar in make-up to those stratigraphically above.

Context 10 produced the largest group of pottery (Table 4). Although a number of tip lines and discrete contexts were noted within Context 10 (Context 24, 25, 26, 27 and 31), they are all thought to be of the same general deposition event and this is borne out by the ceramic evidence. Similarly to the earlier deposits, Context 10 is dominated by Fabrics 4 and 5. These are almost exclusively undecorated cooking pots with either plain or flanged out-turned rims (Cat. nos 2–4, 6 and 11). Some decoration is present, although this is rare, and normally consists of ‘pie-crust’ rims (nos 5 and 13),

Table 3. Area B, Quarry 7: pottery quantification (all fills).

Fabric type	Number of sherds	Weight of sherds (g)	EVES Cooking pots	EVES Jugs	EVES Bowls	EVES Storage vessels
<b>1</b>	37	943	-	-	-	-
<b>2</b>	38	843	-	-	-	-
<b>3</b>	36	1080	-	-	-	-
<b>4</b>	7037	148,878	44.17	7.91	0.10	25
<b>5</b>	6755	155,237	53.66	0.82	0.57	-
<b>6</b>	82	2114	0.88	-	-	-
<b>8</b>	1	87	-	-	-	-
<b>9</b>	265	5735	1.52	0.30	0.30	-
<b>10</b>	11	187	-	-	-	-
<b>12</b>	663	14,856	1.99	0.40	0.20	-
<b>13</b>	7	53	-	-	-	-
<b>14</b>	19	233	-	-	-	-
<b>17</b>	4	132	-	-	-	-
<b>18</b>	1	63	-	-	-	-
<b>TR5</b>	1	12	-	-	-	-
<b>TR6</b>	14	244	0.12	-	-	-
<b>Total</b>	<b>14,971</b>	<b>330,697</b>	<b>102.34</b>	<b>9.43</b>	<b>1.17</b>	<b>25%</b>

and simple finger-impressions on the rim (no. 7) or around the shoulder (no. 6). Other decoration on these fabric types is usually limited to incised wavy line decoration (no. 22). Similar vessels have been noted at Lewes Castle (Gardiner 1992). Handled cooking pots/storage vessels and skillets are also present in these fabrics from Context 10, as well as a single curfew. However, these forms are never present in large quantities (nos. 14, 15–17 and 46). Jugs are rare in Context 10. All those present are in Fabric 4 and all are unglazed (nos 18–19).

Fabrics 1 to 3 are present in far smaller quantities (Table 4). No jugs are present in these fabrics, the entire assemblage in Context 10 being made up of cooking pots. These generally have simple flaring rims of twelfth-century type (nos 9 and 10), although Fabric 4/5 rims can be of a similar form (no. 11). More developed rims are also present (nos 8 and 12) in these earlier fabrics. Decoration is rare, and is similar to that of Fabrics 4 and 5. Applied thumbed strips are also present (no. 21).

Other fabrics from Context 10 include 6, 9, 12 and 14. These are never present in large quantities but where discernible they appear to be from jugs, many of which are glazed (no. 20). The source of some of these is likely to be the Ringmer and Rye kilns. A few skillets/bowls are present in Fabric 6 (no. 23). A late twelfth- to early thirteenth-century date is probable for this context.

Context 8 contains a similar range of fabrics and forms to those of Context 10. The only exception to this being a heavy strap handle in Fabric 6 (no. 1). Conjoining sherds between Context 8 and 10 indicate that both were deposited together.

The southern side of the quarry contained a different set of contexts. Although stratigraphically separate, based on ceramic grounds, these are likely to have been deposited at a similar date to Context 10 (this suggestion is reinforced by the presence of conjoining sherds between Contexts 10 and 30). The lowest of these was Context 34. This produced another large assemblage in similar fabrics to those from Context 10 (Table 5).

The dominant pottery in Context 34 are cooking pots in Fabrics are 4 and 5. The rim forms of these is similar to those from Context 10, but wide flaring rims are more common (nos 31–33 and 35). Similar rims are present in Fabric 2 (no. 36), some of which are of 'pie-crust' type (no. 34). Shallow bowls, some of which may be undiagnostic skillets sherds, are present in both fabrics 4 and 5 (nos 40–41). Jugs in these fabrics are rare (nos 42–43).

Other fabrics include several sherds of cooking pots in Fabric 12 (nos 37 and 39) as well as sparsely glazed jugs in Fabrics 6 and 9 (nos 44–45). Two sherds of Saintonge-type ware (Fabric 17) are present, along with a little intrusive transitional pottery. Although the flaring rims and shallow bowls suggest a slightly earlier date for Context 34 than Context 10, the presence of other similar rim forms along with the similar fabric make-up of the assemblage would suggest they were actually deposited at a similar date.

Context 30 produced another similar assemblage to that of Context 34, but better quality sandy jugs (Fabric 12) appear slightly more common (no. 25), suggesting a slightly later date. This is also suggested by the associated metalwork. However, the presence of some transitional sherds along with its stratigraphic position in relationship to Context 19 make the degree of intrusive material difficult to ascertain. A mid thirteenth- to early fourteenth-century deposition date is likely.

### Conclusions

The lack of a securely dated medieval ceramic sequence from Lewes poses problems when trying to define precise dates from excavated assemblages within the town. This problem is emphasised further by the long periods during which certain fabrics and forms were in use. As a result, close dating is difficult to achieve with certainty at present. This situation has posed problems with the medieval assemblage from the current site, and a combination of fabric and form criteria has

Table 4. Area B, Context 10: pottery quantification.

Fabric type	Number of sherds	Weight of sherds (g)	EVES Cooking pots	EVES Jugs
1	13	372	-	-
2	18	414	-	-
3	12	362	-	-
4	1841	41,356	9.88	2.23
5	1334	28,137	8.67	-
6	26	698	0.84	-
9	33	1043	0.76	-
11	5	150	-	-
12	197	5523	-	-
14	4	65	-	-
<b>Total</b>	<b>3483</b>	<b>78,120</b>	<b>20.15</b>	<b>2.23</b>

Table 5. Area B, Context 34: pottery quantification.

Fabric type	Number of sherds	Weight of sherds (g)	EVES Cooking pots	EVES Jugs	EVES Bowls
1	3	40	-	-	-
3	6	178	-	-	-
4	792	16,234	7.86	-	-
5	986	25,014	9.50	0.20	0.37
6	4	80	-	-	-
9	57	1415	-	-	0.30
12	56	896	0.60	-	0.20
17	2	66	-	-	-
TR6	3	79	-	-	-
<b>Total</b>	<b>1909</b>	<b>44,002</b>	<b>17.42</b>	<b>0.20</b>	<b>0.87</b>

been used to estimate the most likely date range for contexts, based on current knowledge. It is probable that future work on the town's medieval pottery will refine this dating.

The bulk of the pottery from the site is of twelfth- to early thirteenth-century date. This date range cannot be based on the fabrics alone. For example, Fabric 1 could easily start as early as the eleventh century, whereas Fabrics 4 and 5 could be in use as late as the early fourteenth century. Other criteria such as the presence, or indeed absence, of certain forms and fabrics have had to be taken into account during dating. The presence of Saxo-Norman traits such as 'pie-crust' rims and shallow bowls as well as small quantities of crude unglazed jugs is the best indicator of date. However, most of the rim forms are of thirteenth-century type, and it is probable that the earlier pieces are the last survival of the Saxo-Norman traditions before the full development of the ceramics of the later medieval period. Exactly how far these lasted into the thirteenth century is difficult to say, particularly considering the function of the site.

The later medieval, transitional and post-medieval assemblages are easier to date, as the fabrics have a wider geographical distribution and dated parallels can be found from other sites. Later thirteenth- to fifteenth-century pottery is present in small quantities when compared to the earlier material. This cannot be seen to be representative of the hospital's usage however, as later middens/rubbish pits may lie outside the excavated areas.

As might be expected, the vast majority of the medieval pottery from the site is of local origin. Winchelsea Black-type ware (Fabric 16) and Rye products are present only in small quantities. Imported pottery is also not well represented.

Fabrics 1 to 7 show great similarities in tempering agent and technology, and it is quite probable they are from the same production area, even if spread over a period of time. Some may have been produced at the Abbots Wood kilns near Upper Dicker (Barton 1979, 182) while others could be from Ringmer. The kilns at Ringmer were producing pottery from at least the twelfth to sixteenth centuries (Hadfield 1981, 105; Bleach 1982, 47). Although some of the rim forms at Ringmer are similar to those of Fabrics 2–7 (Hadfield 1981, 95, Form 4), the occurrence of shell in these fabrics suggests Ringmer may not be the source of this material. This is certainly true of the recently excavated thirteenth-century kiln at Ringmer (D. Gregory pers. comm.). It is possible that as yet undiscovered kilns of the Ringmer industry were producing wares in these fabrics, but at present this seems unlikely. Another production source closer to Lewes, with easy access to flint grit and shell tempering agents, is probable. The large percentage that these wares make up suggests the possibility that the hospital was supplied directly from the manufacturer.

The glazed jugs from the site are in the main Ringmer or Rye products. The finer Ringmer jugs from the recently excavated kiln are of a high standard (D. Gregory pers. comm.) and in many instances have similarities to vessels produced at Rye. The distinction between the two sources may be problematic without diagnostic sherds. No sherds definitely attributable to the kilns at Marchants Farm, Streat, dated by the excavator to the late thirteenth to early fourteenth century (excavations unpublished) were discovered. This is probably because most of the assemblage from the hospital site predates this kiln's production period.

The pottery of foreign origin forms a very small part of the medieval assemblage. The imported finds therefore reflect

the pattern typically found in Sussex, where imported pottery seems not to have circulated in any quantity far beyond its port of entry (Freke 1978, 212; Orton forthcoming). The imported medieval wares consist of a few pieces of North French and Saintonge-type green glazed wares (Hurst 1980, 121).

The stratified assemblage within Quarry 7 is dominated by cooking pots. The remaining forms include handled cooking pots, storage vessels, skillets and bowls. Jugs are present only in small quantities and most of these are of crude unglazed types. This would suggest that the majority of this material is derived from kitchen refuse, with few tablewares being present. However, the relatively small quantity of jug sherds present may be the result of the early date of the assemblage, with jugs becoming far more numerous during the thirteenth century. Alternatively, the utilitarian nature of this assemblage may be postulated as being representative of the specialised role of the site. This suggestion should be treated with caution, however, as a similar absence of finewares was noted at Lewes Castle, which was obviously a prestigious residence (Gardiner 1992). One point of particular interest is the total dominance of Fabrics 4 and 5 in the quarry assemblage. This could represent the bulk-buying of ceramics from the producer to equip the hospital. Why so much of this was discarded in such a relatively short period remains uncertain.

### Catalogue (Figs 7–10)

#### Context 8

1. Heavy strap handle with thumbled sides and three rows of slashing/stabbing. Fabric 6.

#### Context 10

2. Cooking pot with everted flanged rim and oblique fingering/thumbing wipes on body. Fabric 5.
3. Cooking pot with thick everted flanged rim and oblique fingering/thumbing wipes on body. Fabric 5.
4. Necked cooking pot with thickened everted flanged rim and fingering/thumbing wipes on body. Fabric 5.
5. Cooking pot with 'pie-crust' rim with slight flange. Fabric 5.
6. Cooking pot with thickened everted rim and finger impressed decoration around shoulder. Fabric 5. Similar to an example from Lewes Castle (Gardiner 1992, 86, no. 3).
7. Cooking pot with thickened everted rim. Finger impressed decoration on rim. Fabric 3.
8. Cooking pot with beaded everted rim and fingering/thumbing wipes on body. Fabric 3.
9. Necked cooking pot with simple everted rim. Fabric 3.
10. Cooking pot with simple everted rim. Fabric 2.
11. Cooking pot with slightly thickened everted rim and fingering/thumbing wipes on body. Fabric 5.
12. Necked cooking pot with thickened flanged horizontal rim. Fabric 3.
13. Deep bowl or pipkin with thickened everted 'pie-crust' rim. Fabric 5.
14. Pipkin/handled cooking pot with everted flanged rim and remains of hollowed tubular handle. Fabric 5. A similar example has been found at Lewes station (Barton 1979, 54, no. 6).
15. Skillet with solid triangular stabbed handle and thumbled base. Patchy internal olive green glaze. Fabric 4.
16. Tubular skillet handle with stabbing around rim. Fabric 4.
17. Handled cooking pot or storage vessel with thumbing on handle. Fabric 5.

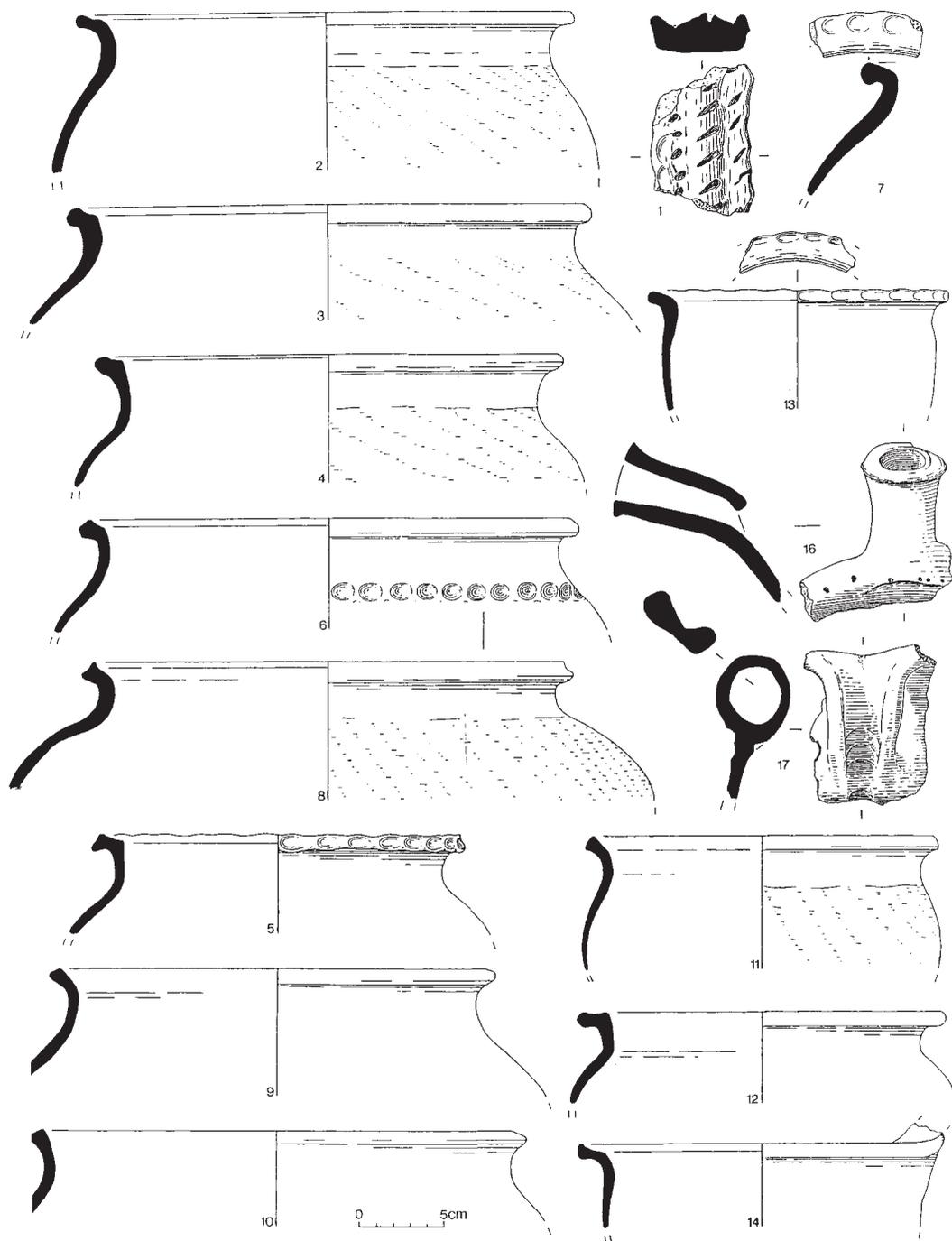


Fig. 7. Pottery (Nos 1-14).

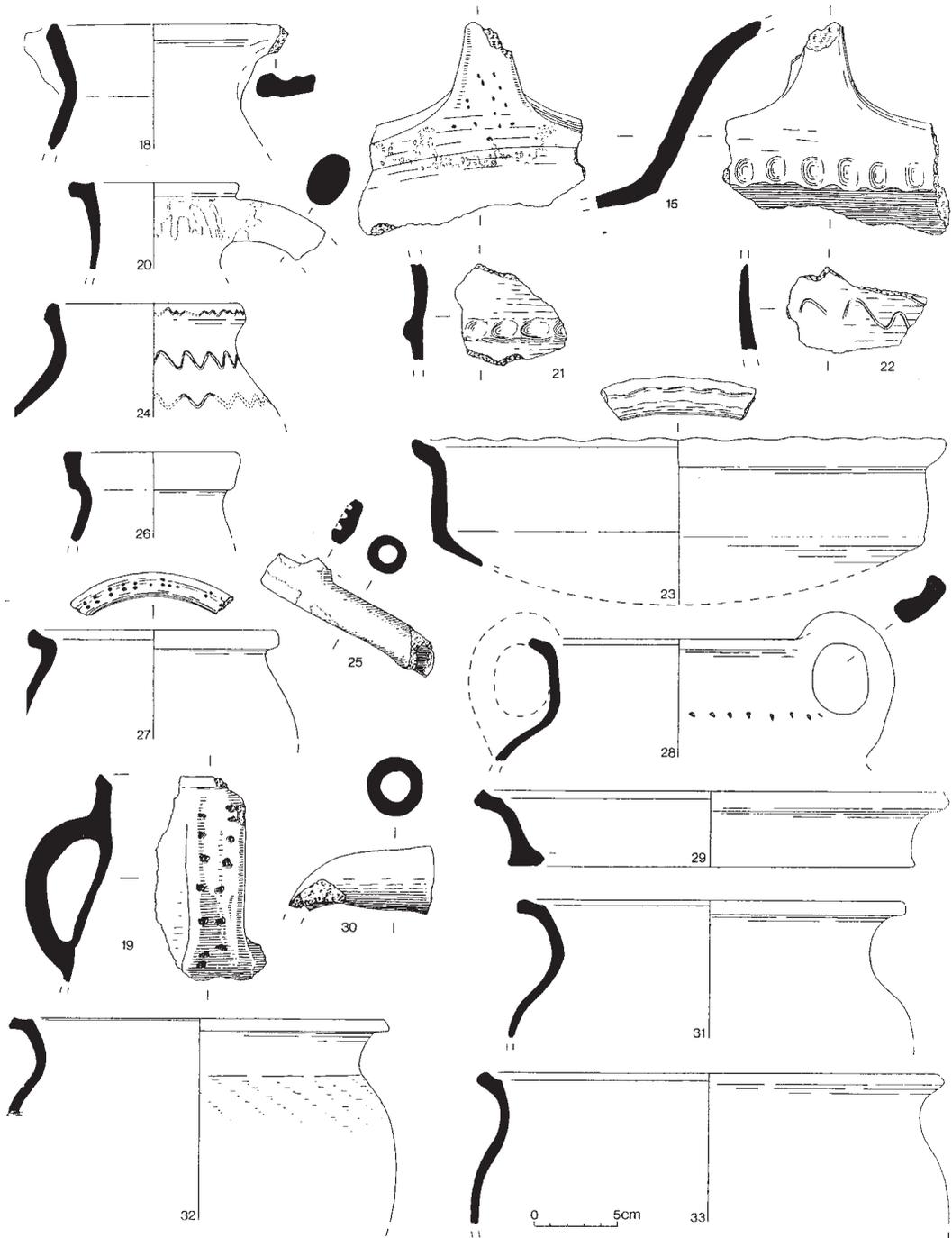


Fig. 8. Pottery (Nos 15-33).

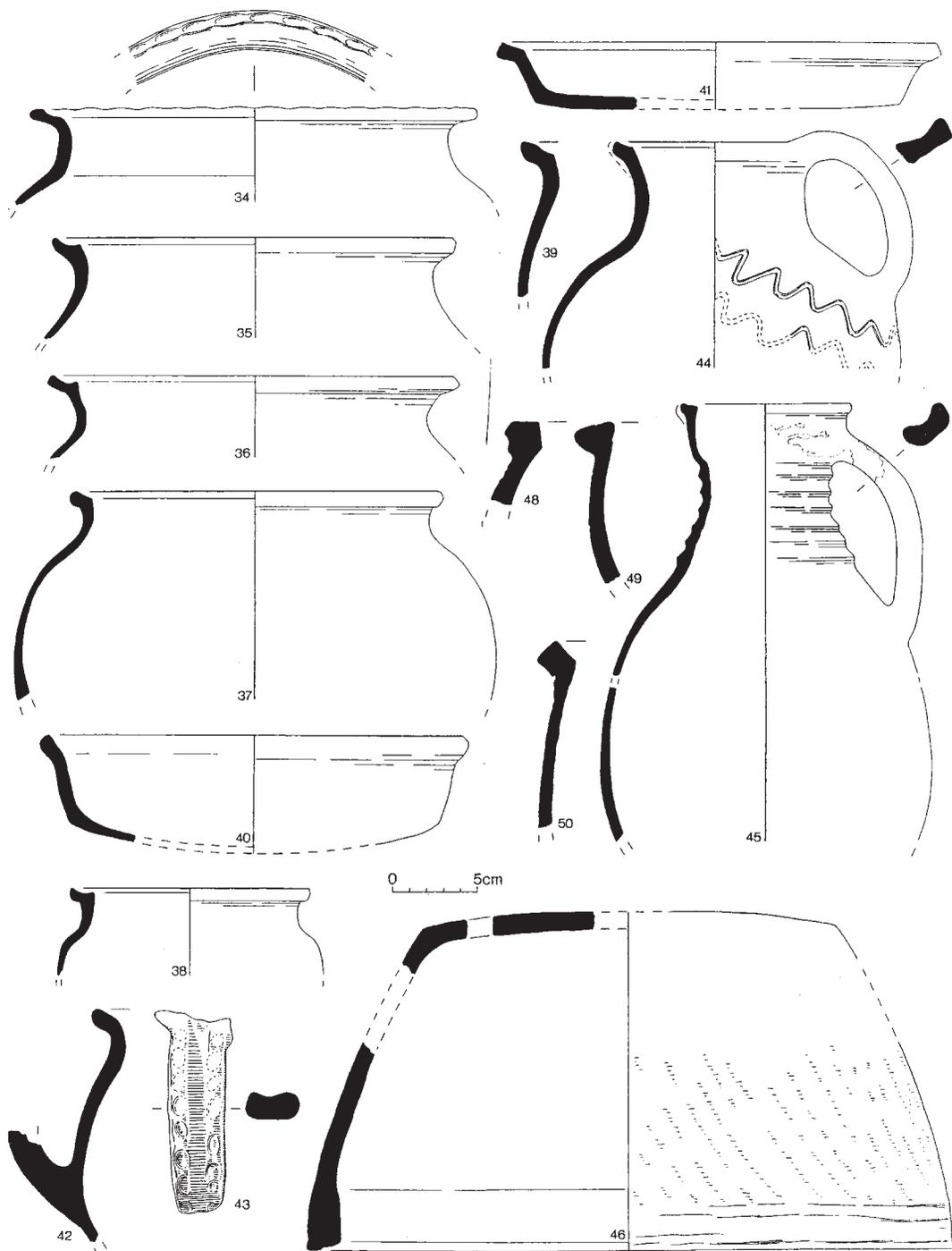


Fig. 9. Pottery (Nos 34-46, 48-50).

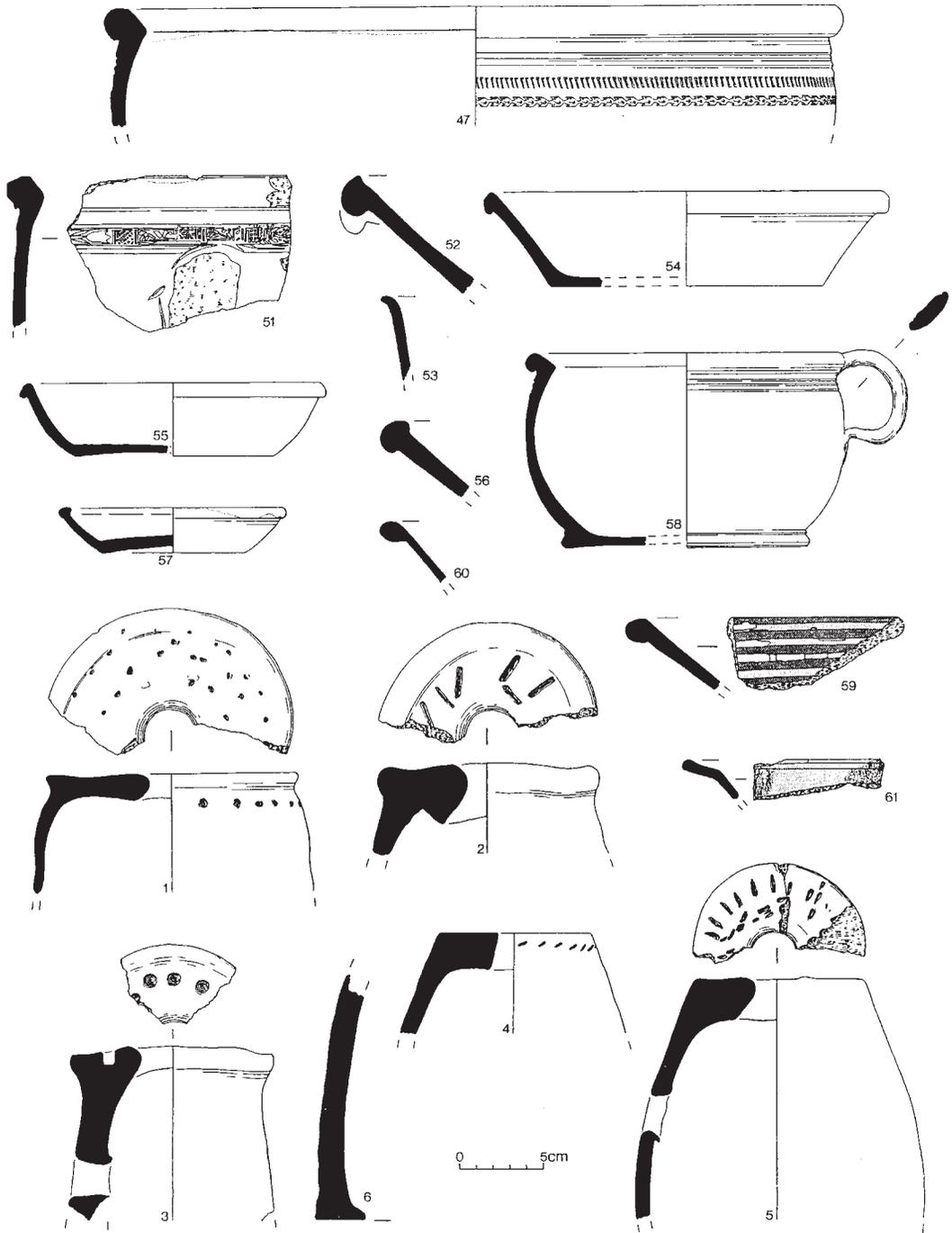


Fig. 10. Pottery (Nos 47, 51-61) and chimney pots (Nos 1-6).

18. Unglazed jug with strap handle and simple spout. Fabric 4.
19. Unglazed jug with crude stabbed strap handle. Fabric 4.
20. Jug with out-turned thickened rim and flattened rod handle. Patchy external green glaze. Fabric 12.
46. Curfew with vent holes and internal sooting. Fabric 5.

#### Context 27

21. Decorated bodysherd with horizontal thumbed cordon. Fabric 1.
22. Decorated bodysherd with incised wavy line. Fabric 4.
23. Bowl or skillet with simple flanged 'pie-crust' rim and pronounced sagging base. Fabric 6.

#### Context 29

24. Unglazed jug with simple rim and incised wavy line decoration. Fabric 2.

#### Context 30

25. Tubular spout from a jug with deeply grooved supporting strap handle. Patchy light green glaze. Fabric 12.
26. Unglazed jug with thickened rim. Fabric 5.

#### Context 32

27. Cooking pot with everted flanged rim with stabbing. External sooting. Fabric 5.
28. Strap-handled necked cooking pot with simple out-turned rim and stabbing on shoulder. Fabric 4.
29. Dish/bowl or skillet with out-turned flanged rim. Fabric 4.
30. Hollowed skillet handle. Fabric 5.

#### Context 34

31. Necked cooking pot with everted flattened rim. Fabric 5. A similar example from Lewes is dated to the twelfth to early thirteenth century (Freke 1975, 79, no. 29).
32. Necked cooking pot with horizontal flanged rim and oblique fingering on body. Fabric 5.
33. Cooking pot with everted flanged rim. Fabric 5.
34. Cooking pot with flanged 'pie-crust' rim and rim-edge blackening. Fabric 2.
35. Cooking pot with pronounced flanged everted rim. Fabric 5.
36. Cooking pot with flaring rim with pronounced flange/internal bead. Fabric 2.
37. Cooking pot with thickened out-turned rim with slight flange. Fabric 12.
38. Necked cooking pot similar to no. 35. Fabric 4.
39. Cooking pot with everted flanged rim. Fabric 12.
40. Bowl or skillet with pronounced sagging base and simple rim. Fabric 5.
41. Dish/bowl or skillet with out-turned rim. Fabric 5.
42. Jug with simple everted rim and remains of a strap handle. Fabric 5.
43. Strap handle with two rows of thumbing. Fabric 5.
44. Unglazed jug with plain strap handle and everted flanged rim. Incised wavy line decoration on body. Fabric 6.
45. Jug with plain strap handle and slightly corrugated neck. Patchy external dull green glaze. Sherds were found in both Contexts 32 and 34. Fabric 9.
46. (see Context 10).

#### Context 52

47. Storage vessel with bead rim and rouletted decoration. Glazed internally. Fabric PM1.

48. As no. 47 but with squared rim and all over glaze.
49. Bowl with triangular rim. Internal glaze. PM1.
50. Storage vessel with upturned squared rim. Internal glaze. PM1.
51. Storage vessel as no. 50 but with external rouletted decoration. PM1.
52. Shallow bowl/dish with bead rim and simple pouring spout. Internal glaze. PM1.
55. Bowl/dish with bead rim. Internal glaze. PM1.
56. Shallow bowl/dish with bulbous rim. Internal glaze. PM1.
59. Plate with bead rim. Internal white slipped stripes (glazed yellow) against plain body of pot (glazed brown). Internal glaze. PM5.
60. Bowl with bead rim. Internal white slip under clear glaze. PM2.
61. Plate with internal white slip with brown mottling under a clear glaze. PM2.

#### Context 54

53. Mug with simple rim and all over glaze. PM1.
54. Bowl/dish with bead rim. Internal glaze. PM1.
57. Small plate/saucer with bulbous rim. Internal glaze. PM1.
58. Chamber pot with out-turned bead rim. Internal glaze. PM1.

#### THE CHIMNEY POTS by Luke Barber

Fragments of at least six chimney pots were also recovered during the excavation. Virtually all were from the fills of Quarry 7 in Area B (Contexts 8, 10 and 27). The majority of these were from Context 10. All pieces are in Fabric 5 (see above) and come from 'Sussex type' chimneys and are similar to pots found previously in Lewes (Dunning 1961; Gardiner 1992). No complete pot could be reconstructed, but fragments show they were of the normal pattern with a main vent at the top and holes at the sides to promote an up-draft. All the pots have stabbing and/or slashing on the top. This stabbing was, as Barton (1979, 66) observes, more likely to be to aid successful firing than for decoration. There is no evidence on any of the sherds for the applied strips sometimes found. All the pots illustrated on Figure 10 (nos 1–6), with the exception of no. 5 which was from Context 27, are from Context 10. The reason why so many chimney pots should be incorporated into this deposit is unclear, but they may represent damaged materials left over from construction activity which were disposed of at a later date.

#### THE METALWORK by Luke Barber

The excavations recovered 930 pieces of ironwork from 101 different contexts and 58 pieces of non-ferrous metalwork from 23 contexts. The majority of the ironwork consists of nails or nail fragments (840 examples). Of the two excavated areas, Area A produced the larger assemblage of metalwork (703 pieces of iron and 32 pieces of non-ferrous), although most of these were related to the burials. Generally all the metalwork is in good condition, but much of the iron has heavy corrosion products adhering to the surfaces and for this reason all the metalwork was x-rayed. The x-ray plates form part of the site archive, along with a full list of all the metalwork.

**Metalwork associated with the burials** (Figs 11, 12) The majority of metalwork from Area A is associated with the burials, originating either from coffins or, more rarely, from

the burials themselves. The presence or absence of coffins with the burials was not always easy to determine on the occurrence of nails in the grave cuts (a total of 534 examples were recovered from 57 burials). This is because most grave fills contained nails in low quantities, and it is likely that many of these were residual from other coffins or unrelated timberwork.

Having said this, at least 19 burials appear to be associated with coffins (for example Skeletons 168, 186, 194, 197, 283, 320, 359). This is based on not only the position of the nails within the graves, but also the quantity involved. Most graves associated with a coffin contained between 10 and 54 nails and nail fragments. Minimum numbers of excavated nails per coffin varied considerably, too, ranging from five to 26. This may, however, be due to the recovery technique, as a metal-detector was used only intermittently during the excavation of Area A. No set pattern could be discerned from the positioning of nails and so little can be said regarding coffin construction. However, some nails were recovered from above the skeletons, as well as around the grave edges, suggesting their use in lid construction. It is interesting to note that the proportion of coffins in the chalk-cut graves is high compared to that in the quarry graves, although coffins are present in this area as well.

The forms of the coffin nails vary somewhat, but the majority are of one type. These consist of nails with square or rectangular shanks and flat elongated rectangular heads (Fig. 11, nos 1 and 2). This type of nail varies in length between 41 and 62 mm long, although most are around 55 mm. Head dimensions vary, but are usually in the region of 18 × 10 mm. A number of these nails from the present excavation have traces of mineralised coffin wood still adhering. The other nail form definitely associated with coffin construction is a general type with a flat circular or slightly oval head (Fig. 11, no. 4). These are far less numerous than the elongated rectangular-headed type, and are of a general purpose function. Other nail forms, such as those with domed elongated rectangular heads (Fig. 11, no. 3), although found in a few graves may not be from coffins.

With the exception of a fragment of a possible small circular handle (Skeleton 186) and a few small pieces of studded sheeting fragments, no other coffin furniture other than nails was recovered from the cemetery. This suggests that coffins, where used at all, were of a basic type.

Metalwork actually associated with the burials is rare. Being a Christian cemetery associated with the poorer element of society, this is hardly surprising, and many of the burials are likely to be unclothed shroud burials. Indeed, a few copper-alloy pins were recovered from some of the burials, although their apparent sparsity may again be the result of recovery techniques or complete decay. Shroud pins were located from both graves associated with coffins (Skeleton 186 had five pins, Cat. no. 11) and those without (Skeleton 340 had two pins). Copper alloy lace ends were recovered from three of the burials (Skeletons 230, 252 and 336). Only Skeleton 252 produced a pair, the other lace ends being singular recoveries. Whether these were from clothing, shoes or shroud fixings is uncertain.

Nine burials were buried with buckles and one further example was found with only a buckle pin. All buckles, with one copper-alloy exception, are in iron and, despite x-raying, no non-ferrous plating was visible on any example. The buckles are of two main types: belt and shoe. The shoe buckles, totalling five in number, are all of the same form with round-sectioned circular frames and iron wire pins (Cat. no.

5). Single examples were located associated with Skeletons 164 and 251 and a pair was located with Skeleton 252. The belt buckles are in three basic forms. The most common (three examples) consists of D-shaped frames (Skeletons 171, 242 and 316: Cat. nos 6–7), closely followed by circular framed examples (Skeletons 224 and 244: Cat. nos 9–10). These circular-framed buckles are present in iron (Skeleton 224) and copper alloy (Skeleton 244). A further copper alloy example, presumably originally associated with a burial, was located in the general burial soil (Context 76). The last form of belt/strap buckle is represented by a single example of an oval framed buckle (Skeleton 268: Cat. no. 8). Unfortunately all these buckle forms have a long period of use and, although primarily of medieval date, they cannot be used to precisely date any of the associated burials.

Other metalwork associated with burials other than funerary material and dress accessories included an iron manacle, a knife, a fragment of horseshoe and various other pieces of residual material such as waste lead and sheet copper alloy fragments. Of these items only the manacle (Skeleton 249: Cat. no. 12) can be proven as being interred with the burial. It is likely that the horseshoe and knife (Cat. nos 13–14) were residual within the grave fill.

#### **Metalwork unassociated with the burials: Area A** (Fig. 12)

Most of the metalwork falling under this heading is of post-medieval date, the majority of which comes from contexts of the eighteenth to nineteenth centuries. A few earlier post-medieval items are present, including a copper-alloy spur buckle. All items are listed in the archive. The medieval items consist mainly of iron nails and strip fragments, though never present in large quantities, from the fills of the quarries. The only diagnostic item of medieval ironwork other than nails is part of a rowel spur (Cat. no. 15). This was from a small pit cut into the burial soil within the quarry (Context 188/189, not illustrated on Fig. 2).

#### **Metalwork from Area B** (Figs. 12, 13)

Area B produced 227 pieces of ironwork (181 of which were nails or nail fragments) and 26 pieces of non-ferrous metalwork (copper alloy, pewter and lead). A varied assemblage of medieval and post-medieval items was recovered from the old topsoil (Context 3). This consists of medieval shoe and belt buckles as well as 19th-century traders buttons. However, due to the mixed nature of these upper deposits work has concentrated on the metalwork from sealed and dated contexts.

The assemblage from the quarry fills is relatively small and consists mainly of nails (77 pieces). These are predominantly general purpose nails with flat or low-domed circular heads and square sectioned shanks. A number of the elongated rectangular headed nails, as used in coffin construction in Area A, are also present. Apart from nails, few diagnostic pieces of ironwork are present in the quarry assemblage. Those present consist of tools and fittings (Cat. nos 16–17). Context 30 produced the largest single group of diagnostic pieces from the quarry, many of which reinforce the slightly later date suggested by the pottery from this context. These are generally of a more domestic nature in including copper alloy dress accessories (Cat. nos 19–21), but the presence of the antler-handled bradial (Cat. no. 18) indicates the continuation of less domestic tasks.

The largest and individually most interesting assemblage from this area came from the two layers of late medieval/early post-medieval soil which had accumulated over the southern end of the quarry (Contexts 18 and 19). Although this group cannot be strictly viewed as a closed one, the degree of diagnostic pieces within it make it of particular interest. Some of the items may be residual, a problem encountered with the pottery from these contexts, but no intrusive material is apparent and these deposits are likely to have been formed before c. 1550. The assemblage is dominated by iron domestic utensils such as knives, the key and candlestick holders. Dress accessories are represented by the iron buckle (Cat. no. 32, although it is also possible this buckle is from a harness) and equestrian equipment by the iron rowel spur (Cat. no. 30). The presence of the spoon bit (Cat. no. 25) indicates wood-working activities. The nails from these two contexts (totalling 23 examples) are virtually exclusively of the general purpose round-headed type; only three rectangular elongated headed form are present.

### The catalogue (Figs 11–13)

#### Area A

- 1 & 2. Iron nails with rectangular elongated heads. (Skeleton 168)
3. Iron nail with domed elongated head. (Skeleton 227)
4. Iron nail with round head. (Skeleton 283)
5. Iron shoe buckle with circular frame and iron wire pin. No signs of non-ferrous plating are evident on the x-ray. Although this form has a wide date range (late thirteenth to sixteenth century) identical examples from London have been dated to the second half of the fourteenth century (Egan & Pritchard 1991, no. 72). (Skeleton 164)
6. Iron belt buckle with D-shaped frame. The pin is intact. There is no sign of non-ferrous plating on the x-ray. Although similar types are dated to the second half of the fourteenth century in London (Egan and Pritchard 1991, No. 389) an example from Norwich has been found in sixteenth-century deposits (Margeson 1993, no. 191). (Skeleton 171)
7. Iron belt buckle as No. 6 but with a slightly larger frame. (Skeleton 242)
8. Iron belt buckle with oval frame. The pin is missing and there is no sign of non-ferrous plating on the x-ray. Similar types have been dated to the fourteenth century in London (Egan & Pritchard 1991, no. 265). (Skeleton 268)
9. Iron belt buckle with circular frame. The pin is intact but there is no sign of non-ferrous plating on the x-ray. The circular framed buckle is a form which saw a long period of use and they are common in late thirteenth- to sixteenth-century deposits. Similar examples from London are likely to be of thirteenth- to fourteenth-century date (Egan & Pritchard 1991, no. 57). (Skeleton 224)
10. Copper-alloy circular framed buckle with pin. Some incised and moulded decoration is apparent on the pin and frame. The frame around one half of the buckle thins in order to allow the pin to pivot freely. A similar example from London has been dated to the later fourteenth century (Egan & Pritchard 1991, no. 32) but the type was common in later centuries as well. (Skeleton 244)
11. Copper-alloy spherical headed pins. Only small quantities of apparent shroud pins were located. The illustrated

example is a typical example (Skeleton 186) with the head formed from a double twist of wire.

12. Iron manacle with part of the chain still attached. The manacle is formed by a tube on one side which acts as both the locking mechanism housing and hinge pivot point for the curving locking bar. Despite x-ray, the exact locking method is uncertain, but a circular disc is set within the tube and three locking pins are driven through this disc and the terminal of the curving locking bar. It appears that the locking pins were split in order to create barbs which sprung open after having been driven into position. Such a locking system would obviously mean that removal of the manacle would be impossible without cutting the circular locking bar or driving the locking pins completely through using some form of punch and hammer. (Secured to the right leg of Skeleton 249)
13. Fragment of iron horseshoe with wavy rim caused by countersinking the oval nail holes. A similar example from Norwich is dated to the twelfth or thirteenth century (Margeson 1993, no. 1829). (Skeleton 244)
14. Not illustrated. Iron whittle-tanged knife blade fragment. A similar example from London is dated to the late twelfth to early thirteenth century (Cowgill *et al.* 1987, no. 5). (Skeleton 244)
15. Iron rowel spur fragment with D-sectioned straight sides and round-sectioned neck. The rowel is missing. (Context 189)

#### Area B

16. Small iron blade with bent whittle tang. Similar examples from Norwich are described as leather-working knives (Margeson 1993, nos 1473–75). All the Norwich examples are ascribed a seventeenth-century date, however. The present example was found in a deposit dated on ceramic grounds to the late twelfth or early thirteenth centuries. (Quarry: Context 10)
17. Iron rod with loop at one end to take an iron ring. No parallel has been found for this object although it is likely to be some form of domestic fitting. (Quarry: Context 10)
18. Iron bradel/awl set in a roughly worked antler handle. (Quarry: Context 30)
19. Copper-alloy buckle with circular frame and pin intact. This form is similar to those found in Area A (Cat. no. 10) and has an identical date range. A similar example from London has been dated to the later fourteenth century (Egan & Pritchard 1991, no. 36) but the present example is from a thirteenth-century context. (Quarry: Context 30)
20. Copper-alloy composite strap-end with forked spacer and single copper alloy rivet fixing. Examples of this type from London have been dated to the later thirteenth and early fourteenth centuries (Egan & Pritchard 1991, No. 664). (Quarry: Context 30)
21. Copper-alloy strap loop with five-sided frame with an internal copper alloy rivet. Examples such as this have been dated to the fourteenth century in London (Egan & Pritchard 1991, no. 1252) but later examples are known from Norwich (Margeson 1993, no. 250). (Quarry: Context 30)
22. Iron chain link with widened section of circular frame for hole to take link. A similar example was found on the manacle from Area A (Cat. no. 12). Context 19
23. Iron candle holder or snuffer? No parallel for this object

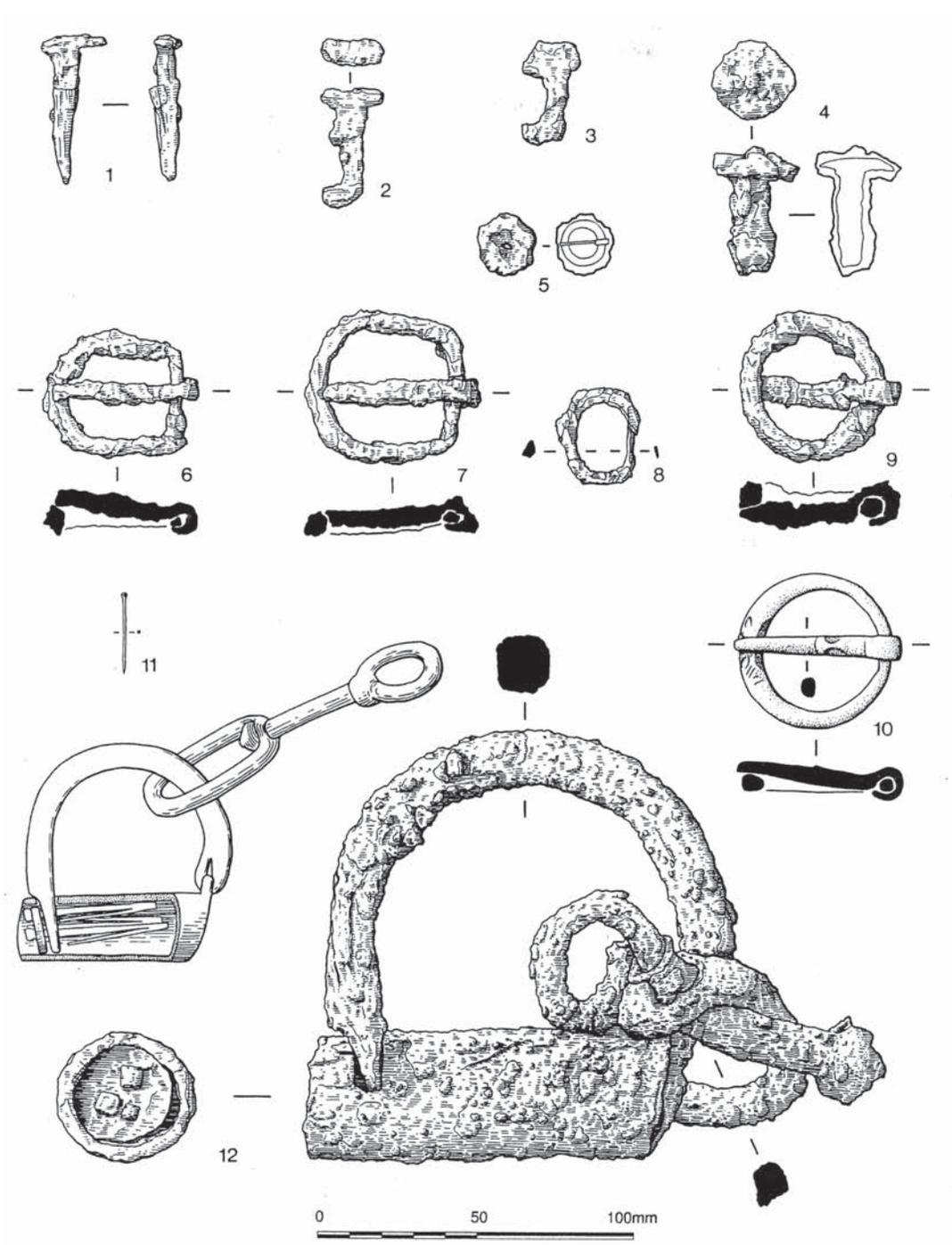


Fig. 11. Metalwork: Area A.

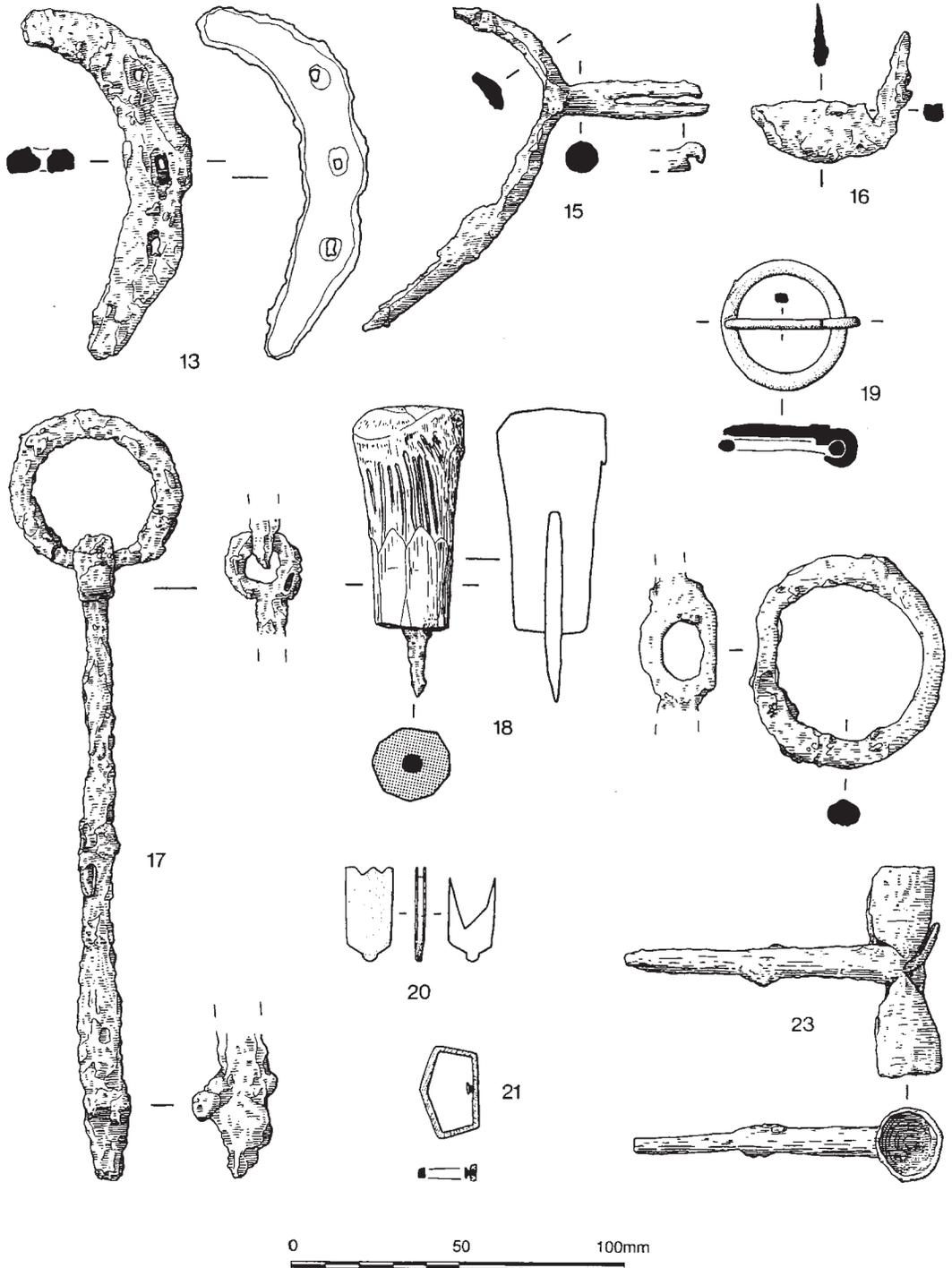


Fig. 12. Metalwork: Areas A and B.

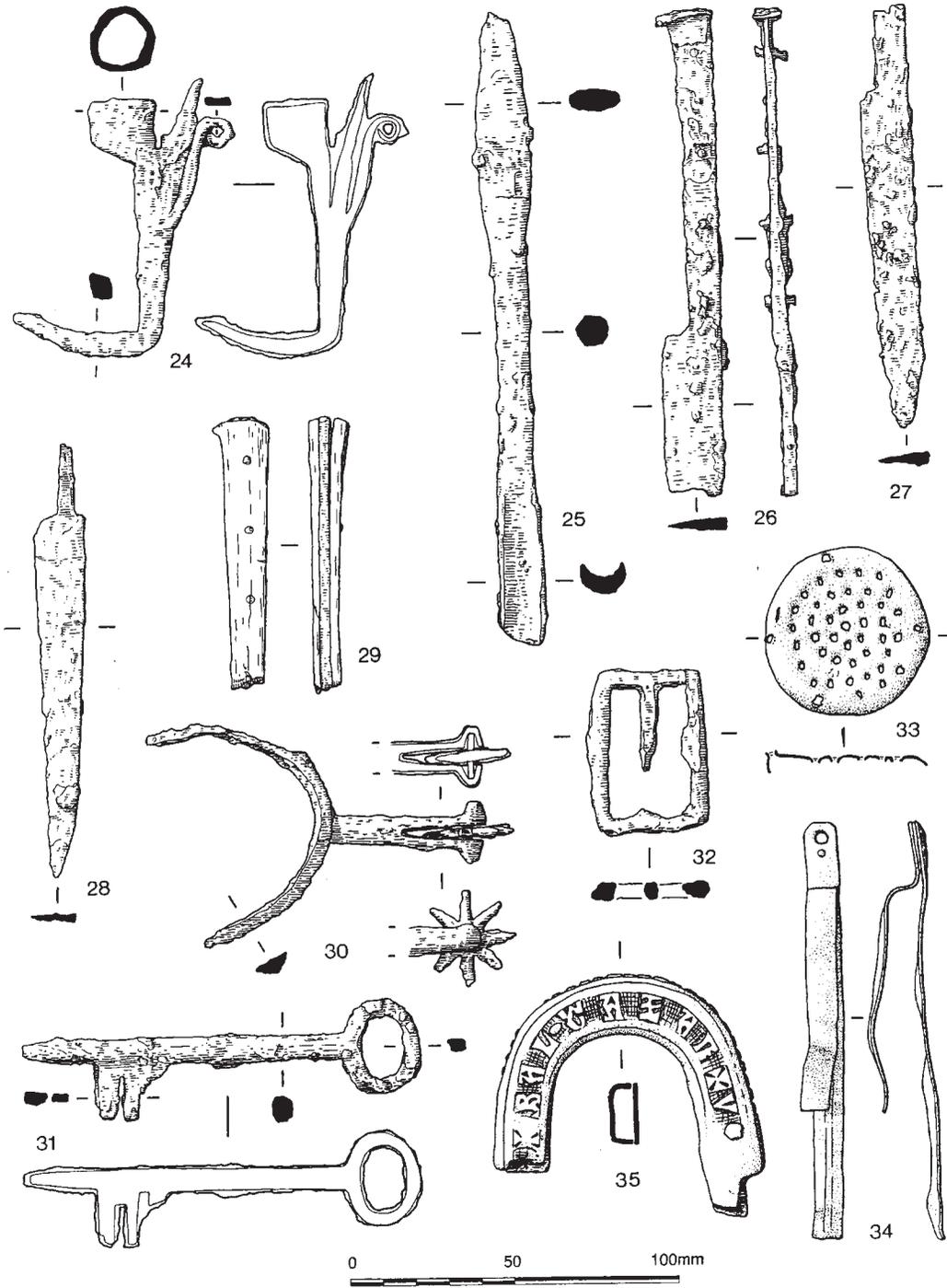


Fig. 13. Metalwork; Area B.

has been found. It could equally be a domestic fitting of some description but at present its precise function remains uncertain. (Context 18)

24. Iron candle holder combining pricket and socket. Presumably the holder was designed to be fixed to the wall or similar. Although no exact parallels have been found, similar styles have been excavated in Norwich which have been dated to the late fifteenth century (Margeson 1993, no. 550). (Context 18)
25. Iron spoon bit with lanceolate terminal (for drilling wood). A number of examples from Norwich have been found in deposits dating to between the fourteenth and seventeenth centuries (Margeson 1993, nos 1389–95). (Context 18)
26. Iron scale-tanged knife with four iron rivets for handle fixing (the scale plates are missing) and iron knob terminal. Fifteenth to sixteenth century. (Context 18)
27. Iron scale-tanged knife. The handle is broken and missing its scale plates although the remains of one fixing hole is apparent. (Context 18)
28. Iron whittle-tanged knife. The tang is set just below the back of the blade. Knives of this form are known from the 14th century onward in London (Cowgill *et al.* 1987, no. 76). (Context 18)
29. Iron handle from a scale-tanged knife with hooked terminal. The bone scale plates are fixed in position by four iron rivets (broken across the fourth). A similar form from Colchester is dated to between 1475 and 1525 (Crummy 1988, no. 3099). (Context 18)
30. Iron rowel spur with straight D-sectioned sides and long round-sectioned neck. The eight-pointed rowel is intact. A similar example from Colchester is dated to the late fifteenth to mid sixteenth century (Crummy 1988, no. 1336). (Context 18)
31. Iron key with oval bow, solid protruding stem and broken bit. Keys of this general type, but with kidney-shaped bows, have been dated to between the sixteenth and seventeenth centuries at Norwich (Margeson 1993, nos 1294–6). (Context 18)
32. Iron rectangular belt or harness buckle with central bar. The central bar is broken and the pin is missing. Probably sixteenth century. (Context 18)
33. Copper-alloy circular sheet with punched holes. This could either be from a strainer or a watering can. A sixteenth-century date is likely. (Context 18)
34. Copper-alloy ?tweezers. These consist of two sheeting strips, forming the arms, being riveted together over a further small piece of copper alloy sheeting. (Context 18)
35. Two piece copper-alloy ?strap terminal with incised inscription '+ BALTAZAR + V'. A similar form, but with sheeting across the central area, is known of from London. It is interesting to note that this example also has an inscription (Egan & Pritchard 1991, 134).

#### COINS AND TOKENS by David Rudling

The excavations revealed two coins (one Iron Age, one medieval), a late sixteenth-/early seventeenth-century rose/orb jeton of Hans Krauwinckel II of Nuremberg, and a late seventeenth-century lead token. The Iron Age coin is an Atrebatian inscribed 'E' type silver Unit attributed to Commius, c. 45–30 BC (Area B, Context 42). The medieval coin is a silver Penny of Edward I, II or III, c. 1279–1335 (Area B, Context 30).

#### The catalogue

1. Atrebatian; inscribed 'E' type silver Unit attributed to Commius, c. 45–30 BC. 1.17 g. 11 mm.  
Obverse: head left, with 'curved ladder' for hair; pellet-in-ring motif in front of face.  
Reverse: horse left; 'E' symbol above horse, with arms of E pointing right; double ring motif in front of horse; animal below horse.  
References: Mack (1975, 446b); Van Arsdell (1989, 355–1); Hobbs (1996, 731–4).  
Area B, Context 42
2. Edward I, II or III, 1279–1335. Silver Penny. New coinage in the name of Edward. Class uncertain (due to excessive wear). Mint of London. Clipped, but likely to have been lost prior to the changes in coinage standards of 1344 and 1351.  
Reference: North (1975, 1010–95).  
Area B, Context 30
3. Nuremberg; Hans Krauwinckel II: master 1586: died March 1635. Brass Jeton. 21 mm.  
Obverse: rosette HANNIS. KRAUWINCKEL. IN. NVR, Three Crowns alternately with three Lis, around a central Rose.  
Reverse: rosette GOTES, SEGEN, MACHT. REICH., Imperial orb surmounted by a cross patty, within a tressure with three main arches.  
Reference: Mitchiner (1988, 1553).  
Area B, Context 3
4. Lead token, Late seventeenth century. 18 mm. Uniface.  
Obverse: ?J.D.  
Area A, Context 52.

#### THE GLASS by Luke Barber

Only 34 fragments of glass were recovered from the excavations. Nine of these were from the quarry in Area B, while the rest were from fills of graves and recent features in Area A. Most of this material is of eighteenth- to nineteenth-century date and consists predominantly of wine bottle fragments, although some window glass is also present. The occurrence of some of this relatively modern glass in grave fills suggests that some intrusive material is present, presumably from disturbance associated with the terrace of cottages. One definite fragment of medieval glass was located in Area A. This consists of a small badly degraded fragment of window glass from the grave fill associated with Skeleton 340.

All the glass fragments from Area B were from the quarry (Contexts 10, 28, 30 and 43). The pieces are all fragments of badly degraded medieval window glass varying in thickness between 3.0 and 3.6 mm. The presence of this material, although not in large quantities, suggests that at least some glazed windows were present within the hospital complex.

#### THE WORKED FLINT by Greg Priestley-Bell

Eleven pieces of worked flint were recovered from the excavations: six from Area A and five from Area B. The material from Area A, which is all residual in medieval or post-medieval contexts, consists of five waste flakes and a core with a single flake removed. All are patinated white but none is diagnostic of period.

Area B produced a single white patinated waste flake from the colluvial layer (Context 22) as well as four large unpatinated flakes from Context 18. The latter are likely to be the result of medieval or post-medieval wall-dressing rather than prehistoric tool manufacture.

**THE WORKED BONE** by Luke Barber (Fig. 14)

Three pieces of worked bone were recovered during the excavations (excluding the scale-tang knife handle described in the metalwork section). These included a four-hole post-medieval button from the topsoil and half a gaming counter from Context 206. The last item is part of a scale from a scale-tang knife. This piece, which is decorated with diagonal grooves and retains two iron fixing rivets (Fig. 14, No. 1), was from Area B (Context 30).

**THE GEOLOGICAL MATERIAL** by Luke Barber,

incorporating comments by John Cooper of the Booth Museum of Natural History, Brighton (Fig. 14) The excavations produced 184 pieces of stone not naturally occurring on the site. This material, recovered from 34 different contexts, weighed in excess of 17 kg. Most of the stone is of relatively local origin, although some pieces have come from further afield. All the material has been fully described, listed and quantified by context on geological material record sheets which form part of the site archive.

The two most common stone types at the site are Upper and Lower Greensand. The Upper Greensand is noticeably glauconitic and is represented by 63 pieces weighing 5731 g. Most occurs as irregular undiagnostic broken pieces, but six fragments have worked faces, frequently showing diagonal tooling. Although the worked fragments are small, ashlar blocks and window mullions appear to be present. These fragments strongly suggest that the other irregular examples are also from architectural elements and that Upper Greensand was brought to the site specifically for this purpose. This stone type, which is relatively easy to shape, would have been used for cornerstones and window and door openings. Most of the undiagnostic worked material is from medieval contexts, in particular the quarry in Area B (Contexts 27, 29 and 32).

The Lower Greensand from the site is present in five variants, presumably representing different outcrops, and totals 63 pieces weighing 6985 g. The majority of the fragments are split along their bedding plains, resulting in thickness varying between 6 and 11 mm. All these types are undoubtedly fragments from stone roofing slates, and indeed a few examples still have circular fixing holes surviving. No complete dimensions are present. These roofing slates were located in medieval deposits in both areas of the site, although the majority were from the quarry in Area B.

Other stone roofing material present in the assemblage consists of West Country slate. The occurrence of this in Sussex has been discussed in detail elsewhere (Holden 1965; 1989). Relatively small quantities were recovered from the present site (35 pieces weighing 1285g), suggesting it was not the primary roofing material. Both Areas A and B contained slate of this type from both medieval and post-medieval contexts. The quarry in Area B once again contained the majority of the pieces. Considering the presence of the terrace of post-medieval cottages, it is surprising that only one piece of Welsh slate was recovered from the site.

The remaining stone types possibly associated with the buildings on site are only present in very low quantities. One piece of possible Portland limestone is present in an early post-medieval context (Post-hole 90) and a fragment of Wealden mudstone was recovered from a nineteenth-century context (Post-hole 86). Ten fragments (1871 g) of a very shelly limestone (Quarr stone) were recovered from the quarry in Area B and the soil layers immediately above (Contexts 18

and 19). This stone type is lightweight due to the many voids between the cemented shell, but is fairly hard. The majority of this type is in the form of undiagnostic lumps, but the presence of two worked pieces shows it was used for architectural pieces. The worked examples (Contexts 29 and 30) exhibit slight signs of rough tooling and one, with a tapering cross-section, appears to be from a window mullion or vaulting rib.

Worked stone objects from the site included whetstone and mortar fragments (see also Worked Chalk report). The majority of the whetstones are of Schist/Norwegian Ragstone (six pieces). All but one are of the usual elongated form with uneven surfaces, sometimes with a roughly D-shaped cross-section. Two of these are from the quarry in Area B (Context 30: Fig. 14, No. 3). Generally, due to the hard nature of the stone, no specific wear marks are apparent, although the surfaces are smoothed from use. The lower end of a smaller whetstone with a shaped square cross-section was also recovered from Context 30 (Fig. 14, No. 2). This example was probably intended to be suspended from a belt. The other whetstone from the site is in a fine-grained Wealden sandstone. It is formed from an irregular block with two adjacent surfaces worn smooth with use. The larger surface also has a single point-sharpening groove at its centre. Although it is likely that this example is of medieval date, it was found in a nineteenth-century context.

Three fragments of Purbeck Marble mortar are present in the assemblage, representing a minimum of three vessels. All are from Area B and consist of one base fragment (Context 18) and two rim fragments, each with square lugs (Contexts 10 and 18). Both rim fragments have broken along horizontal bedding plains and for this reason the extent of the lugs down the side of the mortars is unknown. The types, however, appear to be similar to an example from Seaford (Barber 1995, Fig. 14, No. 16).

**THE WORKED CHALK** by Luke Barber (Fig. 14)

Seven pieces of worked chalk were recovered from the site. These include both objects and chalk fragments with tool marks. Two probable spindle whorls are present, both of which came from the burial soil in Area A (Context 76). The larger of the two appears to be unfinished in that, although it is roughly cut with a central hole, the edges are very uneven (Fig. 14, No. 5). However, considering the size and weight of this example (126 g) it may in fact be a loom weight and as such be a finished piece. The second spindle whorl is of slightly conical form (Fig. 14, No. 4). Although exactly broken in half it is plainly apparent that this whorl has been well finished by turning, creating a good even surface. The surviving section weighs 27 g, indicating an original weight of around 54 g.

The remaining five pieces of chalk are less diagnostic. One fragment, weighing 609 g, appears to have been crudely hollowed out, but its precise function is unknown (Area B, Context 10). The end and corner of an ashlar block were located in Context 32 (Area B). Although it is only a fragment, one complete dimension is present (200 mm) as well as the remains of a probable tapering lewis hole (maximum diameter 40 mm) for lifting the block. The presence of this piece is important in that it demonstrates that the quarries were being excavated to provide chalk blocks for internal construction rather than just providing chalk merely for lime-burning. The remaining pieces consist of two with apparent pick marks (Context 32, Area B and Context 425, Area A) of

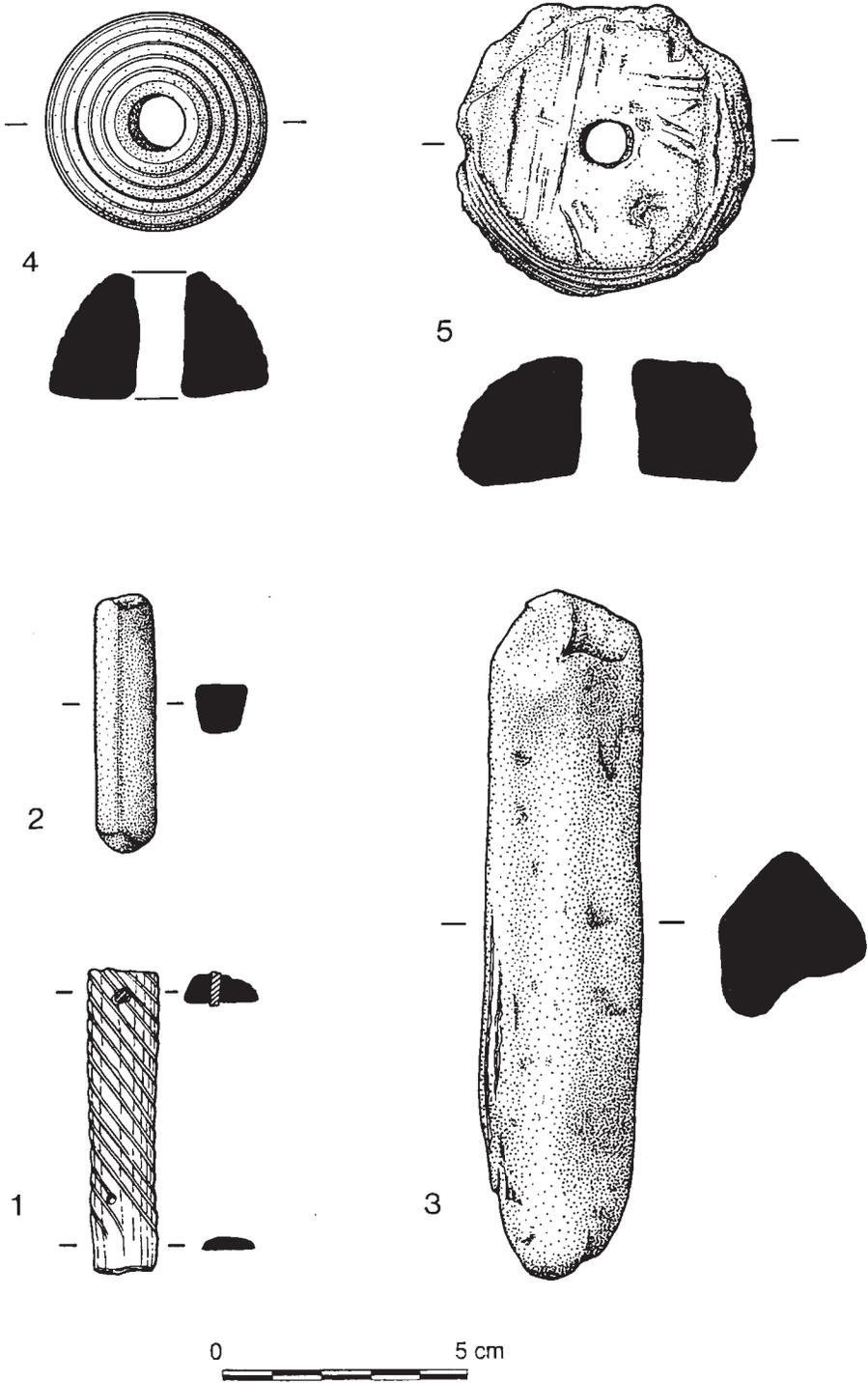


Fig. 14. Objects of chalk and bone.

approximately 4 mm width and one with two sawn cuts (Area A, Context 431). The latter may have been the result of an aborted attempt to cut an ashlar block.

### THE CERAMIC BUILDING MATERIAL

by Lucy Sibun and Richard James

The excavations produced a total of 565 pieces of tile, from 42 contexts (465 pieces from 24 medieval contexts). Five separate fabrics were recognized, the bulk of the tile belonging to Fabric B. The largest medieval/early post-medieval assemblages were recovered from Contexts 18, 19 and 30. The proportions of C, D and E are fairly constant between the three contexts. However, Fabrics A and B display an interesting inverse relationship, with A declining from 31% in 18 to 8% in 30, and B increasing from 39% in 18 to 62.5% in 30. Context 30 has been dated to the thirteenth/early fourteenth century, with 18 and 19 dated to between 1450–1550. This might suggest that Fabric B is earlier than Fabric A.

Figures in brackets refer to percentage of total followed by *percentage of medieval*.

*Fabric A* - (20% 21%) - medium-fired hard, coarse, sandy fabric, containing a high percentage of flint, with grog inclusions. Pinkish-red in colour, sometimes with a grey core.

*Fabric B* - (47% 49%) - medium-hard fired sandy fabric, tempered with shell. Pinkish-orange colour, sometimes with grey core.

*Fabric C* - (5% 5%) - medium-hard sandy fabric, containing large chalk inclusions. Pinkish-orange in colour.

*Fabric D* - (7% 3%) - very high-fired fine fabric, containing iron ore and flint inclusions.

*Fabric E* - (21% 22%) - medium-fired soft fabric, with occasional flint and iron ore inclusions. Orange-brown surface colour.

The tile from the medieval contexts consists mainly of peg tiles, with one piece of possible oven tile and two possible fragments of ridge tiles. Nearly all the recovered tile was fragmentary. Only one complete width measurement could be taken (Fabric D, Context 76, 150 mm). Peg holes were present in both ● and ◆ form. The round holes varied in diameter from 7 to 15 mm, and the diamond holes ranged from 5 to 18 mm in size. One example of a square hole was observed, measuring 9 mm (Context 379, Fabric D). Round peg holes were present in all fabric types, while diamond peg holes were only present on fabric types C and D. It should be stressed, however, that, given the fragmentary nature of the material and the small assemblage involved, no definite conclusions can be drawn from this. The presence of nib tiles should not be overlooked, although no diagnostic pieces were found.

### THE HUMAN BONE by Sue Browne

#### Introduction

Human bone from 103 medieval burials was received for examination. This includes one skeleton (444) from a grave beyond the limits of the excavation but in an area believed (Gardiner pers. comm.) to be part of the medieval cemetery. Most (83) of the skeletons came from graves overlying the

Table 6. Bone preservation (number of individuals).

State of preservation	Number of individuals
Good	72
Fair	27
Poor	4
Total	103

Table 7. Completeness of skeletons.

Completeness	Number of individuals
75%-100%	71
approx. 50%	11
<25%	21
Total	103

bedrock and 20 individuals had been buried in deeper graves cut into the natural chalk.

Generally preservation of the bone is very good, and 70% of the skeletons are well-preserved (Table 6). Interestingly, three of the poorly preserved skeletons (265, 359, 413) came from the chalk-cut graves, where one would expect post-depositional disturbance to have been minimal. However, a portion of two of the grave cuts (264, 412) was not clearly defined, so disturbance may have occurred at some stage, and there was a burial above skeleton 359, which may well have affected the preservation of the underlying skeleton. Other factors also, such as the length of time which elapsed between the death and burial and the microenvironment within the grave itself, may have influenced the preservation of the skeletons.

Seventy-one skeletons (69%) are more or less complete (Table 7), and a high recovery rate was achieved for even the smallest bones. The methods of study follow the guidelines outlined by Brothwell (1981). In general, sexual dimorphism is marked in the adult sample, but three individuals have a somewhat feminine skull although the pelvic and femoral characteristics indicate masculinity. A metrical analysis of the adult humeri and femora placed them (not surprisingly) in the area of overlap between males and females. It was decided that preference should be given to the pelvic data, as these are usually considered to be the more reliable indicators of sex, and the individuals concerned (230, 239, 316) are recorded as 'probably male'.

The dental age of every individual is shown wherever possible but, because of anomalous molar attrition, three individuals (162, 230, 234) could not be assigned with confidence to one of the age ranges used by Brothwell, and they are recorded as 'probably 17–25 years'. Determination of the age of one individual (288) posed particular problems because the molar attrition indicates an age of 25–35 years, cranial suture closure is under way and the basi-sphenoid/occipital synchondrosis is closed (indicating adulthood), but the stage of epiphyseal union in the long-bones is that of an adolescent. Unfortunately age-related changes at the symphyseal face are unscorable, because these elements are absent. Mixing of the bones of two individuals appears unlikely from the excavation records. Was this a teenager showing abnormally heavy wear on the molars and premature closure of the basi-sphenoid/occipital synchondrosis, or an adult in whom epiphyseal union was delayed for some reason?

The maxillary data are from loose teeth only, so the possibility that excessive molar attrition was caused by habitual tooth-grinding could not be investigated by occluding the jaws. However, tooth grinding usually involves abnormal wear in only part of the tooththrow, while in this individual the wear on the anterior teeth is not inconsistent with the wear on the molars. Perhaps his or her diet contained more abrasive material than usual (although deposits of calculus on the occlusal surfaces of some teeth suggest that this individual had not been eating much roughage for a period of time prior to death), or perhaps the dental enamel is softer and was worn away more rapidly than in other individuals (probably this could be ascertained by analysis of the enamel). However, a third molar was fully erupted and in wear, and there has been a considerable amount of alveolar resorption where a lower first molar was lost before death, suggesting adulthood rather than adolescence. Because it is now generally known that current methods using the degree of dental attrition to assess the chronological age of adults in archaeological samples tend to underestimate, rather than overestimate, the age of the individual, it was decided that probably this is an adult in whom, perhaps because of ill-health and/or malnutrition, epiphyseal union was delayed.

In the analyses which follow, the probable male and probable female samples are included in the male and female samples respectively, and the three individuals aged probably between 17–25 years are included in the group aged 17–25 years. Selected results for St Nicholas Hospital are compared with the results for two local cemeteries, Lewes Friary (Browne 1996) and the church of St Giles, Winchelsea (Browne 2004), two non-leper and one leper hospital cemeteries, St Giles, Brough, North Yorkshire (Chundun unpublished), St Leonard, Newark, Nottinghamshire (Bishop 1983) and St James & St Mary Magdalene (Area 3), Chichester, and the cemetery of the church of St Andrew (Period 4), Fishergate, York (Stroud & Kemp 1993).

## Results of analysis

### Demography

The burials are listed in Table 8. The sex of 81 adults and 3 adolescents was determined, thus the sexed sample is 88% of the total adult and adolescent sample (Table 9). Sixty-six (79% of the sexed skeletons) are male or probably male (one is possibly male) and sixteen are female or probably female (one is possibly female). All the comparative sites yielded sexed samples containing more males than females (Table 10), the percentage ranging from 95% at Lewes Friary to 58% at St Andrew's, Fishergate.

The age distribution is shown in Table 11. Eighty-eight individuals (85%) are adult, one (skeleton 288, see above) is probably adult and fourteen (15%) are immature. The age range in the 77 aged individuals is from neonatal to at least 45 years old, the highest number of deaths for each sex occurring in the group aged 17–25 years. With the exception of St Andrews, Fishergate, where over a third of the individuals were immature, the comparative sites yielded samples consisting mainly (or entirely at the Hospital of St Leonard) of adults (Table 12). Inevitably comparisons between the sites are complicated by the fact that different workers use slightly different methods when estimating the age of adults, but it seems that a greater proportion of deaths occurred for those from the Hospital of St James & St Mary Magdalene and St Giles (Table 13).

### Stature estimation

The mean height of the males ( $N = 60$ ) is 1.72 m and for the females ( $N = 15$ ), 1.62 m. The height range for males is 1.61–1.85 m and for females, 1.52–1.72 m.

### Cranial and postcranial measurements

A summary of the metric data is presented in Table 14. Only those measurements with a sample size of 20 or more individuals are shown, but the full range of measurements recorded are stored in the archive.

The cranial shape, expressed by the cephalic index, ranges from two dolichocephalic (longheaded) skulls to seven hyperbrachycephalic, or very round-headed, skulls (Table 15). The mean cephalic index for males ( $N = 22$ ) is 78 and for the small female sample ( $N = 5$ ), 83; the range for males is 70–91 and for females, 77–87. The trend since prehistoric times has been for increasing round-headedness, and these indices are within the usual range for medieval samples.

### Individuals buried in chalk-cut graves

Twenty individuals were buried in graves cut into the natural chalk. They will be discussed briefly here, but there is no evidence that they form a discrete chronological group, and they are included in the total sample in the preceding and subsequent analyses. Nineteen (95%) are adult and one is an adolescent of indeterminate sex; the adults comprise 13 males, 5 females and 1 possible female, thus 72% of the sexed sample is male. The age of all but one of the adults could be estimated from dental remains and a marked difference is seen between the adult age distribution in this group compared and the rest of the sample; the proportion of adults aged 25 years or over is 78% in the group in chalk-cut graves, while in the rest of the sample it is only 43%.

Anticipating the results presented below, there is no definite evidence that any two individuals in this group were genetically related. The two males with an open sacral canal (168, 283) were both buried in chalk-cut graves (Plate 1), but in a sample spanning approximately 400 years this might be simply a coincidence. Additional vertebrae were noted in three spines (273, 283, 336) and a detached neural arch in one (168). The skeletal variants recorded in the rest of the sample occur at approximately the same frequency in the group in the chalk-cut graves, and no particular pattern in their occurrence was found. One male (224) had been buried above a female (258), but they have no skeletal variants in common. The excavation notes record that two males (355, 356) appear to have been buried together above a third individual (362), and perhaps they were members of the same family. In skeletons 356 and 362, a cervical rib is present, but these variants occur widely throughout the sample and are not conclusive evidence of a genetic relationship.

Pathology noted includes a male with probable psoriatic arthritis (359), another male with a long-term dislocated ankle and active inflammation in the other foot (333) and, interestingly, a leper (343).

### Discontinuous, morphological characters

The presence or absence of 19 characters in the skull (Berry & Berry 1967) and 26 in the post-cranial skeleton (Finnegan, 1978) were recorded and the results are shown in Table 16.

Selected results from the comparative sites are shown in Table 17. A continuing problem in the interpretation of non-metric data is the possibility of inter-observer variation in the



Plate 1. Skeleton 168.

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Table 8. List of burials.

Skel. no.	Sex	Age	Height (m)
143	Male	25–35 yrs	1.66
146	Prob. male	35–45 yrs	1.62
153	Male	Adult	-
155	Male	17–25 yrs	-
158	Female	17–25 yrs	1.69
161	Male	17–25 yrs	1.69
162	Poss. male	Prob. 17–25 yrs	-
164	Male	Adult	1.80
168	Male	At least 45 yrs	1.66
171	Male	17–25 yrs	1.85
174	Prob. male	Adult	1.70
177	Male	17–25 yrs	1.76
180	Male	35–45 yrs	1.71
183	Male	15–20 yrs	1.71
186	Male	17–25 yrs	1.81
191	Poss. female	Adult	-
194	Male	35–45 yrs	1.73
197	Male	25–35 yrs	1.76
221	Male	Adult	1.74
224	Male	25–35 yrs	1.61
227	Male	17–25 yrs	1.72
230	Prob. male	Prob. 17–25 yrs	1.70
232	Prob. male	25–35 yrs	-
234	Female	Prob. 17–25 yrs	1.66
236	Prob. male	15–20 yrs	1.72
239	Prob. male	17–25 yrs	1.68
240	Male	17–25 yrs	1.65
242	Male	Adult	1.68
244	Male	Adult	1.68
247	Indeterminate	17–25 yrs	-
249	Male	25–35 yrs	1.79
251	Female	Adult	1.57
252	Male	25–35 yrs	1.75
255	Prob. male	25–35 yrs	-
257	Male	17–25 yrs	1.80
258	Female	25–35 yrs	1.56
262	Indeterminate	Adult	-
263	Indeterminate	Adult	-
265	Female	25–35 yrs	1.56
268	Indeterminate	15–20 yrs	-
271	Indeterminate	Approx. 18 mths	-
273	Male	35–45 yrs	1.73
274	Indeterminate	Adult	-
283	Male	35–45 yrs	1.65
285	Male	25–35 yrs	1.79
286	Female	35–45 yrs	1.61
288	Indeterminate	Prob. adult	-
290	Male	17–25 yrs	1.69
292	Male	Adult	1.67
294	Indeterminate	Adult	-
295	Prob. female	Adult	1.68
296	Indeterminate	18mths–3 yrs	-
298	Indeterminate	0–18 mths	-
300	Indeterminate	18 mths–3 yrs	-
302	Male	25–35 yrs	1.70
303	Male	17–25 yrs	1.72
306	Female	25–35 yrs	1.59
308	Male	25–35 yrs	1.68
309	Male	At least 45 yrs	1.69
310	Male	25–35 yrs	1.76
311	Prob. male	17–25 yrs	-
312	Prob. male	17–25 yrs	-
313	Male	17–25 yrs	1.71
314	Male	17–25 yrs	1.75
315	Male	17–25 yrs	1.74
316	Prob. male	17–25 yrs	1.70 if male
318	Prob. male	Adult	1.75 if male
320	Male	35–45 yrs	1.67
322	Male	25–35 yrs	1.77
324	Male	Adult	1.78
326	Indeterminate	Approx. 14 yrs	-
330	Indeterminate	0–18 mths	-
331	Male	25–35 yrs	1.68
333	Male	25–35 yrs	1.74
336	Female	35–45 yrs	1.69
340	Male	At least 45 yrs	1.68
343	Male	17–25 yrs	1.74
349	Indeterminate	Adolescent	-
352	Indeterminate	18 mths–3 yrs	-
355	Male	17–25 yrs	1.73
356	Male	25–35 yrs	1.81
359	Male	35–45 yrs	1.75
362	Male	25–35 yrs	1.71
365	Female	17–25 yrs	1.72
366	Indeterminate	Child	-
368	Male	17–25 yrs	1.72
370	Male	Adult	1.79
372	Male	35–45 yrs	1.79
374	Male	Adult	1.75
377	Indeterminate	Adult	-
381	Male	25–35 yrs	1.71
382	Male	Adult	1.64
384	Prob. male	15–20 yrs	-
386	Indeterminate	15–20 yrs	-
390	Female	35–45 yrs	1.67
402	Female	17–25 yrs	1.59
404	Male	adult	1.71
406	Indeterminate	adult	-
407	Female	17–25 yrs	1.55
409	Male	17–25 yrs	1.72
413	Female	17–25 yrs	1.72
416	Male	adult	1.73
444 u/s	Female	adult	1.52

Table 9. Sex distribution ( $N = 103$ ).

Sex	Number of individuals
Male	55
Prob./poss. male	12
Female	14
Prob./poss. female	3
indeterminate	19

Table 10. Frequency of males in the sexed sample from St Nicholas Hospital and six comparative sites.

Site		Percentage of males
Lewes Friary	( $N = 44$ )	95%
Hospital of St James & St Mary Magdalene, Area 3	( $N = 66$ )	91%
Hospital of St Leonard	( $N = 77$ )	85%
Hospital of St Nicholas	( $N = 82$ )	79%
Hospital of St Giles	( $N = 28$ )	61%
St Giles Church, Winchelsea	( $N = 15$ )	60%
St Andrew's, Fishergate, Period 4	( $N = 81$ )	58%

Table 11. Age distribution ( $N = 103$ ).

Age range	Entire sample	Males	Females
0–18 mths	2		
18 mths–3 yrs	4		
12–15 yrs	1		
Child	1		
15–20 yrs/adolescent	6	3	
17–25 yrs	30	21	7
25–35 yrs	20	17	3
35–45 yrs	11	8	3
45 yrs +	3	3	
Adult	25	14	3

Table 12. Frequency of adults in the sample from St Nicholas Hospital and six comparative sites.

Site		Percentage of adults
Hospital of St Leonard	( $N = 87$ )	100%
Hospital of St James & St Mary Magdalene, Area 3	( $N = 80$ )	98%
St Giles Church, Winchelsea	( $N = 17$ )	88%
Hospital of St Nicholas	( $N = 103$ )	85%
Lewes Friary	( $N = 55$ )	84%
Hospital of St Giles	( $N = 35$ )	83%
St. Andrew's, Fishergate, Period 4	( $N = 63$ )	63%

Table 13. Age distribution in the adult samples from St Nicholas Hospital and six comparative sites, listed in descending order of the percentages of young adults in the aged sample.

	St Giles Church	Lewes Friary	St Nich Hospital.	St Andrews Church	St Leonards Church	St James & Mary M. Hosp.	St Giles Hospital
17–25 yrs	(50%) 5	(48%)13	(47%) 30		(39%) 21		(17%) 2
Young						(18%)11	
20–30 yrs				(45%)32			
25–30 yrs	3	9	20		13		3
30–40 yrs				18			
Middle						22	
35–45 yrs	1	3	11		8		1
40–50 yrs				17			
45 yrs +	1	2	3		12		6
Mature						28	
50 yrs +				4			
Adult	6	19	24	12	33	17	17

Table 14. Summary of osteometric data for males (the data for females is not shown because measurements were recorded for fewer than 20 individuals).

Biometric symbol	Mean	Variance	Standard deviation	Standard error of mean	Number (N =)
L	182.00	32.62	5.62	1.20	22
B	148.81	47.76	6.91	1.51	21
B'	100.81	15.66	3.96	0.86	21
ZZ	46.06	5.81	2.41	0.41	34
RB'	33.27	8.20	2.86	0.45	40
CYL	21.13	3.50	1.87	0.34	30
HuL1	333.04	219.86	14.83	2.23	44
RaL1	248.29	130.80	11.44	1.70	45
UIL1	268.76	136.48	11.68	1.80	42
FeL1	465.62	495.17	22.25	3.43	42
TiL1	369.28	470.08	21.68	3.83	32
FiL1	361.71	393.17	19.83	3.75	28

Table 15. Cephalic index.

	Number of individuals		
	Males	Females	Total
Dolichocephalic ( $\alpha$ 74.9)	2		2
Mesocephalic (75.0–79.9)	6	1	7
Brachycephalic (80.0–84.9)	9	2	11
Hyperbrachycephalic ( $\chi$ 85.0)	5	2	7

scoring of these characters. Although some (e.g. metopism) are clearly either present or absent, others are defined by the degrees of development of the character. For instance, the presence of a palatine torus was recorded in several individuals in the sample from St Nicholas Hospital, but in each case the torus is small and perhaps it would not have been included by some observers (*see* Lilley *et al.* 1994, 447), and great variation between sites in the frequency of Poirer's facet and plaque on the femoral head suggests that different observers do score these characters differently (and perhaps that the same observer scores differently over time). The different frequencies recorded at different sites for some of the clearly defined characters (such as metopism) are interesting, and a better understanding of their significance, hereditary or otherwise, is needed. At this stage, therefore, further analyses were not undertaken.

#### Anomalies

A number of other skeletal variants were noted and are described briefly below. They were seen more frequently in males (56) than in females (14), as would be expected in a sample in which 64% are males and only 15% are females.

#### Dental anomalies

Radiographic investigation of the congenital absence of the third molar was not undertaken, but visual examination of the dental remains of 74 adults suggested that at least one third molar is agenic in 20 individuals (*see* Table 18). In three of these individuals, all four third molars are probably absent, in five, both maxillary third molars are probably absent, and in five others both mandibular third molars are absent. The

upper lateral incisors in one individual (290) and a mandibular incisor in another (283) are agenic. Teeth which rotated between 20 and 45 degrees from their normal position were recorded in six individuals, and crowded and malpositioned teeth in three (227, 302, 409). In two individuals (194, 232) an upper third molar is anomalous and peg-like and in a third (336) an upper third molar is reduced in size. A deciduous canine had been retained in one maxilla (286).

#### Postcranial anomalies

The neural arch is open posteriorly in two sacra (168, 283) out of 74 scored. An additional, sacralized, lumbar vertebrae is present in three spines (273, 286, 336) out of total 54 spines scored, and in another (384), a sixth lumbar vertebra is present but not sacralized. An additional free vertebra, transitional morphologically but more resembling a sacral than a lumbar vertebra, is present in one spine (283). The separation of the neural arch of a lumbar vertebra from the centrum (spondylolysis) was recorded in total of five individuals, bilaterally (316, 381) and unilaterally (234) in L5 out of 46 scored, and bilaterally (331) in L4, out of 44 scored, and bilaterally (168) in L3, out of 47 scored. A perforated sternum was seen in one individual (381) and the calcaneum and talus are united bilaterally in one skeleton 146; there is no evidence of associated inflammation or trauma in the tarsals of skeleton 146 and probably the union is congenital.

Two other skeletal variants appear to be present at a higher frequency than is usually reported in archaeological material, perhaps partly because the bone was generally well-preserved and even the smallest bones survived intact and were recovered. Cervical ribs are present bilaterally or unilaterally in 13 out of 28 seventh cervical vertebrae examined, and in four other individuals (168, 183, 308, 312) the anterior root of the transverse process of C7 has a morphology of a cervical rib but is not separated from the vertebrae. In 15 individuals the second and third (distal) phalanges of one and two are united to form a single bone; in one individual (244) this anomaly appears to be bilateral. At least some phalanges of the feet were recovered for 69 individuals, but the true frequency of this anomaly is unknown because not all the phalanges were recovered for all individuals.

The question of the inheritability of skeletal variants is

Table 16. Discontinuous, morphological characters (number observed/number of individuals scored).

Cranial data (following Berry & Berry 1967)		Entire sample	Males	Females	Post-cranial data (following Finnegan, 1978)		Entire sample	Males	Females
Sutural ossicles					C1 facet double	L	1/70	1/51	0/13
Coronal		0/37	0/28	0/6		R	5/60	4/43	1/12
Sagittal		1/44	2/36	0/8	C1 posterior bridge	L	11/67	10/48	0/13
Lambdoid	L	20/44	16/35	4/9		R	4/58	5/40	0/12
	R	20/43	17/35	3/8	C1 lateral bridge	L	0/66	0/46	0/13
Ossicle at Bregma		2/61	1/46	0/11		R	2/59	2/41	0/12
Ossicle at Lambda		15/58	13/43	1/11	Suprascapular foramen	L	2/37	2/28	0/7
Ossicle at Asterion	L	8/51	7/40	1/10		R	1/35	1/28	0/6
	R	6/52	5/38	1/12	Acromial facet	L	0/48	0/40	0/7
Epipteric bone	L	4/20	3/15	1/5		R	0/54	0/40	0/9
	R	4/22	3/16	1/6	Os acromiale	L	5/51	4/44	1/6
Parietal notch bone	L	1/49	1/38	0/9		R	8/58	7/43	1/10
	R	2/47	2/35	0/10	Septal aperture	L	2/71	2/51	0/12
Inca bone		0/68	0/52	0/12		R	0/79	0/55	0/13
Metopism		6/71	5/49	1/13	Supracondyloid process	L	2/75	2/53	0/13
Torus auditivas	L	0/75	0/50	0/14		R	4/78	4/57	0/12
	R	0/74	0/50	0/14	Acetabular crease	L	11/75	9/53	2/13
Torus palatinus		9/44	8/35	1/6		R	9/67	8/49	1/11
Torus maxillaris	L	7/57	6/41	1/11	Accessory sacral facet	L	5/65	4/48	1/13
	R	6/60	5/44	1/12		R	7/65	6/49	1/12
Torus mandibularis	L	2/70	2/50	0/14	Allen's fossa	L	8/74	4/52	4/14
	R	2/70	1/50	0/14		R	5/72	2/48	2/13
Supra orbital notch	L	39/55	29/38	6/10	Poirier's facet	L	27/71	20/51	2/13
	R	43/62	33/44	6/11		R	21/67	17/45	1/12
Supra orbital foramen	L	15/55	10/38	4/10	Plaque	L	10/72	9/51	0/13
	R	23/59	16/39	5/12		R	10/67	6/45	0/12
Frontal foramen	L	5/55	3/38	1/10	Trochanteric exostosis	L	7/70	6/49	1/14
	R	4/59	4/39	0/12		R	6/67	5/45	1/13
Parietal foramen	L	20/64	13/48	6/12	3rd trochanter	L	9/74	5/52	4/14
	R	24/65	19/49	4/12		R	12/71	8/50	3/12
Spheno-frontal articulation		1/27	1/20	1/7	Hypotrochanteric fossa	L	16/77	10/53	2/15
						R	16/73	11/50	1/13
					Vastus notch	L	2/62	1/43	0/13
						R	0/58	0/41	0/11
					Emarginate patella	L	1/63	1/44	0/13
						R	0/59	0/41	0/11
					Squatting facet	L lateral	10/66	5/45	4/13
						R lateral	11/67	7/46	4/13
						L medial	1/66	0/45	1/13
						R medial	0/67	0/46	0/13
					Anterior calcaneal facet	L double			2

a difficult one. Some of the variants recorded in this sample, including agenesis of teeth, an open sacral canal, transitional lumbosacral vertebrae and united tarsals, probably do have a genetic basis. Metopism and rotated teeth are thought to be genetically determined, but it is uncertain to what extent environmental factors may also be involved in the development of these and other skeletal variants. Bearing in mind the need for caution, patterns in the spatial distribution in the cemetery of selected anomalies or in the association of more than one anomaly in skeletons were sought in case they might suggest groups of genetically related individuals. The results of the analyses are ambiguous. Three individuals in chalk-cut graves have an extra lumbar vertebra, and two (involving a fourth individual) have an open sacral canal, but two more individuals with an extra lumbar vertebra were buried some distance away. Elsewhere in the cemetery, five skeletons showing metopism and five (different) skeletons

Table 17. Frequency (%) of selected non-metric characters recorded for St Nicholas Hospital and five comparative sites (results are for sexed adults only from St Andrew's Church and for the entire sample from other sites).

<b>Cranial characters</b>		<b>St Nich. Hospital</b>	<b>Lewes Friary</b>	<b>St Giles Church</b>	<b>St Giles Hospital</b>	<b>St James &amp; MaryM Hospital</b>	<b>St Andrew's Church</b>
Metopism		8	17	11	4	3	6
Epipteric bone	L	20	10	0	0	4	33
	R	18	10	0	0	4	27
Torus palatinus		20	9	14	6	6	9
Torus mandibularis	L	3	6	0	0	L&R	4
	R	3	12	0	0	2	4
Frontal foramen	L	9	0	0	6	9	26
	R	7	4	0	18	3	27
Parietal foramen	L	31	25	29	29	67	52
	R	37	42	29	22	53	58
<b>Post cranial characters</b>		<b>St Nich. Hospital</b>	<b>Lewes Friary</b>		<b>St Giles Hospital</b>	<b>St James &amp; MaryM Hospital</b>	<b>St Andrew's Church</b>
C1 facet double	L	1	L&R		9	L&R	20
	R	8	3		8	34	9
Septal aperture	L	3	8		4	0	10
	R	0	6		9	0	5
Acetabular crease	L	15	0		11	2	28
	R	13	0		17	2	17
Allen's fossa	L	11	0		0	2	31
	R	7	0		0	6	24
Poirier's fossa	L	38	4		6	72	4
	R	31	7		6	58	2
Plaque	L	14	.		25	0	60
	R	15	.		26	0	50
Vastus Notch	L	3	0		0	31	19
	R	0	0		0	27	22

Table 18. Dental anomalies (number observed/number of individuals scored).

	<b>Entire sample</b>	<b>Males</b>	<b>Females</b>
Agensis of M3	20/74	7/54	4/15
Open sacral canal	2/74	2/57	0/14
Extra lumbar vertebrae sacralized	3/54	1/44	2/08
Free	1/54	1/44	0/08
Extra lumbosacral vertebrae	1/54	1/44	0/08
Sponylyolysis L3	1/47	1/36	0/11
L4	1/44	1/33	0/11
L5	3/46	2/35	1/11
Perforated sternum	1/40	1/34	0/05
United tarsals	1/68	1/43	0/14
Cervical ribs	13/68	12/53	1/13
2nd/3rd phalanges united, foot (see text for sample size)	15/---	11/---	1/---

showing probable agensis of the third molars are loosely grouped, but in general the skeletal variants are distributed widely throughout the cemetery without obvious clustering. It would perhaps have been more surprising had the data suggested the presence of family groups in a hospital cemetery than that they do not.

*Oral pathology*

A total of 73 deciduous teeth were recovered for five children aged between birth and three years; no dental remains were recovered for the other children in the sample. The only pathology seen in the deciduous dentition was traumatic in origin; a lateral incisor in the mandible of a child aged between 18 months and 3 years (352) had broken off before death at the enamel-cemento junction. Apical abscessing had occurred, but the tooth root is still in its socket.

A summary of oral pathology in the permanent teeth of 74 individuals is shown in Table 19. A total of 30 teeth in 17 males were almost or completely destroyed by caries, and pulp exposure associated with caries cavities was recorded in 25 teeth in 16 males. Pulp exposure from attrition (mainly recorded in individuals aged 35 years or over) was seen in 27 teeth in 11 males and 1 tooth in a female. Deposits of occlusal

calculus associated with extensive dental decay and abscessing were observed in the jaws of three males (186, 340, 382), and large deposits of occlusal and buccal calculus were seen in an individual of indeterminate sex (288) whose age was difficult to determine (see above); the occlusal calculus suggests that affected individuals were not eating a normal diet for a period of time prior to death.

Out of 69 individuals scored, deep lines of enamel hypoplasia (indicating severe phases of infection or dietary deficiency during childhood) were recorded in three individuals (352, 312, 343) — interestingly, all three skeletons show long-standing postcranial pathology (discussed below) — and shallow lines in a further 26 individuals. The teeth of 22 out of 53 males and 6 out of 12 females show some degree of enamel hypoplasia.

Table 20 summarizes the oral pathology recorded in samples from the comparative sites. The results for St Nicholas Hospital do not differ greatly from those for the Hospitals of St Giles or St Leonard, but the frequency of caries cavities, abscess sites and ante-mortem tooth loss is much higher in the sample from the Hospital of St James & St Mary Magdalene, and this is probably related to the greater proportion of older adults in the sample. However, there were more older than young adults in the (admittedly small) sample from St Giles Hospital also; perhaps the fact that St James & St Mary Magdalene was a leper hospital is significant, because the rhino-maxillary changes in leprosy include leprosy invasion of the soft tissue of the mouth (see Wells 1967, 247). Another possible explanation in the case of ante-mortem tooth loss is inter-observer variability in the scoring of sockets where evidence of periodontal disease is seen but no morphological change associated with healing has occurred. In the sample from St Nicholas Hospital, it was suspected that a total of 23 teeth in 17 individuals were loose in their sockets but had not actually dropped out until after death, and these are not included in the totals for ante-mortem loss; however, their inclusion only adds one more individual and increases the frequency of tooth loss in males from 7% to 8% and in females from 10% to 12% — an overall frequency of 8.8%, still very low compared to the findings for the Hospital of St James & St Mary Magdalene.

The frequency of enamel hypoplasia is the sample from St Nicholas Hospital is low compared to the findings from the other three hospitals (Table 20), suggesting that the individuals in the sample from St Nicholas Hospital had been relatively free from phases of malnutrition or infection during childhood.

#### Non-oral pathology

##### Arthropathy

Mild to moderate osteophyte formation in the spine and 'lipping' at the margin of articular surfaces, probably age-related, were recorded in many of the older adults, but more severe joint changes involving morphological modification and/or eburnation of articular surfaces, or bony union, is relatively infrequent, being recorded in only eight males and three females. The spine is involved in eight individuals (273, 283, 286, 322, 340, 390, 416, 444), the wrist or hand in three (168, 333, 444) and the great toe (bunions) in two (273, 374). Interestingly, no severe changes were seen in the hip or the knee, major weight-bearing joints which are particularly subject to stress. The young age of many of the adults (57% of the aged individuals are under 35 years) may be a factor; it is also possible that the sample contains an unknown number

Table 19. Oral pathology in the permanent teeth.

	Entire sample		
	Number	Percentage	
Teeth scored	1749		
Teeth with caries cavities	133	7.6	
Sockets scored	2042		
Abscess sites	52	2.5	
Teeth lost ante-mortem	157	7.7	
Number of individuals showing:			
Caries cavities	(N = 73)	40	54.8
Abscess sites	(N = 74)	30	40.5
Ante-mortem tooth loss	(N = 74)	41	55.4

	Males		Females		
	No.	%	No.	%	
Teeth scored	1312		315		
Teeth with caries cavities	112	8.5	20	6.3	
Sockets scored	1519		402		
Abscess sites	44	2.9	8	2.0	
Teeth lost ante-mortem	113	7.4	42	10.4	
Number of individuals showing:					
Caries cavities	(N = 54;14)	32	59.3	7	50.0
Abscess sites	(N = 54;15)	25	46.3	5	33.3
Ante-mortem tooth loss	(N = 54;15)	32	59.3	7	46.7

of individuals who were long-term inmates and physically less active than the non-hospitalized.

A variety of changes were seen in the joints of the hands and one foot of a male aged 35–45 years (359). In the hands (Plate 4), some carpo-metacarpal and some second interphalangeal joints show inflammatory changes, morphological modification and small cystic cavities in the region of the articular surfaces, other joints are eburnated but show no other changes, and the remaining joints are normal. The metacarpo-phalangeal and first interphalangeal joints, described by Ortner and Putshar (1981, 404) as the predilected locations for rheumatoid arthritis, are not involved. The left foot is normal, but in the right foot the second and third tarso-metatarsal joints show severe morphological changes while the other tarso-metatarsal joints are normal. The first metatarsal shows pitting and cystic cavities distally (Plate 5), but the phalanges of the great toe are normal, as is the metatarso-phalangeal joint (the classic site of involvement in gout) of the left great toe. The spine is fragmentary, but evidence of intervertebral disc degeneration and associated osteophyte formation, probably related to the age of this individual, was noted in the cervical (C4-7) and the lumbosacral (L4-S1) vertebrae. There is no evidence of sacro-iliac inflammation, but the asymmetrical and selective distribution of affected joints in the hands and foot suggests a seronegative arthropathy, perhaps psoriatic arthritis.

Spinal arthropathy and extra-spinal soft-tissue ossification were recorded in another male (374), a mature adult. The right



Plate 2. Skeleton 249 — iron manacle.



Plate 3. Skeletons 251 and 252.



Plate 4. Arthropathy: Skeleton 359.



Plate 5. Arthropathy: Skeleton 359.

Table 20. Oral pathology in the adults from St Nicholas Hospital and six comparative sites.

	St Nich. Hospital	Lewes Friary	St Giles Church	St Giles Hospital	St Leonards Hospital	St Jam & MM Hospital	St Andrew's Church
Teeth scored	1749	674	278	639	614	817	1406
No. carious	133	67	27	56	45	159	
Percentage carious	7.6	9.9	9.7	8.8	7.3	19.5	4.3
Sockets scored	2042	956	374	15	965		
Abscess sites	52	15	0		18	71	
frequency	2.5	1.6			1.9		1.9
Ante-mortem tooth loss	157	35	39	86	140	302	
Frequency	7.7	3.7	10.4		14.5		3.2
Individuals with caries	40	22	11	19	18	40	
Percentage	54.8	64.7	78.6	65.5	36.7	78.4	38
With abscess	30	12	0	9	12	31	
Percentage	40.5	33.3		31.0	24.5	60.8	
With ante-mortem tooth loss	41	29	7	16	23	38	
Percentage	55.4	80.6	50.0	55.2	46.9	74.5	
Individuals showing enamel hypoplasia (%)	42	73	36	86	86	72	53

intervertebral facets of C2–6 are modified morphologically and eburnated, and evidence of intervertebral disc degeneration and considerable osteophyte formation on the margins of the vertebral bodies was noted in the cervical and thoracic spine, and in L5; in the rest of the lumbar spine, osteophyte formation is less severe. In the thoracic spine, the osteophytes are more prominent on, but not confined to, the right side, and several are almost touching the osteophyte the adjacent centrum. Arthropathy was also noted in the costo-vertebral articulations. Some of the sternocostal ligaments are ossified, uniting the left first rib to the manubrium (the right side is absent) and both fourth ribs to the sternum; the superior part of the anterior sacro-iliac ligaments is ossified, uniting the sacrum to the ilia, and ossification of soft-tissue attachments has occurred throughout the skeleton. While the arthropathy in the neck may be age-related, the very large thoracic osteophytes associated with extra-spinal hyperostosis suggest more than simply degenerative changes. Ankylosing spondylitis is unlikely because the lumbar spine and the sacro-iliac articulations are not involved. Possibly the changes represent an early stage of DISH (disseminated idiopathic skeletal hyperostosis), although the thoracic osteophytes do not have the characteristic 'poured wax' appearance usually seen in DISH, nor have they exclusively on the right side.

#### Schmorl's nodes

Schmorl's nodes were noted in 41 spines (56%) out of a total of 73 scored; they were present in 36 (63%) of the 57 male spines examined and in 4 of the 13 female spines. These irregularities on the surface of the vertebral body, frequently seen in archaeological material, are caused by herniation of the intervertebral disc and are usually interpreted as indicators of previous stress in the spine, probably during adolescence.

#### Osteochondritis dissecans

Small 'punched out' depressions, probably osteochondritis dissecans, were noted in one or more articular surfaces in

11 males and 2 females; the depression is formed when a fragment of necrotic bone becomes detached from the articular surface, often as a result of trauma. The joints involved were in the neck (234), shoulder (249, 283, 315), elbow (355), knee (234, 413), ankle (161, 197, 224, 234), and foot (252, 356). It is uncertain whether any of the foramen-sized perforations recorded in the proximal articular surface of the first phalanx of the great toe in seven individuals (194, 224, 265, 285, 295, 313, 316) and in the patella in one (303) are also cases of osteochondritis dissecans.

#### Trauma

The evidence of trauma seen in this sample ranges in severity from unhealed cuts which are likely to have been the cause of death to minor well-healed injuries.

Unhealed cuts marks were recorded in four males. A fragmentary cranium (180) shows a total of five cuts, ranging in length from 38 to 72 mm, in the occipital and parietal bones. In three cases the blow has removed a segment of bone, exposing the diploë and perforating the inner table of bone; the other two cuts penetrated the outer table only. A cranial fragment consisting of the incomplete left parietal and occipital bones from another individual (232) shows two deep cuts at its margins (Plate 6). The extent of the cuts is unknown, but the blow to the occipital must have almost severed the head from the body. The mandible of skeleton 143 has been sliced in half at the symphysis and bears cut marks at three different angles, and the greater trochanter of a left femur (372) shows a cut mark posteriorly.

A healed impact injury, measuring 11 mm in diameter at the ectocranial surface and which just perforated the endocranium, was noted anterior to Bregma on the frontal bone of a male (322) and a probable ossified haematoma (diameter approximately 30mm), probably resulting from a blow on the head, was seen on the frontal bone, adjacent to the left pterion, of a female (336).



Plate 6. Trauma: Skeleton 232.

Osteological examination of skeleton 290 confirmed the observation at the time of excavation that no bones from the left hand were recovered. The left ulna is normal but the distal articular surface of the left radius is very irregular and appears to lack part of the styloid process; an associated amorphous loose fragment probably represents at least two united carpals and, perhaps, the rest of the styloid process (Plate 7). There is no evidence of active inflammation and the bones of the left forearm are the same size as those from the right forearm. Apparently this male, aged 17–25 years, had lost his left hand at the wrist after skeletal maturation and long enough before death for healing to be completed, but sufficiently recently for the arm bones to show no disuse atrophy.

Nine healed fractures were noted in eight individuals (seven males and one female). The fibula was involved in three individuals (258, 309, 381) and both the tibia and fibula in another (257). A healed crush fracture of the fourth lumbar vertebra was recorded in skeleton 249. Healed fractures were also noted in a pubis (370) and a distal humerus (230). An ulna shaft had healed without re-uniting (381), and a midshaft fracture of the radius (322) was in the process of healing at the time of death.

Minor injuries which had healed or were in the process of healing were noted in the sternum of a male (143) and in the bones of the hand or foot of four males and an adolescent of indeterminate sex (224, 257, 322, 333, 349). Small, more or less circular indentations, ranging in diameter from 7 to 14 mm, were noted in the ectocranial surface of the frontal (255, 382) and parietal (343) bones of three males. Two indentations show mild pitting, but not active osteitis, and the third has a smooth surface. These probably represent minor, healed head injuries; an alternative interpretation, suggested by Stroud and Kemp (1993, 223) for similar depressions in crania from Fishergate, is that they mark the site of an overlying soft-tissue lesion such as a sebaceous cyst.

Two skeletons are included in this section because it is believed that the lesions recorded are traumatic in origin. A dislocated left ankle was noted in skeleton 333 (a male). The calcaneum and talus are united and the articular surfaces of the distal tibia and the talus show long-established inflammatory changes. The talus articulated with the tibia not via the articular surfaces but on two areas of additional bone at



Plate 7. Trauma: Skeleton 290.

the posterior edge of the trochlea (Plate 8) and corresponding 'facet' on the distal tibia; thus the foot was malpositioned, and slanted downwards at an angle of approximately 120 degrees to the vertical. The eburnated surface of the tibio-tarsal 'articulation' is evidence that there was some movement, albeit limited, in the ankle, and the extremely modified distal articulation of the lateral metatarsals and proximal first phalanges of the left foot (Plate 9) are further evidence of abnormal gait. Radiographic investigation of the calcaneum and talus did not provide any evidence of a crushing injury, but the inflammatory changes suggest that the dislocation was traumatic rather than congenital.

Only the upper part of skeleton 312 (a probable male) was recovered; the left shoulder is normal, but the right shoulder and upper arm are atrophic (Plate 10). The acromion and coracoid process of the scapula are modified morphologically and the glenoid cavity is very small, the acromial end of the clavicle is twisted round so that it forms almost a right angle with the sternal end of the shaft, and the humerus head is small and the shaft is extremely slender. With so little of the skeleton available for study, explanations of the atrophy can be no more than tentative. Perhaps this is a congenital anomaly, or perhaps paralysis in the arm was a sequel to poliomyelitis. Perhaps, in view of the extreme modification of the left clavicle, it is more likely that the shoulder-girdle was dislocated in a traumatic episode a long time before death, possibly even at the time of birth, during a difficult delivery.

#### Inflammation and infection

Osteitis, in the form of pitting of the surface of the bone, was recorded on the maxilla and mandible of a child aged between birth and 18 months (298), on the endocranium and maxilla of a child aged about 18 months (271) and endocranially, following the line of the sagittal suture, in an



Plate 8. Trauma: Skeleton 333.



Plate 10. Trauma: Skeleton 312.



Plate 9. Trauma: Skeleton 333.

elderly male (309). Pitting on the shafts of the right tibia and fibula of skeleton 257 is associated with healed fractures in both bones. Striations and deposits of subperiosteal bone on the right tibia and fibula of two skeletons are associated with a healed fracture in the fibula and osteitis in the right calcaneum (258) and a foot injury (349). Small deposits of subperiosteal bone are present in the region of the lesser trochanter of the right femur of skeleton 374, but post-mortem damage obscures the extent and possible cause of the inflammation. Bilateral subperiosteal striations which do not appear to be associated with other pathology (a relatively common finding in archaeological material) were recorded on the shafts of the tibia and fibula in five adults and an adolescent (146, 197, 236, 322, 336, 407), and deep striations



Plate 11. Leprosy: Skeleton 343.

and deposits of subperiosteal bone on one side only in two children (326, 366).

Active inflammation was seen in the right foot of a male (333) who had a long-established dislocated left ankle, described above. The bones are light and rather poorly preserved, but four metatarsals and a phalanx show pitting and deposits of 'fluffy' subperiosteal bone on the shafts (the distal articulations are unaffected) and two phalanges are modified distally. The surviving tarsals and several other phalanges are normal. Striations and deposits of subperiosteal bone were noted on the shafts of both tibiae and fibulae and a diagnosis of leprosy was considered, but the changes in the foot are not typical of leprosy and there are no rhinomaxillary changes (Møller-Christensen 1978). In the spine, the fourth and 5th lumbar vertebrae are united, with elaborate bony 'bridging' between the two vertebrae, and L4 is tilted to the right; the rest of the spine is normal. The possibility of tubercular osteomyelitis was investigated by radiographic



Plate 12. Leprosy: Skeleton 343.

examination, which did not reveal the presence of any internal abscessing. An alternative explanation could be herniation of the intervertebral disc, due to degenerative changes and/or trauma, subsequent associated osteophyte formation and, eventually, bony union.

Two skeletons show changes suggestive of leprosy. One, a young male (343), showed none of the cranial changes described by Møller-Christensen in 1961 and 1978 (absorption of the anterior nasal spine, atrophy of the maxillary alveolar process, palatal osteitis, etc.), but the symmetrical tibio-fibular periostitis and the osteitis and destructive changes in the lateral metatarsals are typical of this disease (Plate 11). The osteitis and osteomyelitis seen in the tarsals (Plate 12) and metatarsals are very suggestive of secondary infection spreading from trophic ulcers at pressure points — the head of the 5th metatarsal bones and the sole of the foot at the heel. These findings would be consistent with a diagnosis of the tuberculoid form of leprosy; tuberculoid leprosy has been recorded in a number of skeletons from the Hospital of St James & St Mary Magdalene.

Only the feet and the distal ends of the fibulae were recovered for another adult (377), but the morphological modifications, osteomyelitis, ankylosis and atrophy in the feet (Plate 13) and the periostitis in the fibulae are characteristic of leprosy; however, without data for the rest of the skeleton, this diagnosis is only tentative.

An interesting finding was a male skeleton (252) showing evidence of ulcers on the lower legs. Raised, oval patches of pitted bone on the medial surface of the left distal tibia and the lateral surface of the right distal fibula are associated with pitting, striations and shaft expansion in the tibia and large deposits of reactive bone extending up the shaft in the fibula (Plate 14). The cause of the ulcers is uncertain. Obesity ulcers, usually seen in the middle-aged or elderly, are perhaps unlikely in an individual aged only 25–35 years, although the position of the limbs when the skeleton was *in situ* could be taken as evidence that he was fat (Plate 3); alternatively, it may simply reflect the manner in which the body was placed in the grave. Tropical ulcers would probably not occur bilaterally on the lower legs. An alternative explanation is that the ulcers were caused by irritation from chains or some other means of restraint fitted to the legs over a prolonged period of time. Evidence of the practice of forcible restraint is provided by



Plate 13. Leprosy: Skeleton 377.



Plate 14. Ulcers: Skeleton 252.

skeleton 249, a young male who was buried wearing a shackle on the right leg (Plate 2); however, in this skeleton there is no inflammatory reaction in the leg bones.

The overall frequency of tibial osteitis as defined by Anderson (unpublished) is 16.7% (11/66 adults). This

Table 21. Cribia orbitalia observed/individuals scored.

	0-3 yrs	15-20 yrs	17-25 yrs	25-35 yrs	35-45 yrs	c. 45 yrs	Adult	Total
<b>Immature</b>	3/3	2/4						5/7
<b>Males</b>			9/21	5/14	2/8	1/3	1/2	18/48
<b>Females</b>			3/6	0/2	1/2		1/2	5/12
<b>Unsexed adults</b>			2/2				1/1	3/3
<b>Total</b>	3/3	2/4	14/29	5/16	3/10	1/3	3/5	31/70

relatively high frequency (Anderson recorded 9% at St Gregory's Priory) suggests that the local population was moderately resistant to non-specific infection, since the bony reaction is proof that the individual's immune system was fighting the infection.

#### Porotic hyperostosis

Cribia orbitalia (pitting on the roof of the orbit) and osteoporotic pitting in the external surface of the cranial vault are generally believed to indicate some form of chronic anaemia. Cribia orbitalia was seen in 31 individuals out of 70 scored. The degree of pitting ranges from severe in a child aged about 18 months (271) to mild in 24 adults and adolescence and two children; 19 out of 51 males and five out of 12 females were affected. The frequency of cribia orbitalia is higher in immature individuals than in adults, and in adult females than in adult males (Table 21). The highest frequency for both sexes is in the group aged 17-25 years and nearly half (9) of the males showing cribia orbitalia ( $N = 19$ ) show supra-orbital and/or bi-parietal osteoporosis as well. Supra-orbital osteoporosis was recorded in 24 out of 65 individuals (24 out of 47 males and no females out of 12 scored) and bi-parietal osteoporosis in 11 out of 70 individuals (10 males, six of whom showed supra-orbital osteoporosis also, out of 50 scored and one female out of 14 scored).

#### Hyperostosis frontalis interna

Hyperostosis frontalis interna was recorded in one female (251) This thickening of the frontal bone endocranially is typically seen in post-menopausal females, and suggests that this individual (for whom there are no dental remains) was of advanced years.

#### **Discussion**

Detailed documentary information about medieval hospitals is scanty, and the few excavations which have been carried out have been limited in extent and the human remains they have yielded have tended to be sparse and incomplete. This sample from the cemetery of St Nicholas Hospital provides a much-needed opportunity to expand our knowledge of the subject.

Medieval hospitals were usually run by ecclesiastics and, although Lanfranc's Hospital in Canterbury was founded for men and women inmates (Orme & Webster, 1995, 22), many hospitals in the early medieval period took predominately adult males; later, females were admitted also. Women were cared for during childbirth and if the mother died the child might remain in the hospital; St Mary without Bishopgate and St Bartholomew in London brought up orphans to the age of seven (Orme & Webster 1995, 111). The sample from St Nicholas Hospital covers a long time span, but most of the adults are male. Perhaps the remains of young adult females and infants are evidence of deaths associated with childbirth, and skeleton 251, a female of advanced years, is proof that at

some stage the hospital admitted elderly females too.

The purpose of many medieval hospitals was to provide shelter for travellers, to support the poor and to care for the aged, the infirm and the sick; others were founded between the eleventh and fourteenth centuries to care specifically for lepers (Roberts 1986). St Nicholas Hospital appears to have been a non-leper hospital for most of the time, and the sample includes individuals who were suffering from a variety of complaints, such as long-term joint disease, chronic infection and disability, as well as those who probably died violently, possibly from battle injuries. One male had lost a hand and perhaps this too was a battle injury; contemporary documents refer to several instances of people maimed in the wars and being sent to various hospitals for maintenance, including, in 1314 (the year of the battle of Bannockburn), a man whose hand had been cut off by Scottish rebels (Clay 1909, 99). An alternative interpretation is that his hand was amputated as a form of punishment, a practice current in the early medieval period (Pollock & Maitland 1911, 460-98). The presence of only four males who appear to have died a violent death does not support the anecdotal references to many of the dead from the battle of Lewes being buried in the hospital cemetery, but perhaps excavations elsewhere in the cemetery would prove otherwise. It is not known to what extent the poor are represented in this sample, although the presence of 19 adults and one adolescent in chalk-cut graves suggests not all might have been of the same status. The elderly are present (though in the minority) in the sample, as are one or possibly two lepers. Non-leper hospitals did not exclude those suffering from leprosy, and three are reported at the Hospital of St Giles (Chundun unpublished) and possibly one at the Hospital of St Leonard (Bishop 1983). The insane were accepted into some hospitals and in 1403 St Mary without Bishopgate, London has six insane men and three other sick inmates (Clay 1909, 33). The iron chains, manacles and stocks in this hospital's inventory of 1398 were probably for the restraint of the violently insane, and one wonders whether a similar interpretation is appropriate for the young male at St Nicholas Hospital who was buried wearing an iron shackle. If the large ulcers on the legs of another individual were indeed caused by irritation from chains, this unfortunate man must have been forcibly restrained for a long period of time before he died.

It is perhaps not surprising that there is no evidence of surgery or other medical treatment, because medieval hospitals were institutions where a priest was usually in charge, not a doctor, and the aim was to provide spiritual comfort and general nursing rather than medical attention (Stearns 1985). The low frequency of dental caries and oral abscesses suggests good oral hygiene and/or a diet which was beneficial to oral health, but it is uncertain whether these could be attributed to the hospital regime because we do not know how many, if any, of the individuals in the sample

Table 22. Number of identified fragments and minimum number of individuals for each species from Context 10.

	Cattle	Horse	Pig	Sheep/ goat	Hare	Fowl	Goose	Species ident.
No. of fragments	81	5	48	158	5	32	17	525
MNI	4	2	5	8	1	3	2	

Table 23. Distribution of species from individual contexts and minimum number of individuals from the assemblage as a whole.

Species	Context number								MNI
	8	10	27	28	29	31	32	33	
Cattle	*	*	*	*	*	*	*	*	5
Horse		*	*	*	*	*			2
Pig		*	*	*	*	*	*	*	10
Sheep/goat	*	*	*	*	*	*	*	*	29
Cat				*			*		1
Deer	*						*		1
Hare		*							1
Rat							*		1
Fowl	*	*	*	*	*	*	*	*	6
Goose	*	*	*	*	*	*	*	*	3

MNI = minimum number of individuals

were long-term inmates. In general, the local population as represented by this sample seems to have been relatively free from phases of severe malnutrition or infection during childhood, although some form of chronic anaemia was prevalent, particularly in the young.

#### THE ANIMAL BONE by Sue Browne

The subject of this report is bone which was deposited in Quarry 7 in Area B and is assumed to be food remains from the hospital. The bone came from ten contexts, two of which (9, 23) contained only a few small fragments of undiagnostic mammal bone. Bone from one more context (30) near the top of the quarry was not included in the analysis because of the risk of the presence of intrusive material from Context 19 above. The assemblage probably derives from various sources in the environs of the hospital; the bone is much fragmented by butchering activities, and some fragments have been burnt or gnawed by carnivores. Weathering on some fragments suggests that they lay on the surface of the ground for a period of time, but the majority, which are unweathered, were probably deposited straight into the quarry.

Detailed quantification of the bone was carried out for only one context (10), but it is typical of the assemblage as a whole. A total of 871 fragments were examined, of which 346 (40%) were identified to species level (Table 22). Included in the total of 525 fragments from indeterminate species are 350 fragments of vertebrae and ribs and 85 fragments of long-bones from large and medium-sized (from cattle- to sheep/goat-sized) mammals.

The assemblage consists mainly of the remains of cattle, pig and sheep/goat. Approximately 82% of the bones bear butchery marks, which represent the usual range of activities associated with food preparation — the removal of the extremities, the separation of the hind leg from the pelvis and the jointing of the upper limbs. Mandibles chopped through the ramus or the corpus and crania split open on

the midline were noted, as well as many chopped ribs and vertebrae, including a few vertebrae of sheep/goat size from a carcass which had been divided down the midline. Cut marks were also noted on a few fowl bones. The presence of bones from all parts of the skeleton of cattle, pig and sheep/goat suggests that entire carcasses were butchered very near or at the hospital.

The distribution of species from individual contexts and the minimum number of individuals present in the assemblage as a whole are shown in Table 23. Cattle mandibles and pelves indicate that at least three adult animals and two calves are present. The jaws of pig are from one mature sow and five immature animals, including two males and a female. Long-bones represent a further four animals, one a newborn piglet and one extremely small, probably foetal. Variation in the size of adult cattle and pigs was noted, but there are too few measurable bones in the assemblage to quantify this metrically. Probably some of this size variation is attributable to sexual dimorphism, and some may be due to genetic factors. Sheep/goat mandibles (none is definitely from goat following Payne's (1985) criteria) are from six adult and three immature animals, including two very young lambs/kids, and the distal humerus adds a further 20 animals which were at least partly skeletally mature. All the cranial fragments with horn cores are from sheep (a minimum of five animals), and one horn core from goat is present, but it has been sawn from the cranium and may have been brought to the site from elsewhere. Although there is no definite morphological evidence, using Boessneck's (1969) and Prummel & Frisch's (1986) criteria, of the presence of goat in the postcranial remains, considerable variation in the size of the long-bones suggests that some of them are from goat. A metrical analysis of 20 distal humeri shows a very wide distribution, probably due to the presence of both sexes of more than one species; alternatively, if only sheep are present, the sample presumably consists of animals derived from genetically distinct flocks.

The horse remains are all limb bones and are from adult animals about the size of a New Forest pony. An adult fallow deer is represented by a distal femur. The recovery of the remains of fallow deer from other archaeological sites shows that this species, introduced into Britain from the Continent, was present in this country in early medieval times, but it does not seem to be widespread until the fourteenth century. Both these species were clearly used as a food resource, because the bones bear butchery marks. An antler fragment from red deer consists of the upper part of the beam, so it is not known whether this was a shed antler collected elsewhere and brought back to the site. The few (adult) hare bones bear no cut marks, but presumably the animal was eaten.

Other mammals include cat (a young animal, but not a kitten) and rat. No doubt cats were useful in controlling vermin in the vicinity of the hospital.

The bones of at least four adult and two immature fowl are present, and the geese were all adult birds. The fowl were similar in size to jungle fowl or slightly larger; one goose was the same size as greylag (and perhaps wild) and two were slightly larger (and probably domesticated).

This assemblage, although not large, provides some useful information about hospital fare in medieval times. Although sheep/goat predominate numerically in the assemblage, cattle, with their much larger body size, would have provided the major meat supply. It is interesting that horseflesh appears to have been eaten, as horse bones from medieval sites are often interpreted as the remains of animals fed to dogs. Poultry formed a part of the diet, as no doubt did eggs (eggshell was found in Context 34) and fish were clearly an important food supply (see below). The remains of two wild species (and possibly wild greylag goose) raise the question whether these would have been consumed by the inmates of the hospital or reserved for the ecclesiastics.

#### THE FISH BONE by Sue Browne

A 50-litre soil sample from Context 10 (Quarry 7, Area B) yielded 504.2 g of fish bone, retrieved from sieves with mesh sizes of 10 mm, 2.3 mm and 500 microns. The bone is heavily fragmented and no head bones survive intact. Apart from fragments of head bone from Gurnard and buckler from Roker, the following specific identifications are based on vertebrae and should be regarded with a little caution.

Roker (*Raja clavata*)

Eel (*Anguilla anguilla*)

Herring family (Clupeidae)

Cod (*Gadus morhua*)

Haddock (*Melanogrammus aeglefinus*)

Cod family (Gadidae)

Tub gurnard (*Trigla lucerna*)

Thick-lipped grey mullet (*Chelon labrosus*)

Mackerel (*Scomber scombrus*)

Flatfish

Eels spend part of their life cycle in fresh water and were probably netted or trapped in rivers or lakes near Lewes. The general absence of freshwater fish in the sample is noticeable, particularly when one considered their exploitation by monastic establishments. With the exception of Eel, all the other fish are marine species, most of which would have been available in inshore waters. The grey mullet frequents estuaries and sandy bays, and roker, a tub gurnard and flatfish live in

shallow water. Herring and mackerel may have been caught locally as, although they are usually found in moderately deep water, they move closer inshore seasonally. The cod and haddock were probably caught in deep water, perhaps not locally; salted or dried cod and other deep-water species were distributed from the east coast through extensive trading networks during the medieval period.

#### THE MARINE MOLLUSCS by Elizabeth Somerville

##### Introduction

This report is based on the examination of a sub-sample of the large assemblage of marine molluscs from the fill of the Quarry in Area B of the site. Shell from four of the medieval contexts, ranging in date for the late twelfth/early thirteenth century to the late thirteenth century, was sampled, together with a sample of post-medieval material. The sampling strategy used was first to assess which contexts contained the most material and then to take at least 30% of the material from these contexts. Since the mussel shell had been largely sorted out on site, sufficient of this was processed from the two contexts which contained considerable quantities of mussel to give a sample of at least 30 whole valves.

##### Methods

All shells were identified to species (Fish & Fish 1988) and identified shell was weighed. Fragments smaller than approx 0.5 cm<sup>2</sup> were discarded. Bivalves were counted as complete right/left valves, right/left umbos or fragments, whereas gastropods were counted as complete, apices and fragments. Because not all the shell from the different contexts has been examined, it is inappropriate at this stage to calculate values for the minimum numbers of individuals (MNI). Although all complete shells found were measured, as described below, this report deals only with the metrical data from oysters and mussels.

The maximum length (from umbo to opposite margin) and width (orthogonal to length) were measured for bivalves. Whole oyster shells were also scored for a number of other characteristics, including age and the extent to which the surface of the shell bore the marks of infestation by one or more of the polychaete worm species *Polydora ciliata*, *P. hoplura* and the burrowing sponge *Cliona celata*. The presence of these species was noted, as well as the presence/absence of other encrusting or adhering organisms, including conspecifics.

For gastropods, the maximum length (from apex to base) and width (orthogonal to length) were measured, and a note was made of any infesting or encrusting organisms. In the case of limpets, the maximum axis of the base of the shell was measured as well as a second axis orthogonal to this.

##### Results and discussion

###### Species present

In this sampling of the material oyster (*Ostrea edulis*) and mussel (*Mytilus edulis*) formed the majority of the material. Other species found were winkle (*Littorina littorea*), saddle oyster (*Anomia ephippium*) and carpet shell (*Venerupis pullastra*) from the earliest of the medieval contexts, and limpet (*Patella vulgaris*) from one of the post-medieval contexts. Table 24 gives the sub-sample sizes for oyster and mussel and indicates which contexts contained other species.

###### Oyster

As can be seen from Table 24, the whole oyster shell was

Table 24. Species present at Lewes Hospital Area B in contexts sampled. Contexts are ordered according to age; Contexts 18 & 19 are early post-medieval.

		Context 10	Context 8	Context 32	Context 30	Contexts 18 & 19
Oyster	LHS valves	0	0	1	0	3
	RHS valves	57	58	16	28	22
	LHS umbos	170	149	63	63	63
	RHS umbos	77	127	18	31	27
	fragments	4	38	4	2	0
	weight (gm)	16211.9	15244.2	5733.1	6347.4	5859.7
Mussel	LHS valves	15	13			
	RHS valves	16	17			
	LHS umbos	184	48			
	RHS umbos	187	45			
	fragments	297	41			
	weight	1864.2	698.3			
Other species	present	winkle saddle oyster shell carpet shell				limpet

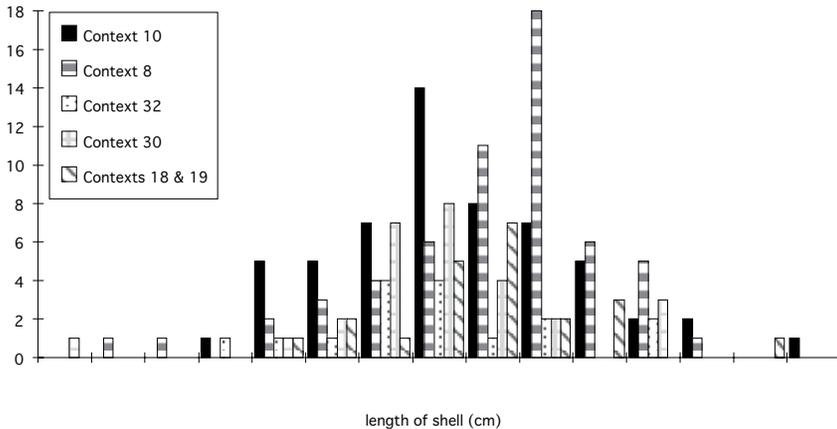


Fig. 15. Oyster shell lengths (right valves).

predominantly right valves, but the greater number of left umbos indicate that there is unlikely to be a bias in deposition. The quantitative information described below comes from the right valves only.

Although Figure 15 shows that there is some variation in the size of shells from the different contexts, this is not significant ( $F = 1.76$ ;  $df = 4, 176$ ;  $p = 0.14$ ). Most of the samples appear to be normally distributed, and the average sizes of the shells, which range from 7.7 cm to 8.2 cm, are well above the average of 6.4 cm given by Winder (1992) for shells from the eleventh to sixteenth century.

The data for shell age is an interesting contrast to the data for shell length. Unfortunately, at least 25% of the shells in each sample could not be aged, and therefore the percentage distribution of ageable shells is given here. It is quite clear that none of these populations shows a normal distribution, but, with the exception of Context 10, there is something of a skewed population, with a long tail of relatively old shells. It would appear, therefore, that selection for harvesting and/or marketing of these oysters is by length alone, without

reference to age.

The data on infestation shows no marked change over the four medieval periods. With further data it may prove relevant that the few heavily infested shells found were all from the post-medieval contexts. However, at all ages 50% or more of the shells showed no infestation, an observation which needs to be tempered by the proviso that this data comes only from the generally less infested right valves. The most common infesting species was *C. celata*, with both the *Polydora* species present in only small numbers. The lack of infestation, together with the good size of the oysters, does indicate that, in this aspect of their diet, the inhabitants of the Lewes Hospital site were well provided for.

*Mussels*

As described in the introduction, a small sample of mussels were measured from two of the medieval contexts.

There is no difference in the size of these but, as indicated in Figure 18, they are smaller than a modern commercial sample ( $F = 4.42$ ;  $df = 2, 77$ ;  $p < 0.05$ ). My experience is that

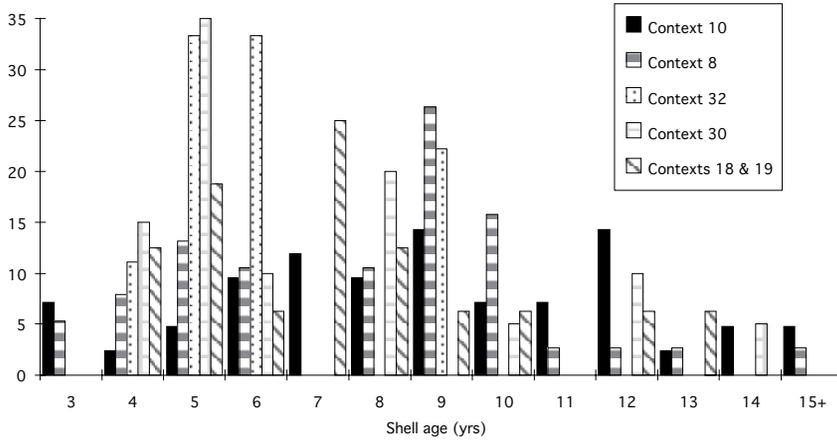


Fig. 16. Oysters: ages (right valves).

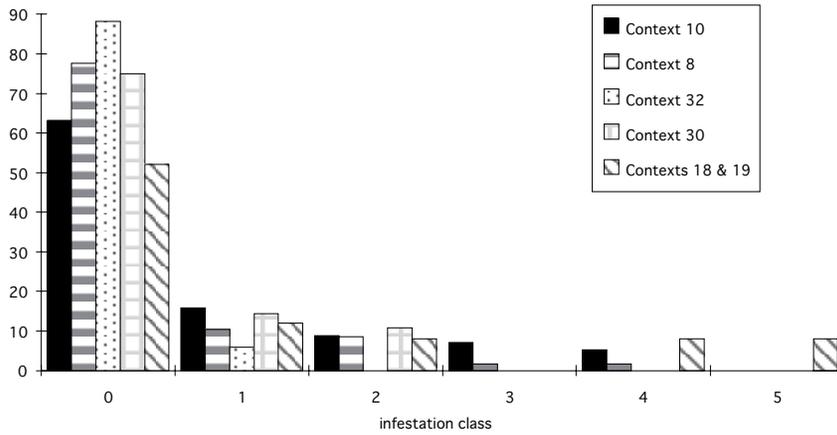


Fig. 17. Oyster infestation.

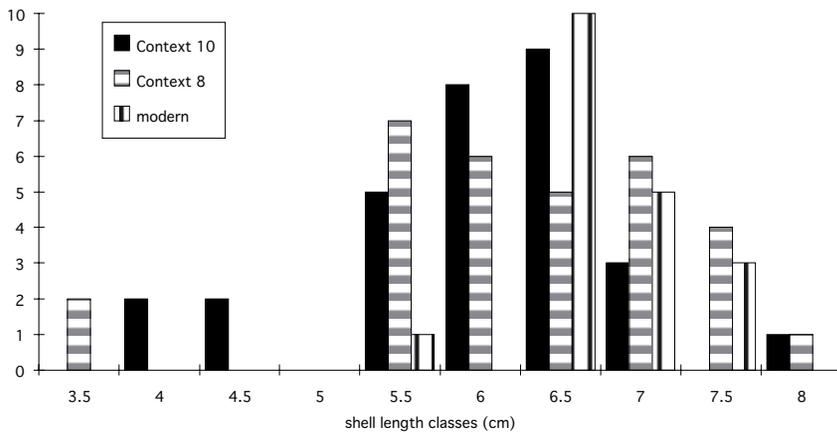


Fig. 18. Mussel shell lengths.

mussel shell rarely survives well on archaeological sites, and there is little data against which to compare these measurements. Nonetheless, some further effort needs to be made in this regard.

### Conclusions

These results indicate that the Lewes Hospital site was fairly prosperous. To complement the large hospital sample, information is also available from two other medieval religious sites in Lewes, namely Lewes Friary and Lewes Priory. A preliminary report of this nature is not the place to give a detailed comparisons between them. However, there are clear differences in infestation levels between the Lewes Hospital site and the Lewes Friary site, and probably some differences in size between the Lewes Hospital and the Lewes Priory sites.

### THE CARBONIZED SEEDS by Pat Hinton

A single-50 litre soil sample was taken at the site (Area B Context 10). This was wet-sieved through a 500 micron mesh in order to retrieve carbonised seeds and charcoal. Although much charcoal was recovered from this sample (material archived) very few seeds were present. The following were identified.

<i>Triticum</i> sp. (wheat)	3
<i>Avena</i> sp. (oats)	4
Unidentified cereals	2 plus fragments
<i>Vicia faba</i> var. <i>minor</i> (broad or field bean)	1 plus fragments
<i>Pisum sativum</i> (pea)	1
cf <i>Pisum sativum</i>	1 plus fragment
<i>Malva</i> sp. (common mallow)	1
<i>Vicia hirsuta/tetrasperma</i> (hairy or smooth tare)	1
<i>Galium aparine</i> (cleavers)	1

All the seeds, particularly the cereals, are poorly preserved and impossible to identify closely to species. With the exception of the last three species, which are common weeds of field or other open spaces, all are from edible plants. However, too few are present to be able to draw any conclusions regarding the diet at the hospital.

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