CHAPTER 12

Introduction to the CD-Rom

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Supplementary maps for Feudal Landscapes (Chapter 9)

Larger versions of three maps presented in the book are provided here (Figs 9.10-12).

CHAPTER 13

Coins

by Nicholas Cooke

13 Coins

Nicholas Cooke

A total of 379 coins was recovered from the Framework Archaeology excavations at Stansted Airport. The majority of these are Roman in date, with two Late Iron Age coins, whilst a number of medieval and post-medieval coins and tokens were found on the LTCP excavations.

The Iron Age and Roman coins

All bar one of the coins are copper alloy, with the single exception (SF 783, found unstratified on the MTCP excavations) being a silver *siliqua* of Valens. Most of the Iron Age coins were recovered from the evaluation and excavations on the MTCP site (some 347 coins in all). The only exception to this is a single Roman coin recovered unstratified from the excavations on the LTCP site (SF 129, an *antoninianus* of Carausius minted AD 286 - 293).

In general, the coins are in fairly poor condition with the vast majority showing significant signs of wear (see Table 13.1). Indeed only two coins were considered unworn on both obverse and reverse. Most of the coins had seen a degree of corrosion, with some very badly corroded indeed. In general the condition of the coins indicates that the coins were probably in circulation for some time prior to their loss or deposition.

The Iron Age and Roman coins from Stansted Airport range in date from two late Iron Age copper alloy coins (SF 766 and 972) to 23 coins of the House of Valentinian (see Fig. 13.1). Some 278 of these could be assigned minting dates with certainty, with the remaining 69 dated on the basis of their size and shape (this allowed them to be broadly grouped into wide date spans – C1/C2, C1/C3, C3/C4 and C4). Figure 13.1 shows the coins from the Stansted excavations grouped into the 21 periods for Roman coin analysis devised by Reece (1991). As expected, the main grouping of coins lies in the 3rd and 4th centuries AD, reflecting the rise to prominence of the settlement on the MTCP at this time.

The two Late Iron Age coins are a copper alloy coin of Tasciovanus (probably minted between 25 BC and AD 1 (SF 972) and a copper alloy coin minted either by Tasciovanus or Cunobelin in the first half of the 1st century AD (SF 766). In addition to these, there are two coins dating to the 1st century AD (SF 789 and SF 866), which are both Flavian in date and one dated to the 2nd century (SF 548, a sestertius of Faustina II). There are three further coins likely to date to the 1st, 2nd or early 3rd centuries AD, based on their size alone. Apart from these the remaining 339 coins date to the late 3rd or 4th century AD.

This pattern of coin loss need not indicate that the site was not in use during the 1st and 2nd century AD, as coins of this date are usually less common as site finds. Both of the Late Iron Age coins were found in later contexts, but their presence does confirm the Late Iron Age origins of the Roman settlement on the MTCP site.

The 3rd and 4th century coin loss is also interesting. As expected, the main peaks of coinage occur in Periods 14 (AD 275 –296) - and 17 (AD 330 – 348). Both of these contain a mixture of 'official' issues and contemporary copies, with Period 14 containing a very high proportion of 'Barbarous Radiates' and Period 17 containing copies of coins of the House of Constantine. The latter are mainly copies of the Gloria Exercitus issued depicting 2 soldiers either side of a single or double standard – 26 out of 40 coins (65%) – with smaller quantities of the celebratory Constantinopolis (7 coins – 17.5%) and Urbs Roma (2 coins – 5%) issues. Other copied coins include coins of Theodora (2 coins – 5%) and the Victoriaeddauggnn type depicting two facing victories holding wreaths (3 coins – 7.5%). Although there are fewer coins in Period 18, half of which are also copies – predominantly the 'Fallen Horseman' Fel Temp Reparatio issues of the AD 350's. All of these copies are contemporary copies of 'official' coinage, possibly struck to compensate for gaps in supply of coinage to Britain and to supply sufficient small change for the provinces needs. It is unclear whether these copies were officially sanctioned, if at all, but they are not uncommon as site finds, and seem to have circulated in the same fashion as officially struck coins.

Coins from the MTCP (BAACP99 and BAACP00)

The size of the Roman coin assemblage from the MTCP is sufficiently large for it to warrant comparison with other large coin assemblages from Roman Britain. Reece (1991) has compiled lists be period of coin assemblages from 140 sites in Britain, each of which contained a significant number of coins identifiable to period. Some 277 of the coins from the MTCP could be identified to period (with the 278th from the LTCP). A comparison between the proportion of coins lost on the MTCP and the average ration of coins lost per period on Reece's 140 sites shows a number of interesting patterns (Fig.13.2).

Overall, as expected, coin loss for the period up to AD 260 is lower than average for British sites. This occurs despite the fact that the site contained a small settlement throughout this period. In the light of this, it seems likely that coins were not used frequently on the site, although taxes would presumably have been paid in coin. The sharp drop in Period 13, between AD 260 and 275, may be a function of the poor condition of many of the radiate coins, which precluded their close identification and led to their inclusion amongst the copies and possible copies assigned to period 14. This may go some way to explaining the large peak of copies assigned to period 14.

The pattern for the following periods is much as expected, before a further major peak of coin loss for period 17 (AD 330 – 348). This period probably coincides with the period at which the site was at its peak, and comes in marked contrast to the following periods, with the sharp fall in Period 21 probably indicating that the site had been abandoned by this time.

In his work, Reece established that a comparison of the ratio between coins on a site struck between AD 260 – 296 (Period B) and AD 330 – 402 (Period D) provided some clear differences between sites of different types. This work established that rural sites from the west of England often have greater proportion of late coins than their eastern counterparts, and that as a result of this the eastern sites have a higher than average ration of Radiate coins to late 4th century coins. The settlement at

Stansted follows this pattern, with an above average B:D ratio. The pattern established by Reece's work is an interesting one, with an apparent fall off in coin loss (and presumably use) in the latter half of the 4th century in Eastern Britain.

<u>Distribution of coins</u>

Most of the early coins from the site appear to come from features in the late Roman settlement, and are therefore residual, whilst many of the 4th century coins from the site were recovered from the dark tertiary fills of late Roman features. These probably formed as the result of ploughing of the site in the Post-Roman or medieval period. They were probably originally incorporated within occupation deposits in the area of the settlement itself. This may also go some way to explaining the mixed nature of the coins and pottery assemblages within these tertiary fills.

<u>Residuality and coin loss</u>

Many of features contained more than one coin within its fills. Those cases in which more than one coin could be assigned to a specific period are shown in Table 13.2 below. This demonstrates is that the fill sequences of some features contain a number of coins from different periods. Earlier coins, and in particular the radiate coins of the late 3rd century AD, often occur in later 4th-century features. This may be the result of a combination of factors. Whilst it is clear that some of these coins may still have been in circulation as small change well into the 4th century, other coins may have been incorporated within later deposits or features as a result of continued settlement activity on the same site. In other words, coins lost on the site in the late 3rd century may have been reworked into later features in the 4th century.

Some of the coins included within this may have became incorporated at different dates – some of the larger features such as wells and large ditches may have had a long period of use spanning the periods concerned, whilst in other cases, later coins will have become incorporated within the tertiary fills of the feature as a result of the incorporation of settlement and occupation deposits through later ploughing activity.

The implications of this are, unfortunately, that the dating provided by a single coin, or even a small number of earlier coins cannot be relied on as dating evidence without the corroborative support of other forms of dated material (principally pottery spot dates) or stratigraphic evidence. Coins from the tertiary fills are less likely to be reliable as direct dating for the use of the feature than those in the primary fills, deliberate backfills and placed deposits, whilst those from secondary fills are more likely to date the end of a feature's useful life or its first disuse.

Conclusions

The Roman coins from Stansted Airport (and in particular the MTCP site) represent a fairly typical assemblage for a rural site in Eastern Britain of the 3rd and 4th centuries. Within this picture however there a number of points of interest. The relative dearth of early coins from and of the early Roman settlements may point to a reluctance to adapt to the new coinage introduced with the conquest. It may equally indicate that these settlements operated at a level at which the coinage available was not useful or necessary.

It is not until the late 3rd century that coins appear in any significant quantities on any of the sites, and when they are found, it is in association with a significantly expanded settlement complex on the MTCP site. This may either indicate that coin use had finally reached a level at which it became an important part of life on this new settlement, or even that the expanded settlement was not a natural expansion of the earlier settlement, but performed a different role.

The large peaks of coinage minted in the late 3rd century and the 330s and 340s AD are not unusual, although those from the MTCP site are slightly higher in proportion to the overall pattern of coin loss on the site than might otherwise be expected. There is no evidence to suggest that either of these might be influenced by deliberately deposited coins or a scattered hoard. The most likely explanation is that these are emphasised by the relative dearth of earlier or later coins. In other words, the pattern of coin loss is influenced by the history of the site, with the largest peaks of coin loss coinciding with the period at which the new settlement on the MTCP site was at its apogee, and that the settlement itself did not continue successfully until the end of the 4th century AD.

The history of coin use on the MTCP site is very much the history of the expanded settlement of the late 3rd and 4th century AD. Prior to this, coinage appears to have played little role in the Early Roman settlements on the MTCP or the LTCP sites.

The medieval and post-medieval coins, tokens and jetons

A single post-medieval coin, a half penny of William III (SF 1089) was recovered unstratified on the MTCP excavations, and probably represents a casual loss. The remaining thirty medieval and post-medieval coins, tokens and jetons were recovered from the excavations of the late medieval and post-medieval hunting lodge excavated on the LTCP site. These range in date from the late 15th century through to the second half of the 20th century.

The earliest of these comprise a group of seven copper alloy jetons struck in Nuremberg. The earliest of these is probably Object 1367, which imitates similar jetons, struck in Tournai in the first half of the 15th century. Neither of the other early jetons can be dated with certainty, but probably represent early developments of the ‘rose/orb’ type of jetons before the patterns became settled. This suggests that they date to the late 15th century. The majority of the remaining jetons (Objects 1165, 1286 and 1327) are ‘stock’ jetons of the ‘rose/orb’ pattern, which date to the first half of the 16th century AD. The latest of the jetons (Object 1403) was struck by Hans Krauwinckel II, who was Guild Master of the Nuremberg jeton makers from 1586 until his death in 1635. Many of these jetons were recovered from layers of cobbling associated with the hunting lodge.

Jetons were reckoning counters used in medieval accounting and mathematical calculations. They were used in conjunction with checkerboards or cloths in order to record values and sums of money. Specialist tokens for this purpose were produced from the late 13th century onwards, and they were in widespread use from the 14th century until the late 17th century, when they were made redundant by the increasing spread of Arabic numerals. Nuremberg took over from Tournai as the main European centre for jeton manufacture in the 16th century. Prior to this, designs on jetons usually reflected those on contemporary coins, and jetons were often minted under government authority. The only controls on the minting at Nuremburg were those imposed by the Guild organisation, and new designs flourished. The presence of jetons on the site of the hunting lodge may indicate that some form of accounting or bookkeeping was taking place.

A small number of 17th-century coins were also recovered from the excavations, including a silver half groat of Elizabeth I (Object 1330) minted in 1601 – 2, found residually in a later pit fill. A small farthing of Charles I (Object 1238) was recovered from the topsoil, whilst two coins of William III (Objects 1153 and 1195) were also found, both from the gridded cleaning of the site.

Three 18th-century coins – a penny of George II (Object 1166) and two half pennies of George III – were also found, the latter two from the topsoil. The coin of George II was recovered during the gridded cleaning of the site. The remaining coins from the site were recovered from the topsoil, and where they could be identified, date to the late 19th or 20th centuries. Many of these, particularly those dating to the first half of the 20th century may represent accidental losses by troops using the wartime installations in the adjoining fields to the south-west and north (an anti-aircraft gun site and an accommodation site were located in these areas).

Conclusions

The late medieval and post-medieval coins from the hunting lodge indicate that the complex was in use from the late medieval period well into the 18th century, although none are especially useful in dating particular sequences or features. Most of the 20th-century coins on the site were probably lost by Allied airmen and support troops stationed at Stansted during the Second World War.

Table 13.1: Coin condition

	Unworn obverse	Slightly worn obverse	Worn obverse	Very worn obverse	Extremely worn obverse	Illegible obverse
Unworn reverse	2		1			
Slightly worn reverse	1	57	7	1		
Worn reverse	1	31	85	6	3	3
Very worn reverse		5	15	74	2	
Extremely worn reverse		1	2	7	47	
Illegible reverse						

Table 13.2: Features containing more than one coin identifiable to period

Cut SG	**Feature**	**Fill type**	**Period 1**	**Period 4**	**Period 13**	**Period 14**	**Period 15**	**Period 16**	**Period 17**	**Period 18**	**Period 19**	**C3/C4**	**Total**
306045	LIA/ ERB ditch	Tertiary fill			1				1			1	3
		Secondary fill				2						1	3
													6
306057	LRB pit	Secondary fill						2				1	**3**
306100	Post-med ditch	Tertiary fill							1				1
		Secondary fill							1				1
													2
306110	LRB ditch	Secondary fill				2			3			1	**6**
306147	C2 – C3 ditch	Secondary fill				1			1				**2**
306151	LIA/ ERB ditch	Secondary fill			1	2			4				**7**
306165	LRB ditch	Secondary fill				2			3			5	**10**
306175	LRB ditch	Tertiary fill				1	1		2			1	5
		Deliberate backfill				1			2				3
		Secondary fill					1	1					2
													10
309187	Unphased	Secondary fill				1			1				**2**
314194	LRB ditch	Secondary fill				1			1	1		1	4
		Placed deposit				2			1			2	5
													9
325030	C2 – C3 pit	Deliberate backfill				2				1			**3**
330151	LRB pit	Secondary fill							2				**2**
336087	LRB ditch	Secondary fill				1				1			**2**
336090	Medieval ditch	Secondary fill				1				1			**2**
338037	LRB pit	Tertiary fill				2			4		1	5	**12**
344018	LRB ditch	Secondary fill				3			4			3	**10**
344026	LRB ditch	Tertiary fill						1	1				2
		Secondary fill		1									1
													3
344052	LRB ditch	Tertiary fill	1										1
		Secondary fill				1							1
													2
344131	LRB ditch	Secondary fill				1	1		2	1			**5**
344137	LRB ditch	Secondary fill				2			1				**3**
344142	LRB ditch	Secondary fill				1			1			1	**3**
344151	LRB ditch	Secondary fill				5					2		**7**
344154	LIA/ ERB ditch	Secondary fill								2		1	**3**
344159	C2 – C3 ditch	Secondary fill	1			2			2				**5**
344170	LRB ditch	Secondary fill			2							1	**3**
344224	LRB ditch	Secondary fill				1				3			**4**
344239	LRB ditch	Secondary fill							2		1		**3**
344355	LRB gully	Secondary fill						1	1				**2**
344372	C2 – C3 waterhole	Secondary fill			1	3							**4**
344375	LRB ditch	Secondary fill				1		1					**2**
344379	LRB natural feature	Deliberate backfill							2				**2**
347041	LRB pit	Secondary fill				3				1	1	2	**7**
349054	LIA ditch	Secondary fill							2				**2**
350031	LRB pit	Tertiary fill				1			1	1	3	1	**7**
350050	LRB pit	Tertiary fill							2	1			**3**
350059	LRB well	Deliberate backfill				2			4	1		2	**9**
355060	LRB pit	Secondary fill							1		1		**2**

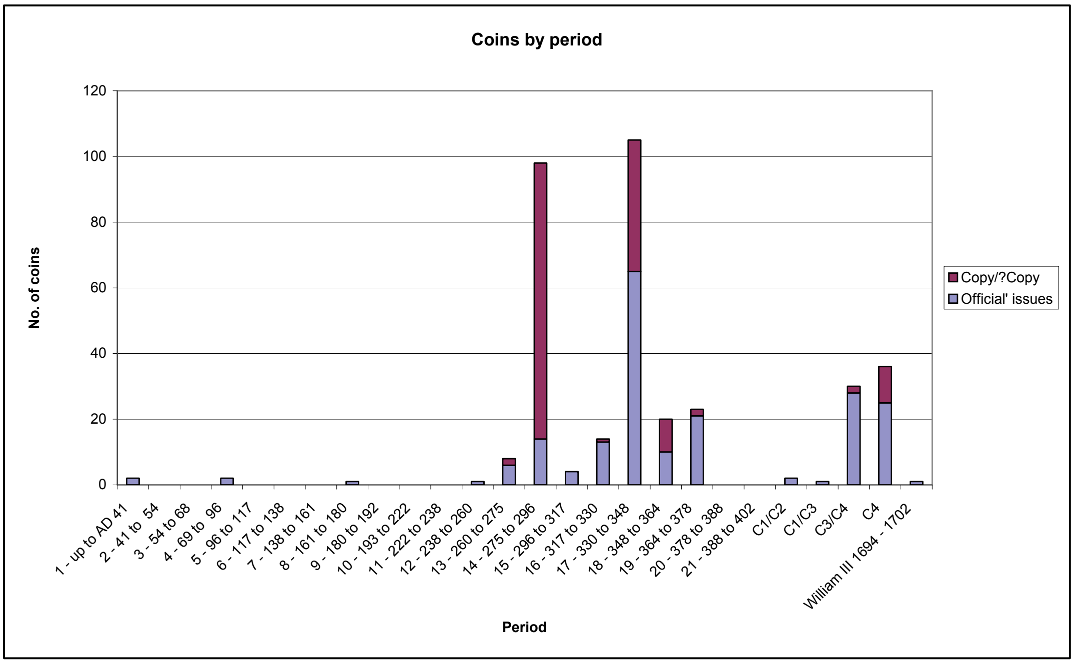


Figure 13.1: Number of coins from Stansted (all sites) by period

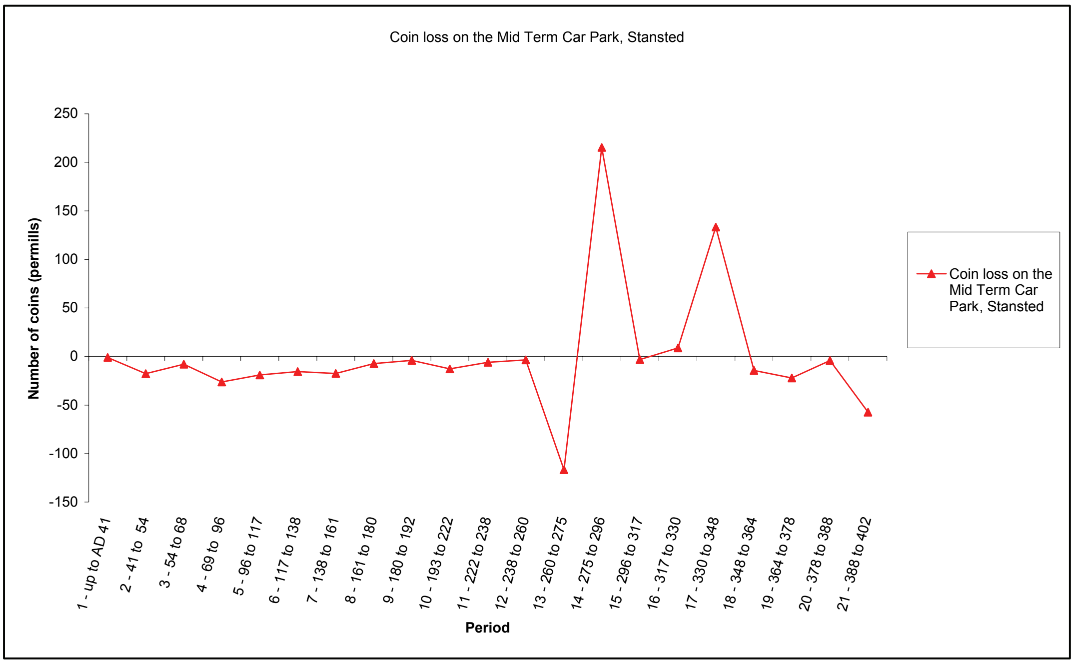
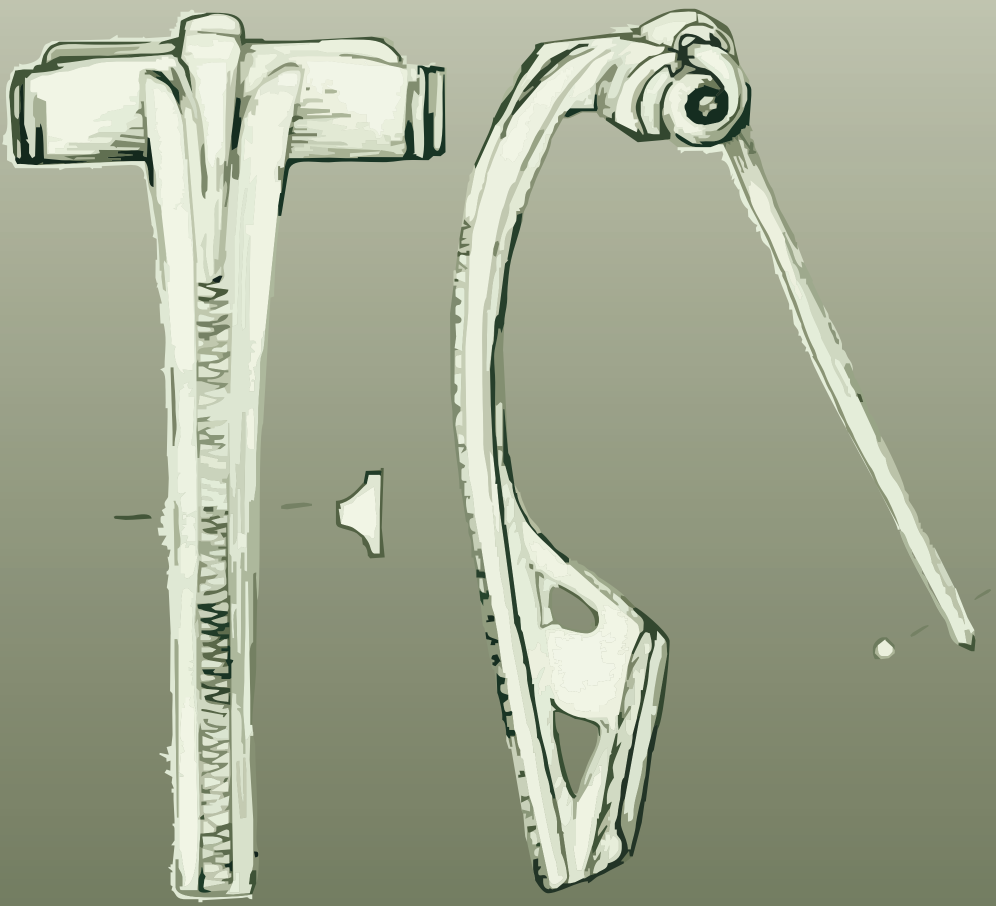


Figure 13.2: Deviation from the British mean of coins on the MTCP excavations

CHAPTER 14

Iron Age, Roman and Saxon metalwork



by Ian Scott

14 Iron Age, Roman and Saxon metalwork

Ian Scott

The Iron Age, Romano-British and Saxon/early medieval material treated in this part of the report comprises material from dated or phased contexts and typologically datable material from later or unphased contexts. The bulk of the material comes from the MTCP (site codes BAAMP99 & BAAMP00) and the LTCP sites (BAACP00). The remaining few objects are from M11 (Site Code: BAALR00) and LBR sites (BAALB00) (Table 14.1).

A total of 924 finds was recorded from the MTCP site. The LTCP site produced 212 objects. Both sites have produced a small number objects from medieval or post-medieval contexts, or objects identified as medieval or post-medieval objects on typological grounds. Where appropriate these are discussed in the report on medieval and post-medieval finds. The material here is discussed by site. The very limited amounts of material from the M11 and LBR sites do not require detailed discussion.

The LTCP site (BAACP00)

Assemblage Composition

The metals assemblage from this site comprises 212 objects. The assemblage is interesting but small numerically and dominated by four functional groups: personal items (n = 65), nails (n = 55), miscellaneous pieces of strip, rod, bar, etc (n = 38) and small unidentified fragments (‘unknown’; n = 42). Otherwise the range and number of finds is limited.

Functional categories and identified finds

There is a single weapon from a context (114038) of late Roman date, but is an arrowhead undoubted medieval type and not relevant to the discussion here. There are two tools, one probably a blade from pair of shears from a 2nd-3rd century Romano-British context (Cat. No.01). The deposit is a tertiary fill and the shears may be later in date. The other probable tool is of uncertain function (Cat. No.02) and from an unphased context.

The items relating to transport are horseshoes, are medieval or post-medieval in date and are omitted here. The single household object is a fragment of a flat-bottomed iron vessel, possibly part of a frying pan, from a late Roman context (Cat. No.03).

The personal items include hobnails (n = 55); the largest group (n=26) was from the fill (134025) of inhumation grave 134027. There is a small but interesting group of brooches and brooch fragments (n = 7, including Cat. Nos 04-07) and other personalia, including a bracelet (Cat. No.08) and a pair of tweezers (Cat. No. 09). The brooches include a la Tène III type (Cat. No.04), a possible Nauheim derivative (Cat. No.05) and a Hod Hill type (Cat. No.06). Typologically all date to the mid 1st century AD and all are from contexts dated to the late Iron Age or early Roman phases. The bracelet (Cat. No.08) is plain with tapering pointed terminals. It is generally thought that bracelets are more commonly found in later Roman contexts, dating to the 3rd and 4th centuries, but this example is plain with few diagnostic features and could be earlier in date. The tweezers (Cat. No. 09) are Roman type but cannot be closely dated, although the examples under discussion are from an early Roman context.

The single item of security is a latchlifter (Cat. No.10) from a late Romano-British context.

Structural items are very limited in numbers. There is a fragment of a possible clamp or dog from a 2nd- or 3rd-century context and a U-staple from an early Romano-British context. Although nails are one of the more numerous classes of find, they were not found in great numbers on this site (n = 54). The nails come almost exclusively from Roman-British contexts (n = 49). They are common Romano-British site finds. We might expect to find more structural items and more nails on a settlement site with buildings.

Although the numbers of finds is limited, and some classes of finds that might have been expected, are absent, or present only in tiny numbers, the presence of the small group of brooches dating to the mid 1st century AD shows that there were people of wealth and prestige present on the site. The composition of the assemblage and the absence of what might be termed domestic finds and of structural metalwork raises questions about the nature of the occupation, or about the subsequent history of the site.

Context and dating

A substantial number (n = 188; 88.7%) of the metal finds are from stratified and phased contexts and most of these are from contexts of Iron Age or Romano-British date (n = 184).

Amongst the apparently stratified material are three nail stem fragments from a middle Bronze Age context (115002). There are some small unidentified fragments from middle Iron Age contexts (128004 and 128005).

Amongst finds from late Iron Age and late Iron Age / Romano-British contexts are a la Tène III brooch (context 136042; Cat. No.04), a fragmentary la Tène III or Nauheim derivative brooch (context 125086; Cat. No.05), a Hod Hill brooch (context 129032; Cat. No.06) and fragments from a brooch of uncertain type with a hinged pin (context 121126; Cat. No.07). Other finds from early contexts include a fragment of bracelet (context 110003; Cat. No.08) and a pair of tweezers (context 143063; Cat. No.09). Other finds from late Iron Age/early Roman contexts include a small number of nails and some miscellaneous fragments (Table 14.2).

Finds from 2nd- to 3rd-century contexts are more limited, and include a probable shears blade (context 138028; Cat. No.01). The only personal items are two hobnails.

Other finds include a possible clamp (context 129025), a few nails, and some miscellaneous fragments.

Late Romano-British finds include a vessel fragment (Cat. No.03) from context 115023 and a latchlifter (context 143005; Cat. No.10). The medieval arrowhead from context 114038 has already been noted, and must be intrusive. There are 44 hobnails from late Roman contexts. They include 26 hobnails from context 134025 and five hobnails from context 134026, both fills of an inhumation burial (134027). Other hobnails came from contexts 115022 (6 hobnails) and 115023 (4 hobnails), and from context 140024 (3 hobnails). There are some nails and miscellaneous fragments (Table 14.2).

The datable finds comprise the Romano-British brooches, which are closely datable to the early to mid 1st century. As a group they are slightly earlier in date than the larger brooch assemblage from the MTCP site, which includes mid to late 1st-century forms.

Catalogue of selected objects from the LTCP site (BAACP00) (Fig. 14.1)

Tools

01 Possible shears blade fragment. Tip of blade and most of handle missing. Fe. L 45 mm. BAACP00, ctx 138028, SF -. Phase: Romano-British 2nd – 3rd C AD. [ID 703]

02 Probable tool. It has a rectangular section handle or tang, which is looped over at the end, and cranked at the other end to a flat rectangular blade, which may be complete. Function uncertain. Fe. L 178 mm. BAACP00, ctx 915006, SF-. Unph. [ID 712]

Household Equipment

03 Vessel fragment from a flat-bottomed vessel with low steeply sloping sides. Fe. L 50 mm. BAACP00, ctx 115023, SF -. Phase: late Romano-British. [ID 708]

Personal Items

Brooches

04 La Tène III brooch. A one piece brooch probably with a four coil spring and internal chord. It has a long thin bow decorated near to pin with a row of relief crosses in a recessed panel. The remains of the catchplate show that it had large cut-outs. The brooch was one piece with a sprung pin (now lost). Cu alloy. L 71 mm. BAACP00, ctx 136082, SF 464. Phase: late IA/early Romano-British. [ID 720]

Compare an incomplete example from Baldock (Stead 1986a, 109 & fig. 40, no 1) and another, slightly plainer, from Saham Toney, Norfolk (Brown 1986, 15 & fig. 8, n 0.5). This form of brooch belongs to the pre-Roman tradition (see Bayley and Butcher 2004, 145), and can be dated to the early to mid 1st AD

05 Possible La Tène III, or Nauheim derivative brooch fragments. One fragment (L 22 mm) forms the top of the bow with part of the spring. A second piece forms a lower part of the bow (L 21 mm). These two pieces do not join, but the brooch seems to have comprised a narrow tapering strip bow edged with a slight groove or beading. There are also two fragments from the spring (L 13 mm & 23 mm). Cu alloy. L overall at least 43 mm. BAACP00, ctx 125086, SF 367. Phase: late IA/early Romano-British. [ID 716]

The precise form of the brooch is uncertain, but most probably it is a Nauheim derivative dating to the first century AD. See particularly an example from Richborough (Bayley and Butcher 2004, 53 & fig. fig. 37, no.2) and generally examples from Fishbourne (Hull 1971, 100 & fig. 36, nos 1-8).

06 Hod Hill brooch with hinged pin. The bow is flat with two parallel ridges running along its length and very slightly curved in profile. The bow is angled near the head. The brooch is eroded and the catch plate is largely missing. Cu alloy. L 33 mm; W 14 mm. BAACP00, ctx 129032, SF 296. Phase: early Romano-British. [ID 714]

Compare an example from Baldock (Stead 1986, 120 & fig. 47, no. 109). The Hod Hill type dates to the mid 1st century and the Roman conquest.

07 Brooch fragments. Uncertain type. Had hinged pin. Fe. L 41 mm. BAACP00, ctx 121126, SF -. Phase: early Romano-British. [ID 699]

Bracelet

08 Plain bracelet with band of oval section. The surviving terminal tapers to a point. Cu alloy. L 58 mm; W 53 mm. BAACP00, ctx 110003, SF 100. Phase: late IA/early Romano-British [ID 713]

Toilet Items

09 Tweezers, formed from plain strip with slightly flared tips. Cu alloy. L 44 mm. BAACP00, ctx 143063, SF 437. Phase: early Romano-British [ID 719]

Security

10 Latchlifter formed from rod of rectangular section, with flat handle with terminal loop. Fe. L 195 mm. BAACP00, ctx 143005, SF 361. Phase: late Romano-British [ID 707]

The MTCP Site (BAAMP 99 & 00)

Assemblage composition

The metalwork assemblage from the MTCP site is somewhat larger than that from the LTCP. It comprises 924 pieces. Two functional groups predominate: nails (n = 373) and personal items (n = 235). Other large functional groups are miscellaneous pieces (n = 110) and unidentifiable fragments (‘Unknown’) (n = 63). The functional range of the metal finds is quite limited.

Functional categories and identified finds

There is a socketed leaf-shaped spear-, or arrowhead (Cat. No.11) from a late Romano-British context, and an unstratified lead pistol ball. The latter is post-medieval, or later, in date.

The nine tools, or tool fragments, include two fragments from modern cast iron ploughshares, one from a context of early medieval date (354064). Otherwise only two objects are from phased contexts, a probable reaping hook (Cat. No.13) from a late Romano-British context (330084), and a copper alloy punch (Cat No. 15) from an early Romano-British context (7204). A second reaping hook (Cat. No.14) comes from context 301001. The latter context is unphased, although finds from it were predominantly Roman-British, and it is comparable to examples from Romano-British contexts. Other tools found in this context are a possible punch (SF 729), a handaxe or hatchet (SF 1092) and a saw (Cat. No.12). The handaxe is clearly quite modern, and the identification of the punch is not certain, and it is not closely dateable. The small, but complete hand saw (Cat. No.12) is similarly not dateable typologically with any confidence.

The items relating to transport include seven horseshoes or horseshoe fragments and four horseshoe nails, which are all medieval or later in date, although a horseshoe fragment, a possible horseshoe fragment, and a horseshoe nail came from contexts (336064, 326062 and 347034) of late Romano-British date. The other transport finds are a probable fragment of tire from a wheel (SF 1013) and a harness bell (Cat. No.16), both from context 301001, which is undated.

Household items, which number 20 items, include a Romano-British spoon bowl (Cat. No.17) from a late Romano-British context (350061), and cleaver (Cat. No.18) of Romano-British type from topsoil (301001). Two possible blade fragments come from late Roman-British contexts (315076 SF 501 & 353009). There are three knives of early medieval form (Cat. Nos 19-21) from late Saxon (317002) and early medieval contexts (310135; 357057), and a possible knife from an early medieval context (310139). Other knives include an undiagnostic blade fragment (context 301001, SF 938) and two knives of post-medieval form with arched backs (context 301001, SF 939; and context 328279). The latter two knives are catalogued with the medieval and post-medieval material, even though one is from the upper fill of a late Romano-British feature (328279).

There is a fragment from a small flat-bottomed iron vessel, possibly a frying pan (Cat. No.22).

The remaining household items are six lead plugs that were used to repair ceramics, which could well be Romano-British but are from unphased contexts (301001 (n = 5); 1000), and two paper clip rivets of late medieval or post-medieval date (context 301001 SF 793; context 1006 SF 740 - both unphased).

The main class of material, personal items, comprises 235 items, and includes 186 hobnails and a single boot clamp. The remaining 48 items include items of apparel, pieces of jewellery and toilet items. The items of apparel or dress include a large decorated button-and-loop fastener (Cat. No.23), which is from an undated context (1006), and two plain studs with T-bar stems (Cat. Nos 24-5), one unphased but one from a Romano-British context. There are two small early medieval hooked tags (Cat. Nos 26-7), one from and early medieval context, and a belt stud with a diamond-shaped head and traces of enamel decoration (Cat. No.28), which is unphased and of uncertain date. There is a fragment of circular buckle or penannular brooch (Cat. No.29) from a late Romano-British context. Cat. No.30 is a distinctive heart-shaped late Roman strap end, although undated stratigraphically. Other items of apparel include a post-medieval button (SF 1501), a buckle fragment (SF 1095), a buckle plate fragment (SF 967) and a plain belt plate (SF 904) all from context 301001 and undated stratigraphically. Another buckle fragment came from a late Saxon context (SF 301, context 307015), but is of later medieval type and is catalogued with the medieval and post-medieval material.

The items of ornament, or jewellery, comprise seventeen brooches or brooch fragments (including Cat. Nos 31-45), five hairpin, or pin, fragments (including Cat. Nos 46-7), and eleven bracelets or bracelet fragments (Cat. Nos 48-58). There is also a possible finger ring (Cat. No. 59). The brooches include a fragment of a la Tène III brooch (Cat. No.31), a so-called ‘Nauheim derivative’ (Cat. No.32), and *Aucissa* brooch (Cat. No.33), a Hod Hill brooch (Cat. No.34), a one-piece Colchester (Cat. No.36), six two-piece Colchesters (Cat. Nos 37-42) and a ‘Dolphin’ brooch (Cat. No.43). All are types that are of mid- to late-1st-century date, and most are from late Iron Age / early Romano-British, or early Romano-British contexts.

The hairpins include an almost complete pin with large head (Cat. No.46) from an early medieval context, and another with a smaller head (Cat. No.47), which is unstratified. The bracelets include examples of early forms (Cat. Nos 48-9), but the majority (Cat. Nos 50-58) probably date to the 3rd and 4th centuries. They come from late Roman contexts or are undated. There is a single possible plain finger ring (Cat. No.59) that was unphased.

The single toilet item comprises a pair of tweezers (Cat. No. 59).

Items of security include a latchlifter (Cat. No. 61), a handle from barb-spring padlock keys (Cat. No. 62), and a length of copper alloy chain (Cat. No.66) from late Roman contexts. The chain may be more decorative than functional. A handle from barb-spring padlock key (Cat. No. 63), a bolt from a barbed-spring padlock (Cat. No.64), a lever lock key (Cat. No. 65) all from undated contexts.

The remaining objects comprise limited numbers of structural fittings (eg Cat. No. 67) a good number of nails (Appendix 2), and a small number of unidentified objects (Cat. Nos 68-75).

The number of finds is not large, and structural finds, household objects, tools are very poorly represented. By contrast personal items and in particular brooches and bracelets are well represented. The skewed composition of the metal assemblage may well give insights into the nature of the occupation of the site.

Context and dating

More than half of metal finds from the MTCP site are stratified (n = 746; 80.7%) and most of these come from late Iron or Romano-British contexts (n = 687). There are small numbers from late Saxon or early medieval contexts (n = 34) and from medieval and post-medieval contexts (n = 18).

There are five finds from late Iron Age/early Romano British contexts. These include two brooches, a ‘Nauheim derivative’ (Cat. No.32) and the much eroded and probably burnt fragments of a two-piece brooch (Cat. No.44) both from context 328013, which was the fill of a cremation burial 328012. The other finds are binding (ctx 360021) and two nails (context 1909).

Finds from early Romano-British contexts are more numerous (n = 59), but include 12 nails, six hobnails, three miscellaneous pieces and 28 small fragments (‘unknown’). The catalogued and illustrated finds comprise a copper alloy punch (Cat. No.15), and six brooches - an Aucissa brooch (Cat. No.33), four two-piece Colchesters (Cat. Nos 37-39, 42) and a Dolphin brooch (Cat. No.43). Finally there are three pin fragments (uncatalogued).

A small number of the early Roman finds came from cremation burials. Cremation 330008 (fill 330007) contained two pin fragments, and a fragment of wire, all copper alloy, Cremation 330018 (fill 330017) contained the Dolphin brooch (Cat. No.43), and Cremation 349139 (fill 349147) contained fragments of a probable Colchester two-piece brooch (Cat. No.42) together with five nails and five hobnails, and (fill 349154) one hobnail and an unidentifiable small fragment of iron.

From Romano-British contexts dated to the 2nd and 3rd centuries there are 17 finds. These include a stud (Cat. No.24) and an eroded two-piece brooch (Cat. No.35). The remaining finds comprise five nails, two structural items, two hobnails, four miscellaneous pieces, and two small unidentified fragments.

Late Romano-British contexts produced the most finds (n = 605), although the bulk of these comprised nails (n = 285) and hobnails (n = 174). There are also 57 miscellaneous pieces, 25 pieces of slag or cinder, and 24 small unidentified fragments.

The finds from contexts of this period included a small spear-, or arrow-, head (Cat. No.11) and a reaping hook (Cat. No.13). A horseshoe (contexts 336064), a possible horseshoe fragment (context 326062) and horseshoe nail (context 347034) are from contexts of late Roman date but are medieval or later types.

The household items include a spoon bowl of Roman type (Cat. No.17) and two poorly preserved knives (contexts 315076 SF 501; and context 353009) (not catalogued). A third knife (context 328279) is of a medieval or later form and is catalogued with the medieval and post-medieval finds.

The personal items, which number 179, include 174 hobnails and a single boot clamp. The majority of hobnails from the site are from later Roman contexts (Table 14.5). Most come from just four contexts: contexts 6604 (n = 52), 319125 (n = 24), 335022 (n = 23) and 348016 (n = 28). The other personal items are three cable pattern bracelets or bangles (Cat. Nos 50-52), and a circular buckle, or brooch fragment (Cat. No.29).

Other items from late Roman contexts include a possible lead weight (context 6606) (not catalogued), and a latchlifter (Cat. No.61), a barb spring padlock key handle (Cat. No.62) and possible key handle (context 1608, SF 13512) (not catalogued), and length of copper alloy chain with small S-shaped links (Cat. No.66).

The remaining items from late Roman contexts include five structural pieces (including Cat. No.67), five ‘bindings’, and eleven unidentified pieces (including Cat. Nos.68-72).

The finds from late Saxon contexts number seven and include one nail and four unidentified small fragments. Otherwise the finds include a whittle-tang knife (Cat. No.20) of good Saxon form (Ottaway form C) and a buckle fragment (context 307015 SF 301) of medieval type. The latter is catalogued with the medieval and post-medieval finds.

A further 27 finds come from early medieval contexts and included three knives: two are of good Saxon type (Cat. Nos 19 and 21), and the third is poorly preserved not diagnostic (context 310139). No. 19 is of Ottaway form D. Other interesting finds include two hooked tags (Cat. Nos 26-27) and a hairpin (Cat. No.46). There are four unidentified objects (including Cat. Nos 73-74). The remaining finds comprise one structural fitting, two miscellaneous fragments, seven nails, five horseshoe nails, a hobnail and a fragment of a cast iron plough share (context 354064) which is intrusive.

Overall the metalwork assemblages lack significant domestic or craft elements. This may reflect the areas excavated, or possibly the types of feature investigated. However, it may be that the strong element of personal ornament in the assemblage, particularly the Romano-British portion, reflects the nature of the occupation of the site. It is also to be noted that some objects were recovered from cremation burials.

Catalogue of selected objects from the MTCP site (BAAMP99 & BAAMP00) (Figs 14.2-14.5)

Arrowhead

11 Arrowhead, or small spearhead, socketed with a leaf-shaped blade. Fe. L 77 mm. BAAMP00 ctx 329027, SF -, Phase: late Romano-British. [ID 412]

Tools

12 Saw, complete. It has a blade with a slightly curved toothed edge and a curved back. The blade is 140 mm long. The handle is in one piece with the blade and is of oval section, slightly curved and ending in a down-curved knobbed terminal. Fe. L 224 mm. BAAMP00, ctx 301001, SF 1044. Unph. [ID 65]

A small hand saw, comparable perhaps to a modern pad saw. Roman handsaws are known, but usually have tapering triangular blades and wooden handles attached by rivets (eg. Verulamium: Manning 1972, 166 & fig. 61, no. 12). An example from Hambledon Hill (Manning 1985, 19-21 & pl.9, no. B21) has a handle attached by a rivet, but the blade has a curved or arched back and straight cutting edge. There is a small saw from London (Wheeler 1930, 79 & pl. xxxvi, no, 5), which has a tapering triangular blade and a solid handle, but it is not similar in form to the example under discussion. The handle of the Stansted saw is reminiscent of the handle of a cleaver or knife from Hod Hill (Manning 1985, 120 & pl.57, no. Q94). It is not possible to be certain of the date of this saw.

13 Reaping, or pruning, hook, with flanged socket. The socket is incomplete, but there is a single extant nail to secure the handle. The strongly curved blade has an oval eye on its outer edge. The purpose of the eye is uncertain. Fe. L 80 mm; W 70 mm. BAAMP00, ctx 330084, SF -. Phase: late Romano-British. [ID 273]

The purpose of the eye, which is clearly visible in the outer edge of the blade, is uncertain. The form of the blade conforms to Manning’s Type 2 reaping hook (1985, fig. 14: reaping hook 2) and is comparable to examples from Hod Hill and Hambledon Hill (Manning 1985, 53-5, pl. 23, F30-F32 & F35).

14 Reaping, or pruning, hook, with complete socket and small strongly curved blade. A single nail secured the head. Fe. L 110 mm; W 80 mm. BAAMP00, ctx 301001, SF 748. Unph. [ID 37]

Comparable small reaping hooks have been found at Caerwent (Jones nd, 44, nos 20-22). These may not be Romano-British examples. The Caerwent examples come from old excavations and are not securely stratified.

15 Punch with tapering circular section stem, the broader end is slightly flared and (?)hammered. Cu alloy. L 124 mm. BAAMP 99, ctx 7204, SF 13525. Phase: early Romano-British. [ID 605]

Transport

16 Harness bell, with clapper missing, but otherwise well preserved. Lathe turned and spun. It has a broad flared body stepped at the top with a domed top pierced with two holes for attachment of the clapper and/or suspension. Cu alloy. D 45 mm; Ht 29 mm. BAAMP00, ctx 301001, SF 843. Unph. [ID 71]

There is a similar bell amongst votive finds from Woodeaton, Oxfordshire (Bagnall Smith 1998, 174 & fig.11, no.16.1). This is identified as part of a priest's regalia.

Household equipment

Cutlery

Spoon

17 Spoon bowl, mandolin-, or fig-, shaped. Crummy Type 3. Cu alloy. L 39 mm, W 26 mm. BAAMP00, ctx 350061, SF 555. Phase: late Romano-British [ID 109]

Parallels from Colchester (Crummy 1983, 69 & fig. 73, nos 2016, 2018-19), Aldborough (Bishop 1996, 14 & fig. 7, no. 26) and Richborough (Wilson 1968, 101 & pl. xliv, no. 180). In the latter example the bowl and handle are separately formed and joined by a tenon. Although the Stansted example consists of the bowl alone there is no evidence that the handle was separately formed. The form appears to be used throughout the Roman period.

Knives

18 Cleaver with socketed triangular blade and curved cutting edge. Triangular cross-section. Roman type. Fe. L 185 mm. BAAMP00, ctx 301001, SF 752. U/S. [ID 39]

This form of cleaver is one of a number of types common in the Roman period (see for examples in Manning 1976, fig. 22, nos 131, 135-36). This example is of Manning 2a cleaver with a straight back and strongly curved cutting edge (Manning 1985, 120-23 & fig. 30). .

19 Knife blade with curved back and edge. No extant tang. Fe. L 73 mm. BAAMP00, ctx 310135, SF -. Phase: early medieval. [ID 261]

A knife that conforms to Ottaway form D, with a curved back (Ottaway 1992, 572: see esp. fig. 234, no. 2934)

20 Whittle-tang knife blade. The tang is cranked in relation to the blade, which is narrow and of triangular section. Saxon. Fe. L 140 mm. BAAMP00, ctx 317002, SF 303. Phase: late Saxon. [ID 156]

A knife of Ottaway Type C (see in particular examples from York: Ottaway 1992, fig. 233, no. 2877, & fig. 234, no.2937).

21 Whittle-tang knife fragment. The tang and blade are cranked. Triangular section blade. Saxon form. Fe. L 68 mm. BAAMP00, ctx 357057, SF -. Phase: early medieval. [ID 258]

Fragment of a knife similar to No. 20.

Vessel fragments (not illustrated)

22 Vessel fragment, shallow sloping side. Fe. L 42 mm; Ht 34 mm. BAAMP00, ctx 314067, SF -. Phase: uncertain. [ID 367]

Personal Items

Items of Dress

23 Button and loop fastener with elongated rectangular head decorated with enamel inlay. The decoration Wild Class VIa (Wild 1970, 141). Cu alloy. L 49 mm; W 22 mm. BAAMP00, ctx 1006, SF 702. Unph. [ID 113]

This fits broadly into Wild's Class VI, with rectangular head and enamelled decoration (Wild 1970, 141 & fig.2, IVa). The decorative scheme is curvilinear rather than the more usual rectilinear scheme with square and triangular enamel panels, and has late Celtic affinities. Compare for example the decoration on a cheek piece or 'slider' from the Eckford Hoard, which MacGregor thought might be of south-eastern manufacture (MacGregor, 1976, vol. 1, 38, vol. 2, no. 45). They are generally thought to be for fastening clothing, but there are suggestions that they might have been used for fastening harness. This example is quite large and solid and could have been used as part of a harness. Generally button and loop fasteners seem to date from before the end of the 2nd century (Wild 1970, 146).

24 Stud with T-bar stem and flattish circular head with central knob. Cu alloy. D 19 x 17 mm. BAAMP00, ctx 328268, SF 171. Phase: Romano-British 2nd-3rd AD. [ID 82]

See an example from Fishbourne, from a late 3rd-century destruction level (Cunliffe 1971, 112 & fig.46, no.109)

25 Stud with T-bar stem and flattish circular head with central knob. Similar to Cat. No.19. Cu alloy. D 18 x 17 mm. BAAMP00, ctx 301001, SF 1073. Unph. [ID 81]

Similar to No. 24.

26 Circular hooked tag pierced by a pattern of 7 ring and dot motifs. Hook missing, but scar where it was attached. Cu alloy. D 11 mm. BAAMP00, ctx 310139, SF-. Phase: early medieval. [ID 72]

A small early medieval clothes fastener. There are broad parallels from Hamwic (Hinton 1996, fig. 4, nos 36/190 & 169/488), Winchester (plain examples: Hinton 1990a, 552 & fig.149, nos 1426–27) and from Maiden Lane, London (Blackmore 1988, 127 & fig.35, nos 8-9). The Stansted examples are small and of lesser quality than many examples.

27 Circular hooked tag pierced by a pattern of five small holes. Hook missing. Cu alloy. BAAMP00, ctx 310139, SF-. Phase: early medieval. [ID 73]

Similar to No. 26.

28 Stud with diamond-shaped head decorated with enamel inlay. The stem is of square section. Cu alloy. L 23 mm; W 20 mm; Ht 12 mm. BAAMP00, ctx 301001, SF 1048. Unph. [ID 133]

29 Circular buckle or brooch comprising incomplete ring with thickening at one end. Circular section. Fe. D 30 mm. BAAMP 99, ctx 2305, SF 1350. Phase: late Romano-British. [ID 548]

30 'Heart-shaped' strap end, with central motif of dot with two concentric rings. It is edged by a border of small ring and dot motifs. Cu alloy. L 34 mm; W 25 mm. BAAMP00, ctx 301001, SF 851. Unph. [ID 120]

Broadly this falls into a class of strap ends described as 'heart-shaped' by Simpson (1976, 201-02 fig. 5). This example does not exactly match the description of Simpson, in that it lacks the double-leaf plate attachment, and the top is flat and plain. It is possibly a copy of a late Roman form rather than an actual example.

Brooches

31 La Tène III brooch fragment. Broad flat upper portion of bow with slight decorative grooving. Little of the spring extant. Cu alloy. L 13 mm. BAAMP00, ctx 301001, SF -. Unph. [ID 88]

32 Probable Nauheim derivative brooch, probably one piece, with strip bow decorated with parallel grooves, and narrowing to plain unpierced catch plate. The pin is missing, but one fragment of spring survives. Fe. L 53 mm. BAAMP00, ctx 328013, SF-. Phase: late IA / early Romano-British. [ID 312]

33 Possible *Aucissa* brooch fragments (x 5), including a probable bow fragment and part of the pin. Cu alloy. L – mm. BAAMP00, ctx 328015, SF -. Phase: early Romano-British. [ID 135]

34 Possible Hod Hill type brooch, eroded. The bow is very slightly curved in the middle and has an angle at the head. It is decorated with cast cross ribs. The catch plate is largely missing. The hinged pin is lost. Cu alloy. L 39 mm; W 16 mm. BAAMP00, ctx 1004, SF 682. Unph. [ID 111]

The bow is quite narrow, but its profile with angled head confirms its affinities.

35 Two-piece brooch, of uncertain form, much eroded. The bow is more or less circular in section with a slight medial ridge. Remains of a sprung pin. Second fragment comprises spring and axle pin. Cu alloy. L 36 mm; W 12 mm. BAAMP00, ctx 330042, SF 875. Phase: Romano-British 2nd – 3rd C AD.[ID 122]

36 Colchester one-piece brooch. (Hull Type 90.) The bow is with an oval section, the catch-plate is largely lost. The spring has an outside chord secured by a hook decorated in profile. Cu alloy. L 39 mm; W 19 mm. BAAMP00 , ctx 301001, SF 878. Unph. [ID 124]

Compare an example from Colchester (Crummy 1983, 12 & fig. 6, no. 40)

37 Colchester two-piece brooch. (Hull Type 92) Curved bow with medial ridge, and solid catch-plate. The pin is sprung with an external chord, which is secured by a pierced lug. Cu alloy. L 39 mm; W 17 mm. BAAMP00, ctx 349132, SF 533. Phase: early Romano-British. [ID 105]

38 Colchester two-piece brooch. (Hull Type 92) Curved bow with medial ridge, and solid catch-plate. The medial ridge is decorated with fine zig-zag pattern for part of its length. The pin is sprung with an external chord secured by a pierced lug. Cu alloy. L 38 mm; W 17 mm. BAAMP00, ctx 349132, SF 534. Phase: early Romano-British. [ID 106]

39 Colchester two-piece brooch. (Hull Type 92.) Curved bow of flattened oval section, and catch-plate with single triangular cut-out. The pin now lost was sprung with an external chord, which was secured by a pierced lug. Cu alloy. L 44 mm; W 17 mm. BAAMP00, ctx 349132, SF 535. Phase: early Romano-British. [ID 107]

40 Colchester two-piece brooch. (Hull Type 92.) The bow has a medial ridge with a section of fine zigzag pattern. The catchplate has two cut-outs. The sprung pin has an outside chord secured by a pierced lug). Cu alloy. L 62 mm; W 29 mm. BAAMP00, ctx 301001, SF 877. Unph. [ID 123]

41 Colchester two-piece brooch, with largely plain bow. Cu alloy. L 40 mm; W 19 mm. BAAMP00, ctx 301001, SF 833. Unph. [ID 119]

42 Fragments of a probable Colchester two-piece brooch with sprung pin. The bow has a medial ridge with lightly chased cross-hatching. The pin and spring are lost but an external chord can be inferred. Found with two small copper alloy fragments - not part of brooch. Cu alloy. L 45 mm; W 14 mm. BAAMP00, ctx 349147, SF 540. Phase: early Romano-British. [ID 108]

43 Dolphin brooch with hinged pin. The bow is of diamond cross-section. There are three transverse notches across the upper part of the bow. Cu alloy. L 34 mm; W 22 mm. BAAMP00, ctx 330017, SF -. Phase: early Romano-British. [ID 130]

The transverse slots were probably inlaid with coloured enamel. Compare an example from Dragonby (Olivier 1996, 255 & fig. 1.8, no 90)

44 Brooch fragments. Part of body of brooch, much eroded, and three fragments of spring. Was a two-piece brooch, but uncertain type. Cu alloy. L 24 mm; W 13 mm. BAAMP00, ctx 328013, SF 712. Phase: late IA / early Romano-British. [ID 114]

45 Brooch pin with coiled spring and axle. Only half the spring survives, but has nine coils. From a two piece brooch. Cu alloy. L 67 mm. BAAMP00, ctx 301001, SF 922. Unph. [ID 125]

Hair pins

46 Hairpin with large head with large head flattened on top, and thin tapering stem. Cu alloy. L 59 mm. BAAMP00, ctx 310139, SF -. Phase: early medieval. [ID 92]

No clear parallel can be found for this pin with has a thin stem and large heavy head. Most probably falls within Hamwic Class Aa, with spherical undecorated heads (Hinton and Parsons 1996, 14)

47 Hairpin with domed head, and incomplete stem. Cu alloy. L 24 mm. BAAMP00, ctx 301001, SF 844. Unph. [ID 98]

A Roman hairpin that falls within Cool’s group 1 (knobbed heads) (Cool 1990, 151-4 & fig.1).

Bracelets

Early broad flat bracelets

48 Bracelet fragment. Flat broad strip with slight decoration down the centre. Cu alloy. L 22 mm; W 17 mm. BAAMP00, ctx 301001, SF 1005. Unph. [ID 74]

49 Bracelet fragment formed from broad flat strip. The outer edges are defined by fine plain beading. There are two parallel beaded lines running along the centre of the band. The terminal is apparently undecorated. Cu alloy. L 47 mm; W 22 mm. BAAMP00, ctx 301001, SF 1030. Unph. [ID 128]

Broad flat bracelets are an early form. See the examples from Colchester (Crummy 1983, 37 & fig. 40, nos 1586-87) and Baldock (Stead 1986b, 125 & fig.52, nos 163-66: no.164 is from a Neronian context).

Cable pattern bracelets

50 Bracelet of cable/rope pattern, formed from two strands of wire twisted together. Cu alloy. D 38 mm. BAAMP00, ctx 348016, SF 504. Phase: late Romano-British. [ID 101]

51 Probable bracelet fragment, comprising three strands of wire twisted together to form a cable pattern bracelet. Cu alloy. L 81 mm. BAAMP00, ctx 6606, SF 995. Phase: late Romano-British. [ID 127]

52 Possible bracelet fragment, comprising length of wire of flattened section, originally twisted but now partially untwisted. Cu alloy. L 69 mm. BAAMP00, ctx 333050, SF 510. Phase: late Romano-British. [ID 103]

The rope, or cable, pattern bracelet was a common later Roman form. See examples from Colchester (Crummy 1983, 38 & fig. 41, nos 1611, 1613, 1628 & 1633) and from South Shields (Allason-Jones and Miket 1984, 134-6, nos 3.267-3.277).

Miscellaneous bracelets

53 Bracelet fragment, of half round section. One end is broadened and flattened with a slight groove down the centre. Encrusted. Cu alloy. L 43 mm. BAAMP00, ctx 301001, SF 853. Unph. [ID 121]

54 Bracelet, formed from strip decorated with ring and dot motifs. Cu alloy. D 40 mm. BAAMP00, ctx 1004, SF 677. Unph. [ID 110]

Compare complete bracelet with hooked terminals and decorated with ring and dot motifs from Kingscote, Gloucestershire found in fieldwalking (Viner, 1998, 208 & fig. 100, no. 1.22)

55 Bracelet fragment, comprising terminal with two ring and dot motifs. The rest of the band has a central groove and notched edges. Cu alloy. L 34 mm. BAAMP00, ctx 301001, SF 768. U/S. [ID 117]

Compare examples from Kingscote, Gloucestershire found in fieldwalking (Viner, 1998, 208 & fig. 100, no. 1.21) and from Aldborough (Bishop 1996, 49 & fig.29, no.293).

56 Bracelet fragment, with raised opposed chevron motifs. Cu alloy. L 23 mm. BAAMP00, ctx 301001, SF 797. U/S. [ID 118]

A bracelet with raised chevron or zig-zag pattern was found at Baldock (Stead 1986b, 125 & fig.53, nos. 174) in a late context.

57 Bracelet with narrow band of oval section, with transverse grooving. At intervals there are thicker sections, or applied collars. Cu alloy. D 52 mm. BAAMP00, ctx 301001, SF 985. U/S. [ID 126]

Compare examples from Kingscote, Gloucestershire (Viner 1998, 154 & fig. 75, nos 1.303-1.305). They are from late contexts dating to 3rd and 4th centuries.

58 Bracelet with thin band of oval section. A variant of the crenellated bracelet form. Cu alloy. L 46 mm. BAAMP00, ctx 301001, SF 1061. U/S. [ID 129]

Possible Finger Ring

59 Possible finger ring of oval section. Cu alloy. D 26 mm. BAAMP00, ctx 301001, SF 1091. U/S. [ID 132]

Comparable to rings, which are interpreted as votive offerings, have been recovered in some numbers from a suggested shrine at a site at Kings Meadow, Higham Ferrers, Northamptonshire (report in preparation).

Toilet Items

60 Small tweezers formed from plain narrow strip and with slightly pointed tips. Cu alloy. L 45 mm. BAAMP00, ctx 1007, SF 692. Unph. [ID 112]

Security, including locks, keys and chains

61 Latchlifter formed from rectangular section strip. The handle is broader and terminates in a loop. Fe. L 178 mm. BAAMP00, ctx 306031, SF 808. Phase: late Romano-British. [ID 157]

62 Barb spring padlock key handle, comprising tapering strip rolled into a suspension loop at the narrow end. At the broad end the strip is broken but there is evidence that the handle was bent to form the bit and for a cut out in the bit. Fe. L 109 mm. BAAMP00, ctx 365032, SF 550. Phase: late Romano-British. [ID 4]

63 Not illustrated, Similar to No. 62. Barb spring padlock key handle, with a tapering flat rectangular section stem. The narrower end is rolled into a loop. The wider end was originally bent and formed into the bit, now missing. Traces of cut-outs in bit survive. Fe. L 145 mm. BAAMP00, ctx 301001, SF 942. U/S. [ID 55]

64 Barb spring padlock bolt fragment. The two barb springs have are now detached from the square section bolt stem fragment. Much of the bolt is missing, so that it not possible to determine how the padlock and bolt were secured. Fe. L 60 mm. BAAMP00, ctx 301001 SF 681. Unph. [ID 163]

65 Lever lock key, with large rectangular bit. The stem of the key is hollow at the outer end, and has a circular bow with a small knob opposite the stem. The bit has at least three slots or clefts. In profile the bit is not flat but shaped to form bullets. Fe. L 91 mm. BAAMP00, ctx 301001, SF 969. U/S [ID 162]

66 Chain of eight irregular and worn figure-of-eight or S-shaped links. One link is incomplete. The links vary in size: from 14 mm to 17 mm; most are *c*. 15 mm long. Cu alloy. L 96 mm. BAAMP00, ctx 331005, SF 506. Phase: late Romano-British. [ID 102]

Structural fittings

The bulk of structural fittings comprise nails, which have been tabulated in Appendix 2.

67 Ring and looped bar. The bar appears twisted. Fe. L 135 mm. D of ring 57 mm x 55 mm. BAAMP00, ctx 355066, SF -. Phase: late Romano-British. [ID 257]

Objects of uncertain function

68 Possible handle formed from square section rod, expanded at one end, which is broken. Fe. L 62 mm. BAAMP00, ctx 329027, SF -. Phase: late Romano-British. [ID 413]

69 Not illustrated. Object comprising thick circular head and stem of square section. The top of the head has a raised triangular section. Function uncertain. Fe. L 112 mm. BAAMP00, ctx 348007, SF 965. Phase: late Romano-British. [ID 189]

70 Object comprising strip of rectangular section, rounded at one end and pierced with a nail hole, the other end is formed into a handle or tang, incomplete. Fe. L 159 mm. BAAMP00, ctx 306066, SF 557. Phase: late Romano-British. [ID 158]

71 Tapering rod of circular section. At the wider end the object thins sharply to a square section, perhaps a tang, now missing? Fe. L 208 mm. BAAMP00, ctx 306066, SF -. Phase: late Romano-British. [ID 294]

72 Object formed from bar bent at a right angle, with one end flattened and broad to a blade like edge. Function uncertain. Fe. L 34 mm; W 31 mm. BAAMP00, ctx 336048, SF -. Phase: late Romano-British. [ID 154]

73 Ring or collar, plain and of triangular section. Cu alloy. D 14 mm x 16 mm. BAAMP00, ctx 310139, SF -. Phase: early medieval. [ID 77]

74 Small domed fitting, with tiny knob at crest. Tinned. Function uncertain. Cu alloy. D 10 mm. BAAMP00, ctx 310135, SF -. Phase: early medieval. [ID 91]

75 Not illustrated. Strip handle with looped terminal. Possibly a looped handle from a key. Fe. L 51 mm. BAAMP00, ctx 1000, SF -. Unph. [ID 224]

The LBR and M11 sites (BAALB00 and BAALR00).

The objects from the LBR site are all iron. Five pieces are miscellaneous fragments of wire, strip and rod, there is one possible structural fragment (a possible broken clamp, but more probably a fragment of strip), a single nail and a latchlifter (Cat. No.74). The material from the M11 site comprises five miscellaneous fragments, four nails and a piece of rod formed into a loop at one end.

76 Latchlifter, formed from rod of circular section, with flat rectangular section handle with looped terminal. Fe. L 277 mm. BAALB00, ctx 204005, SF 584. Phase: Romano-British 2nd – 3rd C AD. [ID 622]

Table 14.1: Overall numbers of metal objects by site and phase

	Phase															
Site Code	**MBA**	**EIA**	**MIA**	**LIA**	**LIA/ERB**	**ERB**	**RB 2-3c**	**LRB**	**RB**	**Late Saxon**	**EM**	**M**	**PM**	**Unph**	**U/S**	**Totals**
BAACP 00	3		16		50	16	25	77					1	24		**212**
BAAMP 00	3				3	56	15	463	1	6	26	15	2	65	107	**762**
BAAMP 99					2	3	2	142		1	1		1	9	1	**162**
BAALB 00						1	8									**9**
BAALR 00		1		4	4									2		**11**
Totals	**6**	**1**	**16**	**4**	**59**	**76**	**50**	**682**	**1**	**7**	**27**	**15**	**4**	**99**	**108**	**1156**

Table 14.2: LTCP site - Summary quantification of metal finds by phase and function

	Function													
Phase	**Arms**	**Tools**	**Transport**	**Household**	**Personal**	**Security**	**Structural**	**Bindings**	**Nails**	**Misc**	**Query**	**Industrial**	**Unk**	**Totals**
MBA									3					**3**
MIA													16	**16**
LIA/ERB					6				8	21	1	1	13	**50**
ERB					4		1		6	5				**16**
RB 2-3c		1			2		1		11	8			2	**25**
LRB	1			1	44	1		2	24	4				**77**
PM			1											**1**
unph		1			9				3				11	**24**
Totals	**1**	**2**	**1**	**1**	**65**	**1**	**2**	**2**	**55**	**38**	**1**	**1**	**42**	**212**

Table 14.3: LTCP site: summary quantification of metal finds by phase, context and function

Phase	Context	Function													Totals
		Arms	**Tools**	**Transport**	**Household**	**Personal**	**Security**	**Structural**	**Bindings**	**Nails**	**Misc**	**Query**	**Industrial**	**Unk**	
MBA	**115002**									3					**3**
	Sub Total									*3*					***3***
MIA	**128004**													10	**10**
	128005													6	**6**
	Sub Total													*16*	***16***
LIA/ERB	**110003**					1									**1**
	110013					1									**1**
	110079												1		**1**
	113075									2					**2**
	125086					1									**1**
	129031									1					**1**
	129057											1			**1**
	136082					1									**1**
	136089									1					**1**
	136138										1				**1**
	138041					1									**1**
	139015										1				**1**
	140010										1				**1**
	151005									3	9			13	**25**
	151006										1				**1**
	151007										4				**4**
	151025										2				**2**
	151028					1									**1**
	156024									1	1				**2**
	157008										1				**1**
	Sub Total					*6*				*8*	*21*	*1*	*1*	*13*	***50***
ERB	**110075**							1							**1**

Phase	Context	Function: Arms	Tools	Transport	Household	Personal	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unk	Totals
ERB	**112052**										1				**1**
	121028									2					**2**
	121126					1									**1**
	129032					1				1	3				**5**
	136013									1					**1**
	139019					1									**1**
	139042									1					**1**
	143032										1				**1**
	143063					1									**1**
	147023									1					**1**
	Sub Total					*4*		*1*		*6*	*5*				***16***
RB 2-3c	**129025**					2		1		1					**4**
	138026									2					**2**
	138027									5	7				**12**
	138028		1							3	1			2	**7**
	Sub Total		*1*			*2*		*1*		*11*	*8*			*2*	***25***
LRB	**109045**										1				**1**
	114038	1													**1**
	115022					6				2	1				**9**
	115023				1	4				1	1				**7**
	121016									2					**2**
	129017									5					**5**
	134025					26									**26**
	134026					5									**5**
	136003									1	1				**2**
	136055									1					**1**
	138021									8					**8**
	140024					3			2	4					**9**
	143005						1								**1**

Phase	Context	Function													Totals
		Arms	**Tools**	**Transport**	**Household**	**Personal**	**Security**	**Structural**	**Bindings**	**Nails**	**Misc**	**Query**	**Industrial**	**Unk**	
	Sub Total	*1*			*1*	*44*	*1*		*2*	*24*	*4*				***77***
PM	**114043**			1											**1**
	Sub Total			*1*											***1***
Unph	**107056**					9				3				11	**23**
	915006		1												**1**
	Sub Total		*1*			*9*				*3*				*11*	***24***
	Totals	**1**	**2**	**1**	**1**	**65**	**1**	**2**	**2**	**55**	**38**	**1**	**1**	**42**	**212**

Table 14.4: MTCP site: summary quantification of metal finds by phase and function

	Function														
Phase	**Arms**	**Tools**	**Transport**	**Household**	**Personal**	**Measure**	**Security**	**Structural**	**Bindings**	**Nails**	**Misc**	**Query**	**Industrial**	**Unknown**	**Totals**
MBA				1	1					1					**3**
LIA/ERB					2				1	2					**5**
ERB		1			15					12	2	1		28	**59**
RB 2-3c					4			2		5	4			2	**17**
LRB	1	1	3	4	179	1	4	5	5	285	57	11	25	24	**605**
RB					1										**1**
Late Saxon				1	1					1				4	**7**
EM		1	5	3	4			1		7	2	4			**27**
M										11	1			3	**15**
PM											2	1			**3**
unph			1	2	6		1	4		43	13	2		2	**74**
U/S	1	6	4	9	22	1	2	6	5	6	29	17			**108**
Totals	**2**	**9**	**13**	**20**	**235**	**2**	**7**	**18**	**11**	**373**	**110**	**36**	**25**	**63**	**924**

Table 14.5: MTCP site: hobnails

Phase	Context	Hobnails
middle BA	314067	1
Sub Total		*1*
early RB	349147	5
	351004	1
Sub Total		***6***
RB 2-3 C	328268	2
Sub Total		***2***
late RB	2305	12
	2311	1
	6604	52
	6606	3
	6609	3
	6617	1
	6619	1
	319125	24
	319139	1
	319175	7
	319178	1
	319200	1
	330088	4
	333003	1
	334016	2
	335017	4
	335022	23
	335028	1
	347029	1
	348016	28
	352003	1
	356060	2
Sub Total		***174***
RB	349154	1
Sub Total		***1***
early Medieval	337015	1
Sub Total		***1***
Unphased	342085	1
Sub Total		***1***
Grand Total		**186**

Table 14.6: MTCP site: summary quantification of metal finds by phase, context and function

Phase	**Context**	**Function**														**Totals**
		Arms	**Tools**	**Transport**	**Household**	**Personal**	**Measure**	**Security**	**Structural**	**Bindings**	**Nails**	**Misc**	**Query**	**Industrial**	**Unknown**	
MBA	**307032**										1					**1**
	314067				1	1										**2**
Sub Total					*1*	*1*					*1*					***3***
LIA/ERB	**1909**										2					**2**
	328013					2										**2**
	360021									1						**1**
Sub Total						*2*				*1*	*2*					***5***
ERB	**6323**										1				1	**2**
	7204		1													**1**
	309155											1				**1**
	319303										1					**1**
	320084										1					**1**
	328009														2	**2**
	328015					1										**1**
	328037					1									4	**5**
	330007					2						1				**3**
	330017					1										**1**
	330019												1			**1**
	330146										1				2	**3**
	332021										2				17	**19**
	349042										1					**1**
	349132					3										**3**
	349133														1	**1**
	349147					6					5					**11**
	349154														1	**1**
	351004					1										**1**
Sub Total			*1*			*15*					*12*	*2*	*1*		*28*	***59***

Phase	Context	Function														Totals
		Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	
RB 2-3c	**6319**											1				**1**
	6335										1					**1**
RB 2-3c	**319309**								1							**1**
	325028											1				**1**
	328268					3			1		4					**8**
	330042					1										**1**
	330051														2	**2**
	333054											1				**1**
	347116											1				**1**
Sub Total						*4*			*2*		*5*	*4*			*2*	***17***
LRB	**1608**							1	1		2					**4**
	1707										2					**2**
	2305					13					3					**16**
	2311					1					5	1				**7**
	6309										1					**1**
	6505										3					**3**
	6509										2		1			**3**
	6604					52					3					**55**
	6606					4	1				9	6		3	2	**25**
	6608										1					**1**
	6609					3					10				2	**15**
	6611										1					**1**
	6617					1					7					**8**
	6619					1										**1**
	6621										1	1				**2**
	306026										6					**6**
	306031							1			3	1				**5**
	306037											1				**1**
	306056											2				**2**

Phase	Context	Function														Totals
		Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	
	306066									1	4		2			**7**
	314143										1					**1**
	315076				1						2					**3**
	315087										1					**1**
LRB	**315090**										1					**1**
	315111										2		1			**3**
	316061										2					**2**
	319125					24				1						**25**
	319139					1										**1**
	319150										1					**1**
	319158										1					**1**
	319167											1				**1**
	319175					7										**7**
	319178					1					1					**2**
	319200					1										**1**
	319234										2					**2**
	319238										2					**2**
	320013											1				**1**
	320072										1					**1**
	321210										2					**2**
	321227										1					**1**
	321232										4					**4**
	321233										1					**1**
	321234										1					**1**
	321239											1				**1**
	323049										2					**2**
	324001											1				**1**
	325027										1					**1**
	326045										1					**1**

Phase	Context	Function														Totals
		Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	
	326046										1					**1**
	326054										4					**4**
	326062			1							2					**3**
	327014										1				1	**2**
	328152										1					**1**
	328167										5				7	**12**
LRB	328180										2					**2**
	328194										2					**2**
	328221											1				**1**
	328256										2					**2**
	328279				1											**1**
	328292														6	**6**
	328293											1				**1**
	328297														1	**1**
	329027	1											1			**2**
	329032										1					**1**
	330065										1					**1**
	330084		1													**1**
	330088					4					3	1	1			**9**
	330096										1					**1**
	330100										2				2	**4**
	330108										4	1				**5**
	330116										1					**1**
	330120										1					**1**
	330136								1							**1**
	330148										1					**1**
	331005				1											**1**
	332024										1					**1**
	333003					1					5		1			**7**

Phase	Context	Function: Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	Totals
LRB	**333023**											2				**2**
	333026										3	3	1			**7**
	333038										1					**1**
	333050					1							1			**2**
	333052									1	7	9		19		**36**
	334006										1					**1**
	334009										1					**1**
	334011											1				**1**
	334012											3		2		**5**
	334014										2					**2**
	334015										2	1				**3**
	334016					2					39					**41**
	334018											1				**1**
	334023										1					**1**
	334031										8					**8**
	334034										1	1				**2**
	334036										3					**3**
	335005											1				**1**
	335017					4			1		1	2				**8**
	335022					23					1	1				**25**
	335028					1										**1**
	336006										1					**1**
	336048										3		1			**4**
	336064			1												**1**
	336074														1	**1**
	337018										1					**1**
	338008											1				**1**
	338015					1					1					**2**
	345050													1		**1**

Phase	Context	Function														Totals
		Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	
	347015											1				1
	347029					1										1
	347034			1												1
	347049										2					2
	348007												1			1
	348016					29					2					31
	349035										1					1
	349169											1				1
	350023										2					2
	350030										1					1
LRB	350032											2				2
	350061				1				1		2	1				5
	351007										1					1
	352003					1					3	1			2	7
	353009				1						2					3
	354010									1						1
	355005										1					1
	355033										1					1
	355057										1					1
	355066								1							1
	355078											1				1
	355081											1				1
	355122											1				1
	356002										1					1
	356004										1					1
	356060					2					1					3
	356061										3					3
	356079											2				2
	358007										1					1

Phase	Context	Function Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	Totals
	359025										41					**41**
	359026										3					**3**
	359033										2					**2**
	362033									1						**1**
	365003										1					**1**
	365032							1			1					**2**
Sub Total		*1*	*1*	*3*	*5*	*179*	*1*	*3*	*5*	*5*	*285*	*57*	*11*	*25*	*24*	***605***
RB	349154					1										**1**
Sub Total						*1*										***1***
L Saxon	**1106**										1					**1**
	307015					1										**1**
	317002				1											**1**
L Saxon	**323014**														1	**1**
	340006														3	**3**
Sub Total					*1*	*1*					*1*				*4*	***7***
EM	**920**			1												**1**
	310128										2					**2**
	310135			3	1						1		1			**6**
	310139				1	3					1	1	1			**7**
	336004										1					**1**
	337015					1										**1**
	354064		1													**1**
	354074								1							**1**
	356091			1								1				**2**
	356103												2			**2**
	357027										1					**1**
	357057				1											**1**
	357070										1					**1**
Sub Total			***1***	***5***	***3***	***4***			***1***		***7***	***2***	***4***			***27***

Phase	Context	Function														Totals
		Arms	Tools	Transport	Household	Personal	Measure	Security	Structural	Bindings	Nails	Misc	Query	Industrial	Unknown	
Med	**354047**										5					**5**
	354048										1					**1**
	354055										1					**1**
	354059										4				3	**7**
	354061											1				**1**
Sub Total											*11*	*1*			*3*	***15***
PM	**8713**												1			**1**
	333044											2				**2**
Sub Total												*2*	*1*			***3***
unph	**0**							1			4					**5**
	525														1	**1**
	1000				1				2		20	6	1			**30**
	1004					2										**2**
	1005												1			**1**
unph	**1006**				1	1						1				**3**
	1007					1					5	1				**7**
	6207								1							**1**
	6238										1					**1**
	6333								1		3					**4**
	6607											2				**2**
	301002					1						1				**2**
	310144										1					**1**
	317010											1				**1**
	320146										2					**2**
	324021										1					**1**
	330207			1												**1**
	335009										2	1			1	**4**
	342085					1										**1**
	343128										1					**1**

		Function														
Phase	**Context**	**Arms**	**Tools**	**Transport**	**Household**	**Personal**	**Measure**	**Security**	**Structural**	**Bindings**	**Nails**	**Misc**	**Query**	**Industrial**	**Unknown**	**Totals**
	395025										3					**3**
Sub Total				*1*	*2*	*6*		*1*	*4*		*43*	*13*	*2*		*2*	***74***
U/S	**0**										1					**1**
	301001	1	6	4	9	22	1	2	6	5	5	29	17			**107**
Sub Total		*1*	*6*	*4*	*9*	*22*	*1*	*2*	*6*	*5*	*6*	*29*	*17*			***108***
Totals		**2**	**9**	**13**	**21**	**235**	**2**	**6**	**18**	**11**	**373**	**110**	**36**	**25**	**63**	**924**

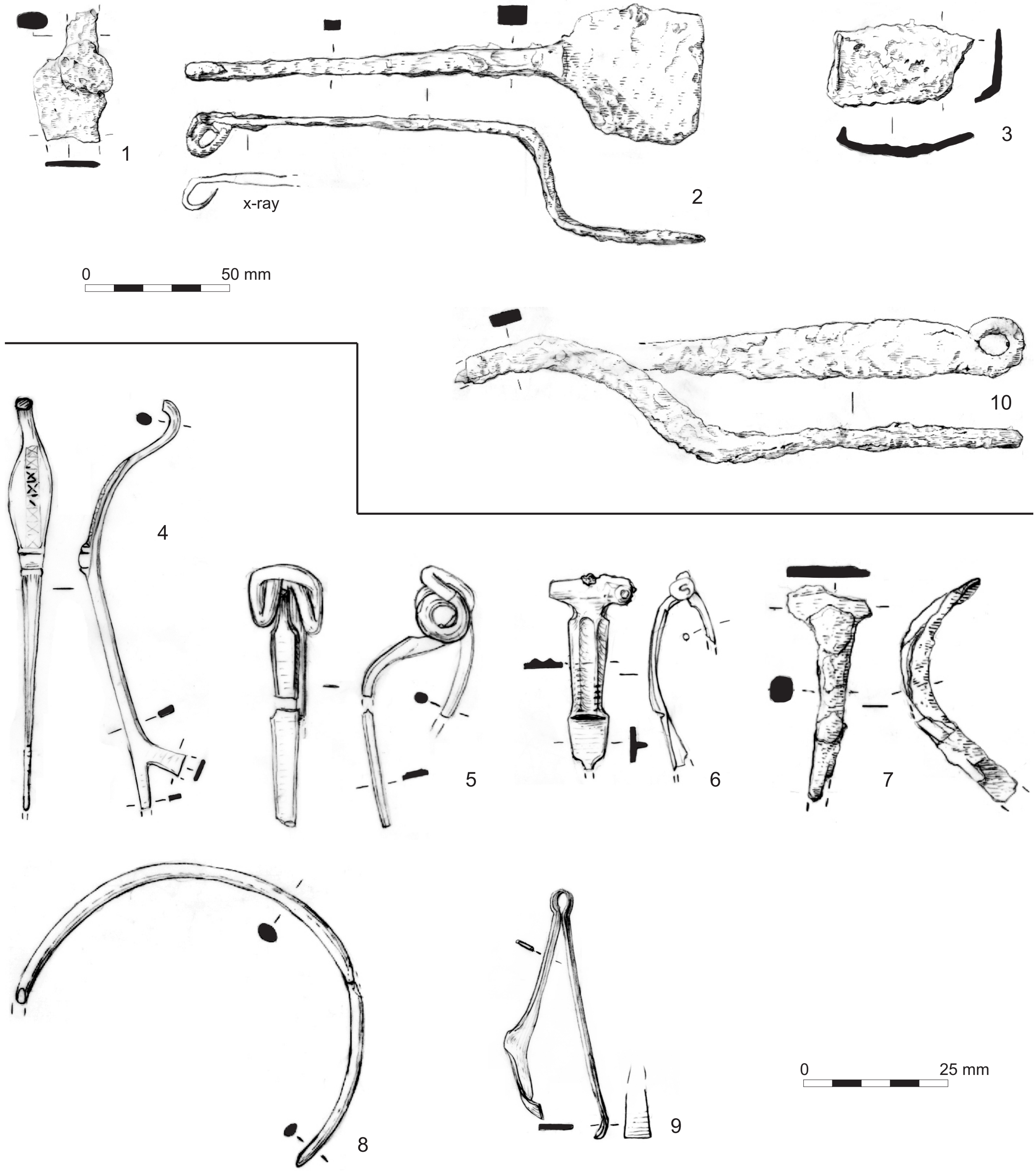


Figure 14.1: Selected metalwork (details in the catalogue)

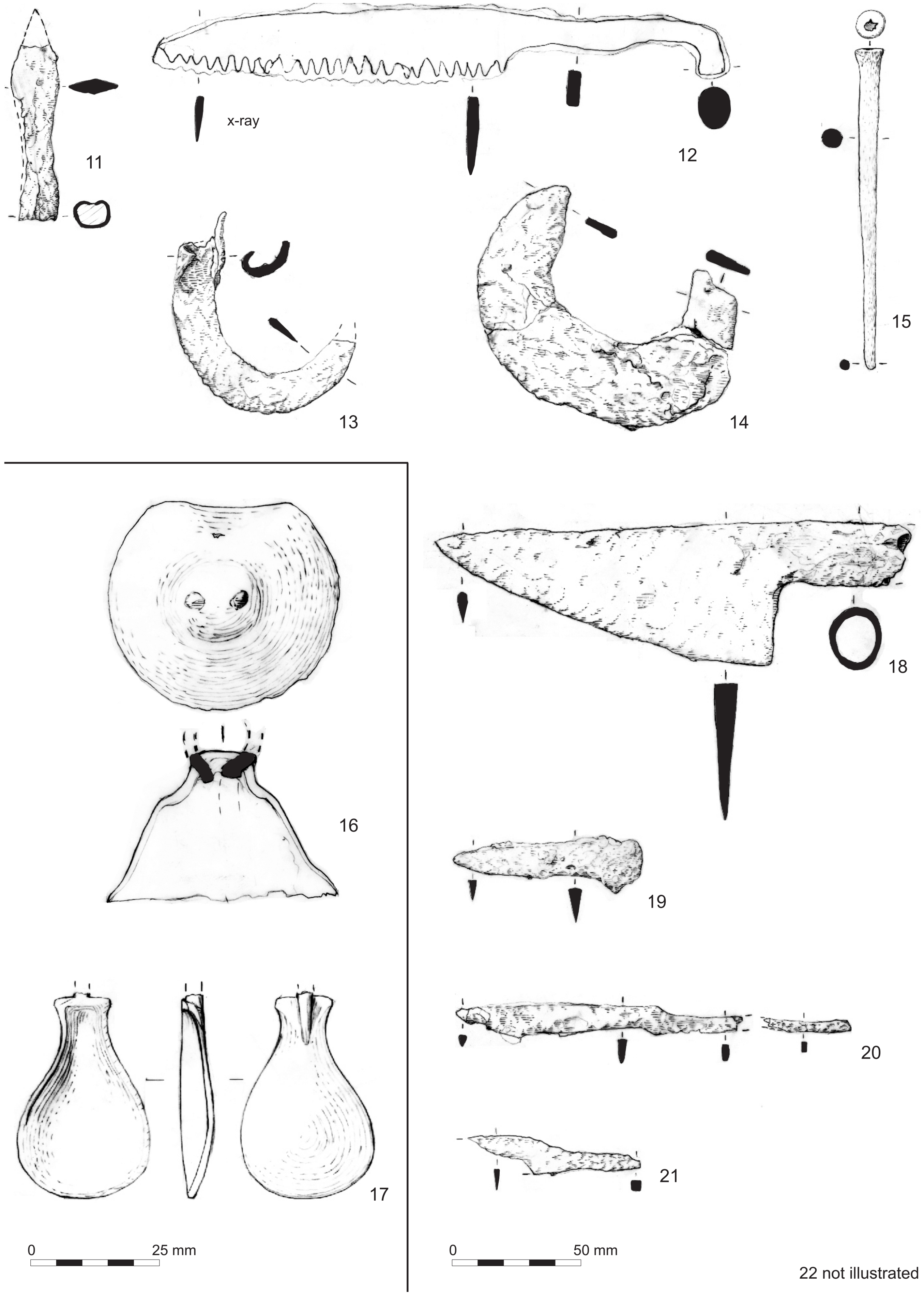


Figure 14.2: Selected metalwork (details in the catalogue)

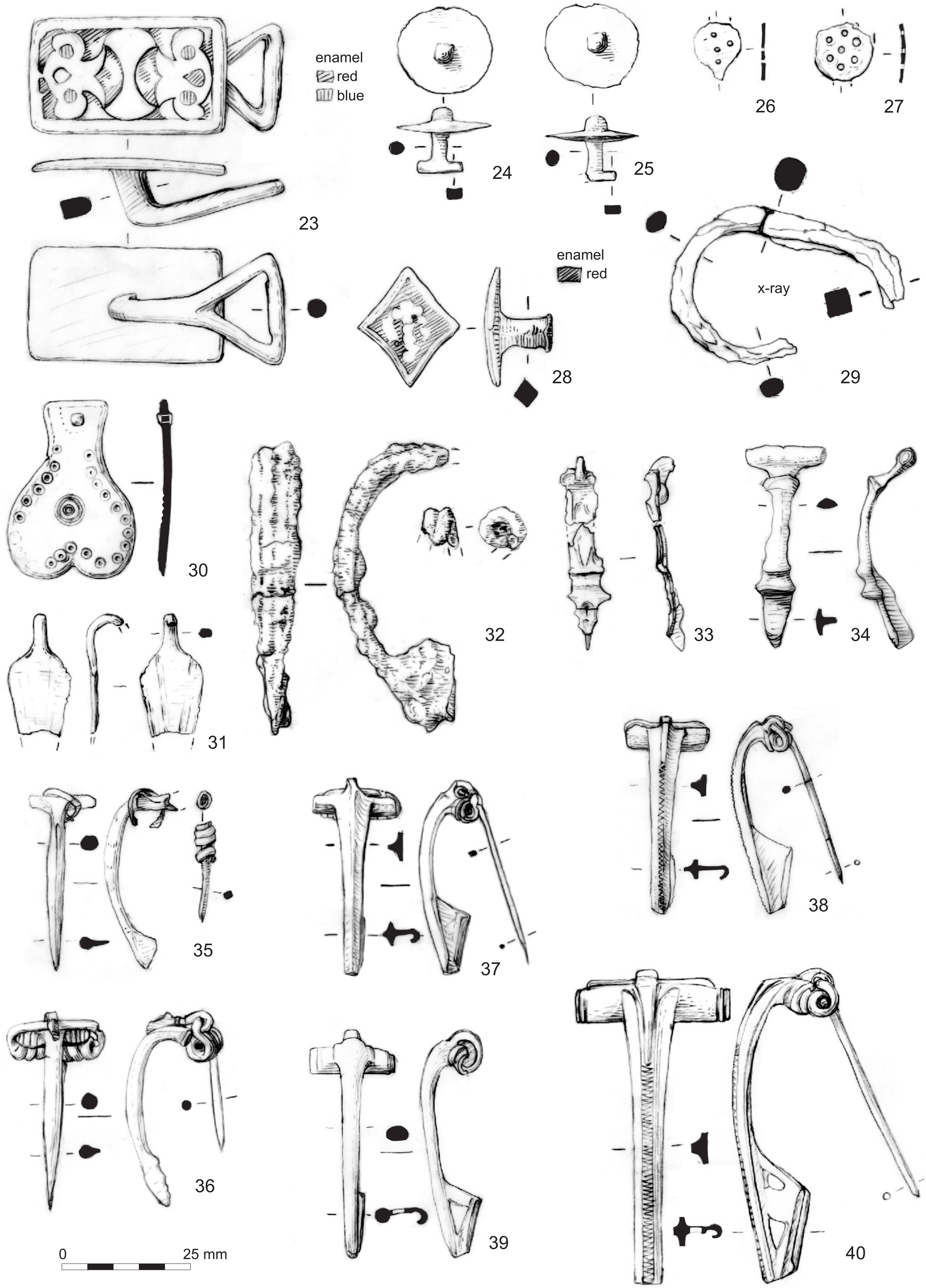


Figure 14.3: Selected metalwork (details in the catalogue)

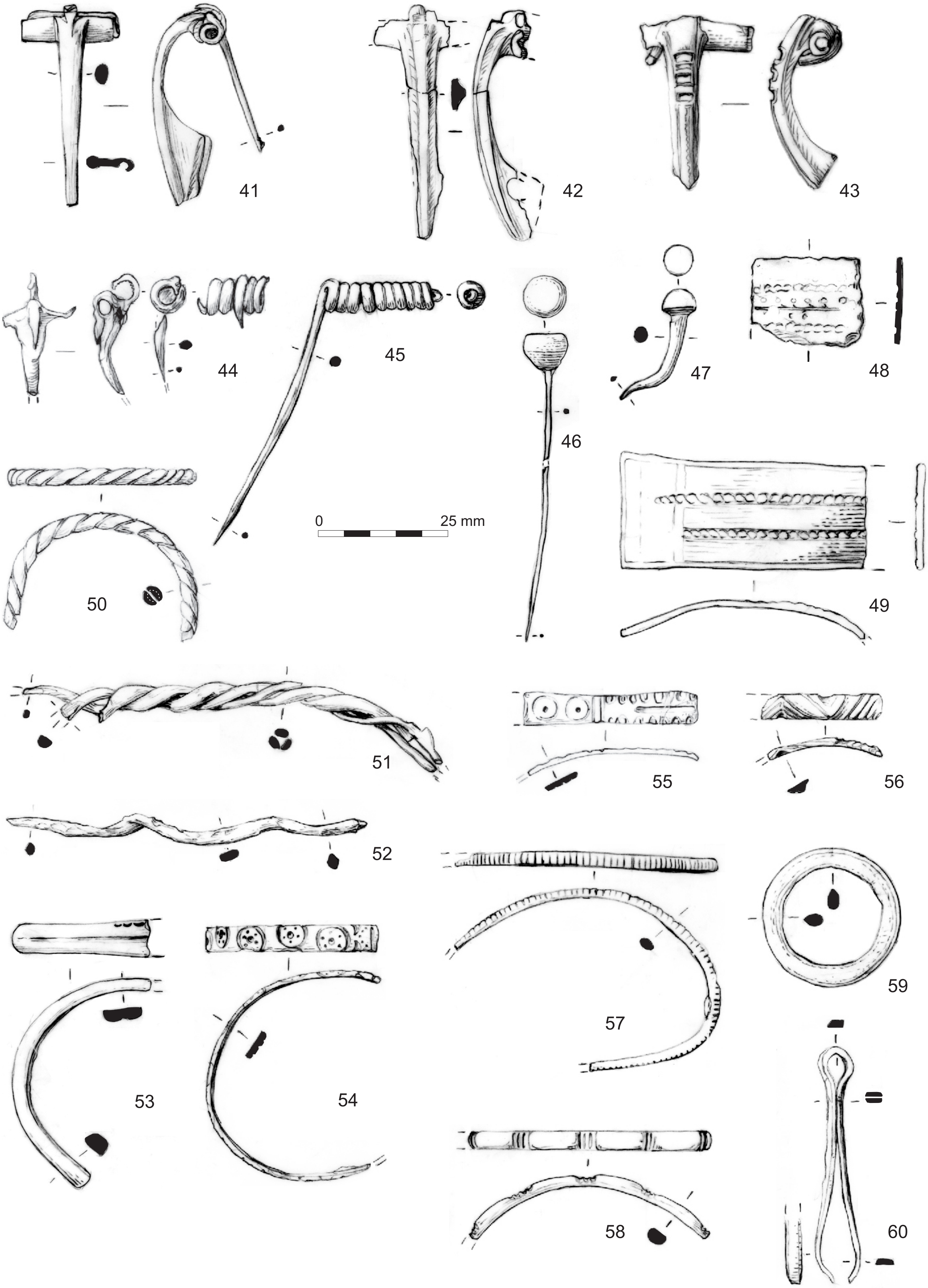
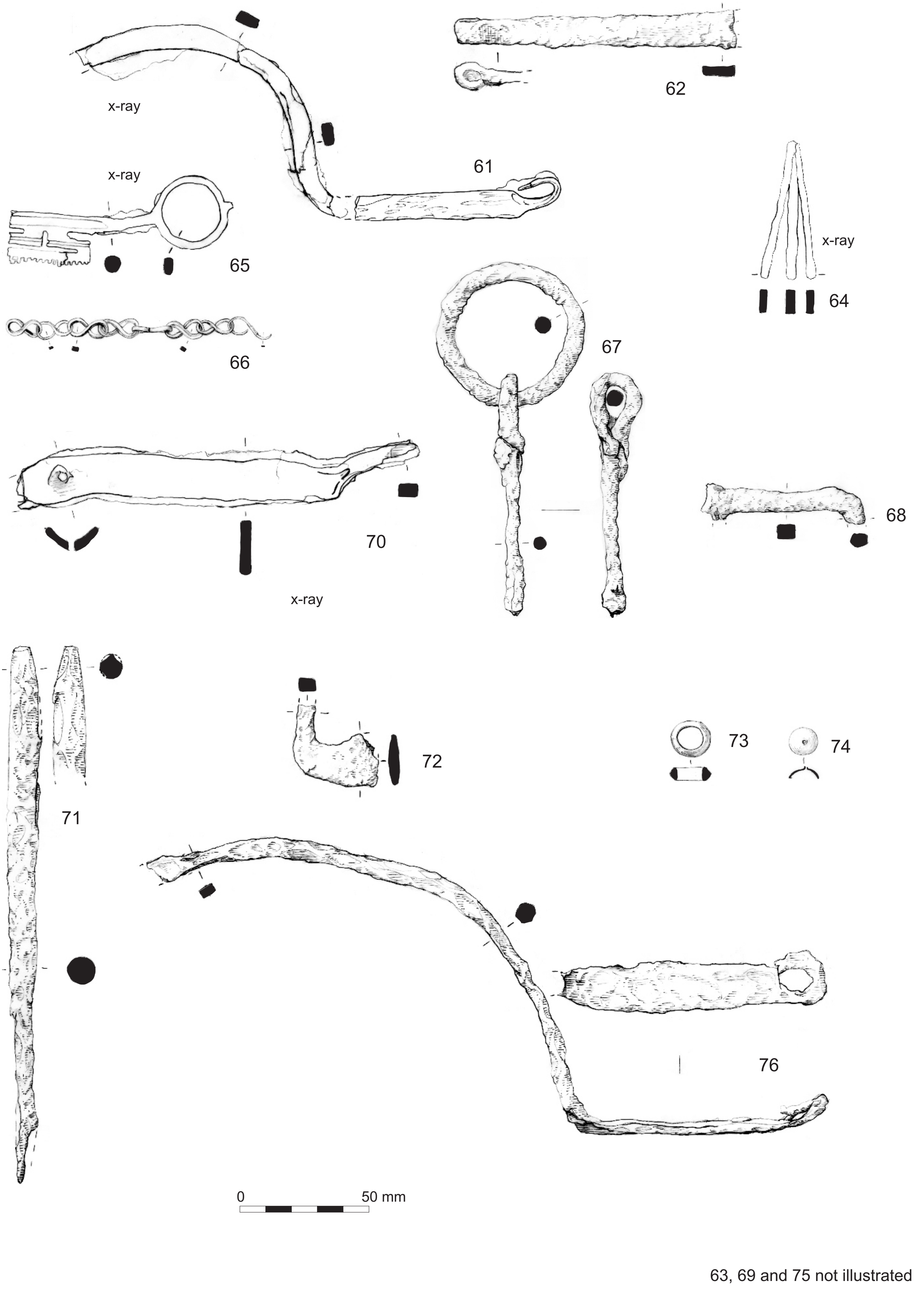


Figure 14.4: Selected metalwork (details in the catalogue)

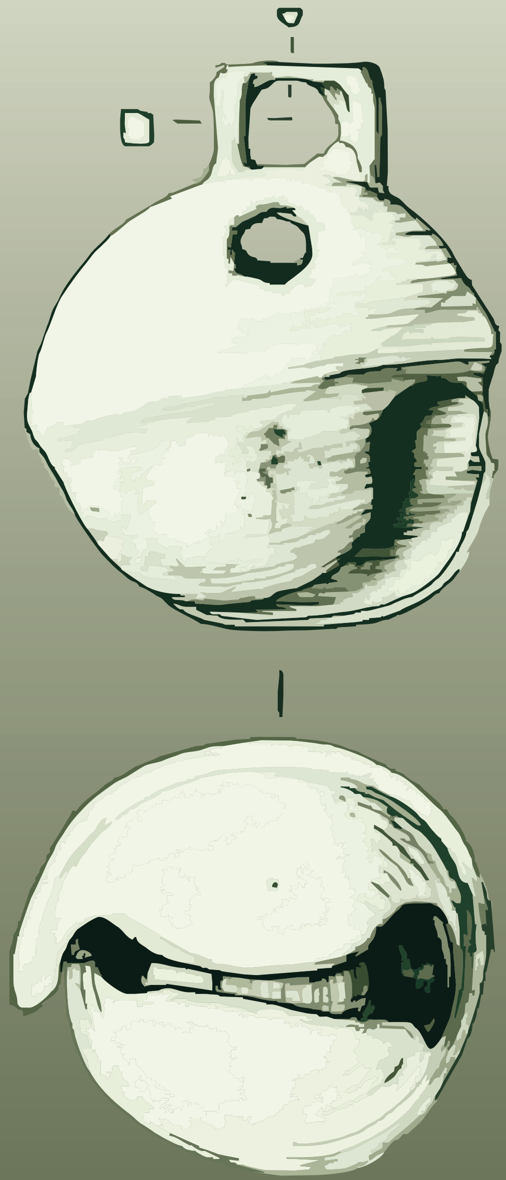


63, 69 and 75 not illustrated

Figure 14.5: Selected metalwork (details in the catalogue)

CHAPTER 15

Medieval and post-medieval metalwork



by Leigh Allen

15 Medieval and post-medieval metalwork

Leigh Allen

A total of 1,042 post-Roman metal objects was recovered from the excavations carried out at Stansted Airport. The bulk of the assemblage is post-medieval in date and was recovered from the final phase of work carried out on the LTCP site in 2001 (containing the hunting lodge). However smaller assemblages were recovered during the earlier phases of work at the LTCP (BAACP99 and BAACP00) and also from the MTCP (BAAMP99 and BAAMP00), FLB (BAAFL00) and the LBR (BAAFL00) sites.

The assemblage comprises 166 copper alloy objects (excluding coins), 856 iron objects (including 653 nails) and 21 lead objects. Table 15.1 indicates the number of objects of each metal type from each of the sites.

This report deals only with the identifiable objects; a full list including all the miscellaneous fragments and unclassified objects will be deposited with the archive. The metalwork assemblage has been divided into the following functional categories; personal accessories, domestic items, lock furniture, knives, tools, horsegear, objects associated with hunting and structural objects (including nails). The first section of this report is a catalogue of the identifiable objects recovered from all phases of work at Stansted Airport and is ordered by function the second section discusses the artefacts by site and phase.

Section 1 - Catalogue

Personal Accessories

Lace tags (Fig. 15.1, nos 1-3)

A total of 24 lace tags were recovered from LTCP site (BAACP01). All are formed from rolled sheet copper alloy. Three types have been recovered from Stansted; one of each type has been illustrated. The typology used here follows Oakley (Oakley and Webster 1979, 262-3) and Margeson (Margeson 1993, 22). The first type tapers slightly and has edges that overlap along its length (Margeson type 3), the second type also tapers but has edges that meet at the upper end and then overlap at the tip (Oakley type 1 dating mainly to the 15th century with some of 16th and 17th century date), both of these two types of tag have holes at the top for thread or a rivet to attach it to the lace or ribbon. The third type has edges that meet but then turn in on themselves and does not require sewing or a rivet to attach it (Oakley type 2 dating from the mid 16th to 17th centuries). Lace tags are a common find in post-medieval contexts as the fashion for tighter fitting garments in the late medieval to post-medieval periods would have produced a great demand for laces (Egan and Pritchard 1991, 284).

1. (illus.) Lace tag with a slight taper. The edges meet at the upper end but overlap at the tip, and there is a rivet/thread hole at the top (Oakley type 1). BAACP01, SF 1283, ctx 480065, length 23 mm.
2. (illus.) Lace tag tapering and with edges that meet and then turn in on themselves to secure the tag to the lace (Oakley type 2). BAACP01, SF 1259, ctx 448001, length 27 mm
3. (illus.) Lace tag with a slight taper and edges that overlap and a rivet/thread hole at the top (Margeson type 3). BAACP01, SF 1271, ctx 448002, length 30 mm

Pins (Fig. 15.1, nos 4-6)

A total of 64 pins were recovered from the LTCP site (BAACP01). Three types of pin have been recovered from Stansted and one of each type has been illustrated. Type 1 has a wire wound head, the coils of the head are distinct, type 2 has a spherical head where the coils are present but indistinct and type 3 is a large more robust pin with a cast spherical head. Pins are a common find in post-medieval contexts and are often found in association with large numbers of lace tags.

4. (illus.) Pin with a wire spiral wound head; the coils of the spiral are distinct BAACP01, SF 1370, ctx 459027, length 28 mm.
5. (illus.) Pin with a spherical wire wound head the coils of the spiral are indistinct BAACP01, SF-, ctx 447011, length 34 mm
6. (illus.) Large pin with cast spherical head BAACP01, SF 1210, ctx 480068, length 47 mm

Wire loop fasteners (Fig. 15.1, no. 7)

Six wire loop fasteners were recovered from the LTCP site (BAACP01). Simple loops of fine wire with the ends twisted around each other are commonly found in large numbers in medieval and post-medieval contexts. Often associated with assemblages of pins and lace tags, they were used to fasten garments (Margeson 1993, 20, fig.10, no.101). All six examples from Stansted are identical; one example has been illustrated.

7. (illus.) Wire loop fastener with the ends twisted around each other. BAACP01, SF 1275, ctx 448001, length 11 mm.

Hook and eye fastener (Fig. 15.1, no. 8)

A single s-shaped fragment from the hook of a hook and eye fastener was recovered from LTCP site (BAACP01). This type of fastening was commonly used in the late medieval and post-medieval period.

8. (illus.) A fragment from the hook of a hook and eye fastener BAACP01, SF 1158, ctx 448001, length 17 mm.

Hooked clasp (Fig. 15.1, no. 9)

The remains of a hooked clasp with a composite sleeve and internal spring was recovered from the LTCP site (BAACP01). Hooked clasps were probably used to join decorative accessories together or onto a garment or strap. This particular design of clasp with its decorated sleeve and simple internal spring dates to the late 15th century (Egan 2005, 44-45, fig. 26 no.160).

9. (illus.) Hooked clasp, the back plate has a roughly cut rectangular flap, which has been folded back internally to form a spring. The curved front sheet is decorated with an openwork lattice design, the hook end is broken off. BAACP01, SF 1156, ctx 480010, length 30 mm.

Buttons (Fig. 15.1, nos 10-13)

A total of seven buttons were recovered from the LTCP site (BAACP01). Three types of button were identified; all of post-medieval date; one of each type has been illustrated. The most common type is the plain circular, discoidal button with an integral attachment loop; there are five examples of this type. Three have a wire loop attachment (Biddle and Cook 1990, 578, fig. 155, no.1760) and the other two have a short rectangular shank with a perforation through it (Biddle and Cook 1990, 578, fig. 155, no.1752). Two examples have a coating of tin on the upper surface. The remaining two buttons are a circular dished button with four holes at the centre for attachment, and a two-piece button consisting of a copper sheet metal cover over an iron back. The upper face has an embossed decoration on it.

10. (illus.) Plain, circular discoidal button with an integral wire attachment loop BAACP01, SF-, ctx 449017, diameter 31 mm

11. (illus.) Plain, circular, discoidal button with a rectangular perforated shank BAACP01, SF -, ctx 449018, diameter 14 mm

12. (illus.) Dished button with a rounded rim and 4 holes at the centre for attachment BAACP01, SF 1197, ctx 448001, length 16 mm.

13. (illus.) Two piece button with a copper alloy sheet metal cover over an iron back, the means of attachment is missing. The upper face is decorated with an embossed design, possibly a thistle. BAACP01, SF 1236, ctx 448001, diameter 15 mm

Buckles (Fig. 15.1, nos 14-43)

A total of 32 buckles (and buckle parts) were recovered, 29 came from the LTCP site (BAACP01), 1 from the MTCP site and 2 from the FLB site. A variety of buckle forms are present, ranging from simple utilitarian circular, oval, rectangular, and D-shaped frames through to more ornate double-oval frames. The larger iron buckles particularly the examples with trapezoidal-shaped frames and sheet metal rollers are probably for use with horse's harness. There is a single example of a buckle with an oval frame and a composite rigid plate (Cat. No.39) of mid 14th to early 15th century date (Egan and Pritchard 1991, 78-82, fig 48 and 49) and a rectangular locking buckle of late medieval date (Egan and Pritchard 1991, 97, fig 62, no.445).

14. (illus.) Small annular buckle frame with pin BAACP01, SF 1185, ctx 480039, iron, length 13 mm

15. (illus.) Oval frame with narrow offset bar, the pin is missing BAAFL00, SF 243, ctx 402019, copper alloy, length 33 mm

16-17. Rectangular buckle frame with pin (found corroded to SF 1192b)

BAACP01, SF 1192a, ctx 448001, iron, length 46 mm (illus.)

BAACP01, SF 1303, ctx 480053, iron, length 36 mm

18. (illus.) Rectangular buckle frame with central bar, the bar is waisted slightly at the centre where it has been worn by the pin. BAACP01, SF -, ctx 449018, iron, length 34 mm

19. (illus.) Rectangular buckle frame the bar is slightly recessed and there is a notch for the pin rest BAACP01, SF -, ctx 449017, copper alloy, length 35 mm

20. (illus.) A cast rectangular buckle frame with pin. The frame has a flattened hexagonal section, 14th -15th century in date (Williams 1978, fig 22.10 and Margeson 1993, 28, fig 14, no.145). BAACP01, SF 1232, ctx 472004, copper alloy, length 32 mm

21-26. D-shaped buckle frame with pin

BAACP01, SF-, ctx 459008, iron, length 39 mm (illus)

BAACP01, SF 1167, ctx 448001, iron, length 41 mm

BAACP01, SF 1192b, ctx 448001, iron, length 32 mm(corroded to SF 1192a)

BAACP01, SF 1178, ctx 480034, iron, length 25 mm

BAACP01, SF 1163, ctx 448001, iron, length 32 mm

(illus.) BAACP01, SF 1267, ctx 448001, copper alloy, length 14 mm

27. (illus.) A D-shaped buckle frame with an arched bar (pin missing) BAACP01, SF -, ctx 449018, copper alloy, length 30 mm

28-29. Elongated D-shaped buckle frame with pin

BAACP01, SF 1339, ctx 458024, copper alloy, length 58 mm

(illus) BAACP01, SF-, ctx 465029, iron, length 59 mm (pin missing)

30 A double D-shaped buckle frame BAACP01, SF 1187, ctx 448001, iron, length 25 mm

31. (illus.) Trapezoidal buckle frame with pin BAACP01, SF 1402, ctx 472003, iron, length 43 mm

32. (illus.) Trapezoidal buckle frame with sheet roller and pin BAACP01, SF 1395, ctx ?, iron, length 52 mm

33. (illus.) A simple cast double-oval buckle frame with slightly expanded pin rests. Iron corrosion around the central bar is all that remains of the pin. BAACP01, SF 1202, ctx 448001, copper alloy, length 33 mm

34. (illus.) A cast double-oval buckle frame with expanded pin rests and lobes at the junction of the bar and frame. The pin rests are decorated with raised bobbles in the form of a flower. A similar example from Norwich was recovered from an early 17th century context (Margeson 1993, 28, fig.17, no.174) BAACP01, SF 1407, ctx 452015, copper alloy, length 40 mm

35. (illus.) A cast double-oval buckle frame with 4 knops, one at each corner and lobes at the junction of the bar and frame. Iron corrosion around the central bar is all that remains of the pin. Late 16th-17th century in date (Zeepvat 1992, 142, Fig.53, no.39). There are fine grooves/ scratches on both faces, which are probably casting flashes from the manufacturing process. BAACP01, SF 1207, ctx 472004, copper alloy, length 39 mm)

36. (illus.) A cast double-oval buckle frame with lobes at the junction of the bar and frame. The outside edge decorated with a fluted design. BAACP01,SF 1152, ctx 448001, copper alloy, length 28 mm

37. (illus.) A cast double-oval buckle frame with a folded plate around the central bar. The plate is recessed for the pin and has two rivets for attachment to the strap. BAACP01, SF 1211, ctx 480073, copper alloy, length 39 mm

38. (illus.) Fragment from a cast double oval buckle frame with a D-shaped section. BAACP01, SF -, ctx 449017, copper alloy, length 28 mm

39. Buckle with an oval frame and composite rigid plate. The plates are missing from this example and only part of the forked spacer survives. The frame is lipped and bevelled, the bar is off set and constricted for the pin. BAAFL00, SF 253, ctx 401013, copper alloy, length 35 mm

40. (illus) A locking buckle with a rectangular frame with an off centre combined bar and pin. The holes for the bar are flanged for extra strength and there is a groove in the outside edge by which the arm was held closed. BAACP01, 1233, ctx 472004, copper alloy, length 28 mm

41. (illus.) Figure-of-eight shape buckle frame BAACP01, SF 1214, ctx 448001, iron, length 40 mm

42. (illus.) A folded sheet metal buckle plate recessed for the buckle pin. There are 3 possibly 4 perforations through the plate for rivets. BAAMP00, SF 967, context 301001, copper alloy, length 23 mm

43. (illus.) Folded sheet metal buckle plate, recessed for the pin and with 2 rivets to secure the plate to the strap. BAACP01, SF -, ctx 448001, copper alloy, length 27 mm

44. Large buckle pin, that curves up at the tip to fit over the frame BAACP01, SF -, ctx 461001, iron, length 68 mm

45. Curved fragment from a possible buckle frame with a lobed outside edge, the x-ray indicates that the buckle has been plated probably with tin. BAACP01, SF 301, ctx 307015, iron, length 24 mm

Annular brooch/buckle frame (Fig. 15.1, no. 46)

A decorated annular brooch/buckle frame was recovered from the FLB site (context 401013). Buckle frames can usually be distinguished from brooches by the presence of a constriction for the pin, unfortunately this object is broken exactly where the constriction might have been. The frame has areas of cable decoration between which the frame is plain. A similar object recovered from London with identical decoration has been classified as a brooch (Egan and Pritchard 1991, 248-250, fig.160, no.1315).

46. An annular brooch/buckle frame decorated with a cable design, the frame is incomplete. BAAFL00, SF 245, ctx 401013, copper alloy, length 27 mm

Mounts (Fig. 15.2, nos 47-54)

A total of 8 mounts were recovered from the LTCP site (BAACP01). The majority of them are circular, plain domed sheet metal mounts with separate rivets. They would have been used probably in combination with other mounts to form a decorative effect on girdles and other straps and possibly on purses and shoes (Egan and Pritchard 1991, 162). One large circular mount (Cat. No.52) may, because of its size, have been used on horse harness rather than dress. Also included in this section is a small solid, circular domed mound (Cat. No. 54) that has two integral spikes on the flat back for attachment.

47. (illus.) Circular, plain domed mount with a separate rivet through the centre, the rivet is incomplete BAACP01, SF 1255, ctx 448001, copper alloy, length 10 mm

48. (illus.) Circular, plain domed mount with a perforation through the centre, the rivet is missing BAACP01, SF 1295, ctx 480062, copper alloy, length 9 mm

49. A very corroded circular plain domed mount with a perforation through the centre BAACP01, SF 1184, ctx 448001, copper alloy, length 11 mm

50. (illus.) Circular, plain domed mount with a separate rivet through the centre. BAACP01, SF 1175, ctx 480034, copper alloy, length 13 mm

51. (illus.) Circular, plain domed mount with a perforation through the centre, the top of the mount is slightly dished and the rivet is missing. BAACP01, SF 1201, ctx 448001, copper alloy, length 17 mm

52. (illus.) A large circular disc-shaped mount with a worn perforation at the centre and 2 smaller perforations at the edge. BAACP01, SF 1208, ctx 480047, copper alloy, length 52 mm

53. (illus.) Fragment from a cinquefoil mount in the form of a flower with raised decoration on each of the petals and perforation through the centre. The mount has been plated with tin. BAACP01, SF 1190, ctx 448001, copper alloy, length 13 mm

54. (illus.) A solid circular domed mount with 2 integral spikes on the flat back for attachment. Both the spikes are bent almost at 90 degrees. BAACP01, SF 1298, ctx 480053, copper alloy, length 10 mm

Rings

Only three rings were recovered from the excavations one from the FLB site and the other two from the LTCP site (BAACP01). The rings are very crudely made only Cat. No.55 from context 401013 looks, (from its size), to be a possible finger ring, although it could be a suspension ring.

55. A plain ring with a diamond-shaped section BAAFL 01, SF 252, ctx 401013, copper alloy, length 23 mm

56. Two crude rings with circular sections joined at there outside edges by a strip that has been wrapped around them. BAACP01, SF 1252, ctx 472004, iron, length 61 mm

Bells (Fig. 15.2, nos 57-60)

A complete cast crotal, a fragment from a second and two fragments from pellet bells were recovered from the LTCP site (BAACP01). Crotals would have been used on harness; the smaller pellet bells could have been used to decorate dress or harness. Bells are a common find in the later medieval and post-medieval periods (Biddle and Hinton 1990, 726).

57. (illus.) An undecorated cast crotal with a rectangular suspension loop, the iron pellet survives inside (Zeepvat 1992,170, fig 80, and no. 211). BAACP01, SF -, ctx 448001, copper alloy, length 35 mm

58. (illus.) The upper half of a sheet metal pellet bell with a strap loop for suspension; there are traces of solder around the edges where the upper hemisphere would have been joined to the lower BAACP01, SF 1263, ctx 448001, copper alloy, length 20 mm

59. (illus.) Cast fragment from a hemispherical object possibly the upper or lower sections of crotal decorated with incised radiating grooves BAACP01, SF -, ctx 448001, copper alloy, length 24 mm

60. (illus.) A hollow sheet metal hemisphere, possibly the lower half of a pellet bell BAACP01, SF 1244, context 448002, copper alloy, length 21 mm

Patten (Fig. 15.2, no. 61)

A single patten fitting was recovered from the LTCP site. Pattens were used as an overshoe in wet and muddy conditions and consisted of a wooden sole beneath which projected an iron framework. This patten has a ring with 2 angled brackets to attach it to the wooden sole. A similar example recovered from Gt. Linford (Zeepvat 1992, 150-151) is dated to the 17th century.

61. (illus.) A patten fitting with a ring and two angled brackets that terminate in flat plates. One plate has a single rivet through it; the other has 2 rivets. BAACP01, SF 1410, ctx 447004, iron, length 209 mm

Domestic items

Sewing equipment (Fig. 15.2, nos 62-68)

A total of 6 thimbles and a needle were recovered from the LTCP site (BAACP01). Three different forms of thimble are represented. Type 1 is a domed thimble with hand-applied indentations (Cat. No. 62), late medieval in date (Egan and Pritchard 1991, 266-267, fig 206, no.824), type 2 is a straight-sided thimble made in two pieces with machine applied indentations; probably dating to the 17th century (Holmes 1988, 2) and type 3 is made from one piece of sheet metal by the 'deep drawing process' introduced in the 18th century (Holmes 1988, 2).

62. (illus.) A hemispherical thimble with irregular hand applied indentations all over and a small circular perforation through the apex (type 1). BAACP01, SF -, ctx 449017, copper alloy, length 15 mm

63-64. (illus.) Straight sided thimble made in two pieces, the cap is a separate (type2). The indentations are machine applied and there is a plain band at the shoulder and the rim.

BAACP01, SF 1151, ctx 448001, copper alloy, length 21 mm

BAACP01, SF 1228, ctx 450016, copper alloy, length 22 mm

65-66. (illus.) Straight sided thimble made in one piece, the indentations are machine applied. There is a groove at the shoulder and a raised ridge above a plain band at the rim.

BAACP01, SF 1216, ctx 449026, copper alloy, length 20 mm

BAACP01, SF -, ctx 449017, copper alloy, length 22 mm

67. (illus.) Straight sided thimble made in one piece with machine applied indentations, the rim of the thimble is turned over, conclusive proof that it was produced by the deep drawing process (type 3). BAACP01, SF -, ctx 449017, copper alloy, length 18 mm

68. (illus.) A large needle with an oval eye, possibly a darning needle BAACP01, SF 1343, ctx 458024, copper alloy, length 55 mm

Vessels

Two large fragments and a number of small pieces from cast iron vessels were recovered from the LTCP site (BAACP01). The largest fragment (from an unstratified context) has a full profile surviving and stands to a height of 290 mm (it would have had a diameter of *c* 410 mm). A single leg with a slightly expanded foot survives and there is a perforated flange on the rim for a handle. The second fragment is from the base of a vessel also with a single leg with a slightly expanded foot surviving. Such vessels were in use through out the medieval and post-medieval periods, either in an open fire or suspended from a hook above it.

69. Large fragment from a cast metal vessel with a single leg with a slightly expanded foot surviving and a perforated flange at the rim for the handle. BAACP01, SF-, ctx -, iron, height 290 mm, diameter *c* 410 mm

70. Fragment from the base of a cast metal vessel with a single leg with a slightly expanded foot surviving. BAACP01, SF 1406, ctx 462015, iron, length 126 mm

71. Five irregularly shaped cast metal vessel fragments BAACP01, SF-, ctx 461027, iron, length 176 mm

Vessel repairs (Fig. 15.2, no. 72)

Two paper clip rivets were recovered from the MTCP site. These rivets made from folded sheet metal were used to hold vessel repairs in place (Margeson 1993, 93, fig 59, nos 575-576).

72-73. Paper clip rivet made from folded sheet metal

(illus.) BAAMP00, SF 793, ctx 301001, copper alloy, length 28 mm

BAAMP00, SF 740, ctx 1006, copper alloy, length 20 mm

Spoon (Fig. 15.2, no. 74)

An oval bowl from a small spoon was recovered from the LTCP site. There is a raised D-shaped protrusion at one end where the handle would have been attached.

74. (illus.) An oval bowl from a small spoon, There is a raised D-shaped protrusion at one end where the handle would have been attached BAACP01, SF -, ctx 448001, copper alloy, length 35 mm

Lock Furniture

Keys (Fig. 15.3, nos 77-78, 80)

A total of eight keys and a barrel padlock bolt were recovered, seven keys came from the LTCP site (BAACP01) and one from the FLB site. The keys are all for mounted locks and have circular, oval or kidney-shaped bows. There are three types of key present. The first has a hollow stem (all examples of this type are fragmentary and therefore no other characteristics are recorded), the second type has a solid stem and a simple bit, the third type has a solid stem that projects beyond the bit and a symmetrically shaped bit incorporating ward cuts that run the depth of the bit. All these forms of key were in use in the late medieval period but only type 3 continued in use into the post-medieval period (Goodall 1990a, 1007).

75. Key for a mounted lock with a circular bow and a hollow stem. The ends of the bow are inserted into the top of the stem and there is a band around the top of the stem. The bit is missing (type 1). BAACP01, SF -, ctx 466010, iron, length 87 mm

76. Key for a mounted lock with a kidney-shaped bow and a hollow stem. The ends of the bow are inserted into the top of the stem and there is a band around the top of the stem. The bit is missing (type 1). BAACP01, SF 1199, ctx -, iron, length 52 mm

77. (illus.) Key for a mounted lock with a circular bow and a hollow stem, the bit is damaged (type 1). BAAFL00, SF 250, ctx 401013, iron, length 101mm

78. (illus.) Key for a mounted lock with a kidney-shaped bow and a solid moulded stem, the bit is incomplete (type 2) BAACP01, SF -, ctx 448001, iron, length 63 mm

79. Key for a mounted lock with an oval bow and a solid stem that projects beyond the end of the simple bit (type 3). BAACP01, SF -, ctx 447004, iron, length 104 mm

80. (illus.) Key for a mounted lock with an oval bow and a solid stem that projects beyond the bit. The bit is symmetrically shaped incorporating ward cuts that run the depth of the bit (type 3). BAACP01, SF1360, ctx 467020, iron, length 138 mm

81. Key for a mounted lock with a kidney-shaped bow and a solid stem that projects beyond the bit. The stem is stepped above the bit and the tip terminates in a rounded knop. The bit is symmetrically shaped incorporating ward cuts that run the depth of the bit (type 3). BAACP01, SF 1281, ctx 480162, iron

82. The broken ward from a key BAACP01, SF 1357, context 467014, iron, length 21mm

Padlock bolt (Fig. 15.3, no. 83)

83. (illus) Barrel padlock bolt with two spines, the double leaf springs are set at right angles to each other BAACP01, SF -, ctx 466010, iron, length 52 mm

Knives

Whittle-tang knives (Fig. 15.3, nos 84-87, 93-94, 96-100)

The fragmentary remains of 17 whittle-tang knives were recovered, 14 came from the LTCP site (BAACP01), 2 from the MTCP site and 1 from the FLB site. Whittle-tang knives with rod-shaped tangs that were inserted into handles are essentially utilitarian objects and are commonly found in medieval and post-medieval contexts. The earliest example from Stansted dating to the late 13th-14th century was recovered from the FLB site (Cat. No. 84) it has a pronounced triangular blade and a centrally placed tang. There are six examples of knives with bolsters a widening at the junction of the blade and the tang introduced in the 17th century. There are five examples of bone handles, two of which are highly decorated.

84. (illus.) A complete whittle-tang knife with a centrally placed tang and a pronounced triangular-shaped blade, the blade edge is worn through use. Late 13th-late 14th century in date (Cowgill *et al.* 1987, fig 55, no 28 and fig. 60, no. 88). BAAFL00, SF 242, ctx 402019, iron, length 191 mm

85. A very corroded whittle-tang knife the back of the blade and the tang run straight, the blade edge although corroded and worn appears to run parallel to the back of the blade BAACP01, SF 1358, ctx 467014, iron, length 127 mm

86-87. Two very fragmentary whittle-tang knives with the tang is centrally placed, and the blade back and edge run parallel for the short length that survives.

BAACP01, SF 1256, ctx 448001, iron, length 84 mm

(illus.) BAACP01, SF 1229, ctx 448001, iron, length 96 mm

88. A small whittle-tang knife with a centrally placed tang, the blade back and edge run parallel before they both taper towards the tip. BAACP01, SF -, ctx 480071, iron, length 84 mm

89. A very damaged whittle-tang knife the tang is placed just below the blade back. The blade back and edge run parallel for the short length that survives BAACP01, SF -, ctx 449017, iron, length 97 mm

90. A damaged whittle-tang knife with very little of the tang surviving. The stub of the tang is placed just below the blade back. The blade runs straight and the blade edge runs parallel and then rises towards the tip, the blade edge is very damaged. BAACP01, SF 1273, ctx 448001, iron, length 101 mm

91. A whittle-tang knife with only a short section of the blade surviving , the tang is centrally placed and the back of the blade slopes up towards the break, the blade edge runs straight. There is a copper alloy sheet metal shoulder plate at the junction of the blade and the tang it has 4 decorative ridges that are mirrored in the end cap which is detached. BAAMP00, SF 939, ctx 301001, iron and copper alloy, length 120 mm

92. A whittle-tang knife with a short broad blade, the tang is centrally placed and the blade back rises up and curves down to tip, the blade edge runs straight. There is a copper alloy sheet metal shoulder plate at the junction of the blade and the tang BAAMP00, SF -, ctx 328279, iron and copper alloy, length 117 mm.

93. (illus.) A whittle-tang knife with the tang placed just below the back of the blade. The blade back runs straight; the blade edge curves down and then runs parallel to the back for the short length of the blade that survives. There is a copper alloy shoulder plate at the junction of the blade and the tang. BAACP01, SF 1291, ctx 480072, iron and copper alloy, length 149 mm

94. (illus.) A whittle-tang knife with a centrally placed tang the blade back and edge run parallel before they both taper to the tip. The blade widens slightly at the junction with the tang. Fragments of a plain polished bone handle with a hexagonal section are still attached to the tang. BAACP01, SF 1381, ctx 447012, iron and bone, length 230 mm

95. Very damaged whittle-tang knife with a bolster at the junction of the blade and the tang, the blade does not survive. BAACP01, SF 1213, ctx 448001, iron, length 88 mm

96. (illus) A whittle-tang knife with an elongated bolster at the junction of the blade and the tang, very little of the blade and the tang survives. This knife has a plain, lightly polished bone handle with a flattened hexagonal section. BAACP01, SF 1401, ctx 466022, iron and bone, length 96 mm

97. (illus.) A whittle-tang knife with a narrow circular bolster at the junction of the blade and the tang. The blade back runs straight but the blade edge angles sharply down. BAACP01, SF 1310, ctx 480091, iron, length 70 mm

98. (illus.) A whittle-tang knife with an elongated tapering bolster at the junction of the blade and the tang, very little of the blade survives. The bone handle however is complete; it is cylindrical with a rounded butt end where the end of the iron tang protrudes very slightly. The handle is polished and decorated all over with a raised scallop design. BAACP01, SF 1335, ctx 458024, iron and bone, length 115 mm

99. (illus.) A whittle-tang knife with an elongated tapering bolster at the junction of the blade and the tang, very little of the blade survives. The bone handle is complete; it has a flattened hexagonal section and expands slightly towards the butt end, where the rounded end of the iron tang protrudes. The handle is intricately decorated with panels of fine incised crosshatched grooves and rows of ring and dot motif. The whole of the handle is highly polished. BAACP01, SF 1409, ctx 447004, iron and bone, length 100 mm

100. (illus.) A highly polished fragment from a bone ‘pistol grip’ handle from a whittle-tang implement. BAACP01, SF -, ctx 468004, bone, length 58 mm

Scale tang knives (Fig. 15.3, nos 101, 106, 109, 110-111)

The fragmentary remains of 11 scale tang knives were recovered, 9 from the LTCP site (BAACP01) and 2 from the FLB site. This type of knife has a handle that is formed from a narrow central strip to which scales of wood or bone are attached by rivets. There are no complete examples but there are a number with tangs that have copper alloy shoulder and end plates surviving and there are two examples with highly decorated bone scales still attached. Scale tang knives were introduced in the 13th-14th centuries and continued in use into the post-medieval period.

101. (illus.) Scale tang knife with a blade back that continues in line with the back of the tang and with a blade edge that runs parallel to the back. There are three small circular perforations through the tang. BAACP01, SF -, ctx 466019, iron, length 111 mm

102. A very damaged fragment from a scale tang knife both the blade and the tang are incomplete. There is a copper alloy shoulder plate at the junction of the blade and the tang and 2 small circular perforations through the tang. BAACP01, SF 1324, ctx 459007, iron and copper alloy, length 67 mm

103. A fragment from a scale tang knife the blade back continues in line with the back of the tang and the blade edge runs parallel. There is a single copper alloy rivet through the short section of the scale tang that survives. BAAFL00, SF -, ctx 401013, iron and copper alloy, length 120 mm

104. Three damaged fragments from a scale tang knife the blade back continues in line with the back of the tang and the blade edge runs parallel. There is a single circular perforation through the short section of scale tang that survives BAAFL00, SF -, ctx 401013, iron, length 132 mm

105. A small fragment from a scale tang knife handle with 2 small circular perforations through it. BAACP01, SF -, ctx 466010, length 53 mm

106. (illus.) A large scale tang knife the blade back continues in line with the back of the tang and the blade edge runs parallel. The tang has a curved copper alloy end-cap around the butt-end of the handle with a protruding knop at the centre. There is a copper alloy shoulder plate at the junction of the blade and the tang. Through the tang there are five circular perforations, one towards the end is much larger than the others. Three of the five perforations (including the large one) have copper alloy tubular rivets through them. BAACP01, SF 1329, ctx 467001, iron and copper alloy, length 222 mm

107. A fragment from a scale tang knife the blade back continues in line with the back of the tang, the blade edge is very damaged. There is a copper alloy shoulder plate at the junction of the blade and the tang and there are three circular perforation through what remains of the tang. The central perforation is larger than the other two and has a copper alloy tubular rivet through it. There are traces of bone from the scales still adhering to the tang. BAACP01, SF -, ctx 458024, iron and copper alloy, length 95 mm.

108. A fragment from the handle of a scale tang knife, it has a curved copper alloy end plate around the butt end and 4 circular perforations through the tang. One of the perforations towards the butt end is larger than the other three and has a copper alloy tubular rivet through it. BAACP01, SF -, ctx 452010, iron and copper alloy, length 89 mm

109. (illus.) The handle from a scale tang knife with decorated bone scales still attached. The scales are decorated with vertical grooves defining panels that are decorated with fine incised cross-hatched grooves and ring and dot motif. There are two copper alloy rivets securing the scales to the tang. BAACP01, SF 1196, ctx 459013, iron, copper alloy and bone, length 61 mm

110. (illus.) The handle from a scale tang knife with decorated bone scales still attached. The scales are decorated with vertical grooves defining panels that are decorated with patterns of ring and dot motif. There are two copper alloy rivets securing the scales to the tang. BAACP01, SF 1382, ctx 472004, iron, copper alloy and bone, length 66 mm

111. (illus.) Scale tang knife with a plain bolster and a tang set at 90° to the blade, trace of a single perforation through the tang BAACP01, SF 1203, context 480111, iron, length 135 mm

Folding knife (Fig. 15.3, no.112)

A fragment from a folding knife with a short section of the blade surviving inside (visible on the x-radiographic plate) was recovered from the LTCP (BAACP01). Folding knives have metal side plates with organic scales attached. This form of knife was a post-medieval development and evolved into the modern penknife.

112. (illus.) A fragment from a round ended folding knife with a fragment of the folded blade visible on the x-radiographic plate. Decorated bone scales are attached to the metal side plates; the scales are decorated with a pattern of small raised bobbles. BAACP01, SF 1212, ctx 480080, iron and bone, length 48 mm

Dagger Chape (Fig. 15.4, no. 113)

A fragment from a dagger chape was recovered from the LTCP. This fragment is the front half of a two piece-chape decorated with a crude open-work design and with a protruding knop at the base. Chapes acted as terminals for scabbards; they developed from simple objects constructed from sheath binding into two-piece objects that would have had a back plate soldered or brazed into place. This example is probably 15th-16th century in date (Hinton 1990b, 1082-1083, fig 348, no.4036).

113. (illus.) The front plate from a two-piece dagger chape the back plate is missing. The chape is decorated with a crude open work design and has a protruding knop at the end. BAACP01, SF-, ctx 449017, copper alloy, length 39 mm

Tools (Fig. 15.4, nos 114-118)

A small number of mainly horticultural or agricultural tools were recovered from the LTCP site. They comprise a spade shoe, three fragments from large curved blades (probably sickles) and the arm from a pair of shears. There is one object not associated with agriculture or horticulture and that is a possible punch. The spade shoe was designed to fit over the wooden blade of the spade and protect it from wear; this rectangular form is late 16th-17th century in date (Goodall 1983, 242, fig 5, no.52). The design of the sickle has not changed through time and therefore is not possible to date these fragments. The shears represented here are remarkably small, with a short curved arm at the top of a pronounced triangular blade; they are almost the size of scissors rather than shears. The punch has a circular flattened head as if it has been distorted through use, the shank of the possible punch is rectangular and it tapers to a wedge-shaped end.

114. (illus.) A narrow spade shoe with a square cut end and a V-shaped inner groove in the top to receive the wooden blade of the spade. The arms at the side are both incomplete but would originally have been pierced for nails to attach the shoe to the spade. BAACP01, 1346, ctx 457004, iron, length 154 mm

115. (illus.) Part of the curved blade and whittle-tang from a sickle BAACP01, SF 1221, ctx 448001, iron, length 204 mm

116. (illus.) Fragment from a large curved blade, probably a sickle, the fragment is broken at both ends BAACP01, SF -, ctx 448001, iron, length 251 mm

117. (illus.) Fragment from the pointed tip of a large curved blade, probably a sickle BAACP01, SF 1154, ctx 450014, iron, length 107 mm

118. (illus.) The arm from a small pair of shears with a pronounced triangular-shaped blade and short curved arm BAACP01, SF-, ctx 450013, iron, length 78 mm

119. A large solid object with a circular flattened head; the body has a rectangular section that tapers to a wedge-shaped end, possible punch BAACP01, SF -, ctx 458083, iron, length 120 mm

Horsegear

Horseshoes (Fig. 15.4, nos 120-145)

The remains of 38 horseshoes were recovered from various phases of excavation. The majority (25) came from LTCP site, 4 from the MTCP site, 3 from Long Border Road and 4 from the FLB site. There are 17 complete or near complete examples. The earliest type has narrow arms with a lobate profile and circular nail holes set in rectangular countersinkings there are only two examples of this type represented in the assemblage one from The MTCP site and the other from the LTCP site (BAACP01) this type of horseshoe predominates in the 12th and early 13th century (Clarke 1995, 94). The remaining shoes have wider arms (30 mm-35 mm) with plain outer profiles, three or four rectangular nail holes in the arms and an arched or U-shaped inner profile. This type of shoe introduced in the 14th century has continued in use to the present day (Goodall 1993, 225). There are five examples of shoes with nail holes set in a fullered groove, an early 17th century introduction (Goodall 1990b, 1056).

120-121 A horseshoe with narrow arms and a lobate outer profile. There are 3 circular nail holes in each arm set in rectangular countersinkings.

(illus.) BAACP01, SF 1169, ctx 448001, iron, length 121 mm (near complete)

BAAMP00, SF -, ctx 330207, iron, length 108 mm (complete)

122-129 A horseshoe with a plain outer profile an arched or U-shaped inner profile, three rectangular nail holes in each arm and calkins at the tip.

BAACP01, SF -, ctx 465026, iron, length 106 mm

BAACP01, SF -, ctx 465023, iron, length 112 mm (incomplete)

(illus.) BAACP01, SF -, ctx 458024, iron, length 111 mm (near complete)

BAACP01, SF -, ctx 466010, iron, length 118 mm (incomplete)

BAACP01, SF -, ctx 459008, iron, length 106 mm (incomplete)

BAAFL00, SF -, ctx 401013, iron, length 90 mm (incomplete)

BAALB00, SF-, ctx 201023, iron, length 106 mm (complete)

BAAMP00, SF 994, ctx 336064, iron, length 90 mm (incomplete)

130-140 A horseshoe with a plain outer profile an arched or U-shaped inner profile, three or four rectangular nail holes in each arm and no calkins at the tip.

BAAFL00, SF -, ctx 407013, iron, length 106 mm (complete)

BAACP01, SF-, ctx 457026, iron, length 125 mm (near complete)

BAACP01, SF 1270, ctx 448001, iron, length 101 mm (incomplete)

BAACP01, SF -, ctx 458025, iron, length 111 mm (incomplete)

BAACP01, SF 1280, ctx 448001, iron, length 127 mm (incomplete)

BAACP00, SF -, ctx 114043, iron, length 119 mm (incomplete)

BAAMP00, SF 309, ctx 301001, iron, length 100 mm (incomplete)

(illus.) BAACP01, SF 1145, ctx 472004, iron, length 105 mm (complete)

BAACP01, SF 1160, ctx 448001, iron, length 114 mm (complete)

BAACP01, SF -, ctx 463012, iron, length 111 mm (near complete)

(illus.) BAACP01, SF -, ctx 457030, iron, length 125 mm (complete)

141-145 A horseshoe with a plain outer profile, wide arms with three or four rectangular nail holes set in a fullers groove.

BAACP01, SF 1204, ctx 480068, iron, length 109 mm (complete)

BAACP01, SF -, ctx 449017, iron, length 128 mm (complete)

BAALB00, SF -, ctx 201023, iron, length 125 mm (complete) .

BAACP 99, SF -, ctx 1601, iron, length 137 mm (complete)

(illus.) BAACP01, SF-, ctx 449017, iron, length 132 (complete)

146. A horseshoe with a U-shaped profile and heavy calkins at the tip of each arm. There are three rectangular nail holes in each arm, these holes taper inwards in profile from the ground surface of the shoe. BAALB00, SF-, ctx 201023, iron, length 103 mm (complete)

Spurs (Fig. 15.5, nos 149-150, 153)

The remains of seven sets of spurs were recovered from the LTCP site. They are all examples of rowel spurs, although the actual rowel itself only survives in one example. Four of the spurs have long necks, a feature that was fashionable in the 15th-early 16th century (Ellis 1992, 176). The arms of these are relatively straight, and only curve very slightly to fit under the wearer's ankle. The other three spurs have short necks that droop, a feature which first appeared in the 16th century (Ellis 1992, 172). The arms are very straight. A number of this type are plated with tin to enhance their appearance and protect against rust.

147. An incomplete rowel spur the arms appear to slope very slightly to fit below the wearer's ankle, the ends of the arms and the terminals are missing. The circular section neck is long with a slight downward slope along its length. The six-point rowel is still *in situ*. BAACP01, SF 1215, ctx 44801, iron, length 116 mm

148. An incomplete rowel spur the arms appear to slope very slightly to fit below the wearer's ankle, the ends of the arms and the terminals are missing. The circular section neck is long

with a slight downward slope along its length. The rowel box and the rowel are missing. BAACP01, SF 1164, ctx 480040, iron, length 98 mm

149. (illus.) An incomplete rowel spur one arm is complete and curves very slightly to fit under the wearer's ankle; it terminates in a figure of eight shaped terminal. The circular sectioned neck is very long bifurcating at the end to form the rowel box. The rowel itself is missing. BAACP01, SF 1328, ctx 467001, iron, length ?

150. (illus.) A near complete rowel spur, both arms terminate in figure of eight shaped terminals, one has a square bodied hook through it. The neck angles down and birfucates almost immediately for the rowel. The rowel itself must have been unusually large. BAACP01, SF -, ctx 466010, iron, length 131 mm

151. An incomplete rowel spur the arms are straight and taper towards the terminals both of which are missing. The neck is short with a drooped rowel box, which broadens in to broad rowel bosses. There is a moulded collar at the junction of the spur back and the neck. The rowel is missing. BAACP01, SF 1264, ctx 448001, iron, length 112 mm

152. An incomplete rowel spur the arms are straight the neck is short and droops. Both the arms and the neck are incomplete. There are two decorative strips of copper alloy at the base of the neck. BAACP01, SF 1157, ctx 480010, iron, length 77 mm

153. (illus.) An incomplete rowel spur the arms are straight the neck is short and droops. The rowel bosses and the pin survive but the rowel itself is missing. BAACP01, SF -, ctx 449017, copper alloy, length 64 mm

Objects associated with hunting

Arrowheads (Fig. 15.5, nos 155, 163-165)

A total of 14 arrowheads were recovered, 12 from the LTCP site BAACP01) and 2 from the FLB site. Three types of arrowhead are represented in the assemblage, the straight broadhead, the crescent-shaped arrowhead and the small socketed and barbed arrowhead. All are late medieval/post-medieval forms, and would have been used for hunting. The broadheads were used to hunt large game such as deer and wild boar; the long cutting edges would have caused a large wound that would bleed profusely and weaken the pursued animal (Jessop 1996, 199). The crescent-headed arrowheads are believed to have been used to hunt small game and in particular birds (Jessop 1996, 199). The spinning motion of the forked head would make it less likely to skid off the feathers of a bird, which ordinary points have been known to do.

154-157 A large arrowhead with a centrally enclosed socket and two large flat barbs, it is diamond-shaped in cross section. Commonly known as a 'broadhead'

BAACP01, SF 1180, ctx 480033, iron, length 59 mm

(illus.) BAACP01, SF 1268, ctx 448001, iron, length 75 mm

BAACP01, SF 1384, ctx 465023, iron, length 94 mm

BAACP00, SF 124, ctx 114038, iron, length 89 mm

158-163 An arrowhead with a crescent-shaped head and a short socket, the inside of the crescent is sharpened. Commonly known as a 'forker'

BAACP01, SF 1294, ctx 480082, iron, length 59 mm

BAACP01, SF -, ctx 466010, iron, length 61 mm

BAACP01, SF -, ctx 448001, iron, length 36 mm

BAACP01, SF -, ctx 458024, iron, length 76 mm

BAACP01, SF 1172, ctx 480026, iron, length 58 mm

(illus.) BAACP01, SF 1171, ctx 480026, iron, length 64 mm

164-165 Socketed and barbed arrowheads

(illus.) BAAFL00, SF 240, ctx 402019, iron, length 52 mm (illus.) BAAFL00, SF -, ctx 403013, iron, length 56 mm

166-167 Sockets from arrowheads type not identifiable

BAACP01, SF -, ctx 466010, iron, length 44 mm

BAACP01, SF 1159, ctx 448001, iron, length 44 mm

Armour

A possible brigandine plate was recovered from the LTCP site. A brigandine is a garment in the shape of a doublet and hose, which is lined with metal plates riveted to the inside. A typical plate would be riveted along one edge only. Examples with flat-headed copper alloy rivets recovered from Mount House, Witney, Oxfordshire have been dated to the late 15th early 16th century (Eaves 2002, 150, fig 3.15, no.67 and 72). The manufacture of brigandines generally declined in the later half of the 16th century but the Tower of London was still issuing them in the early 17th century (Eaves 2002, 150).

168. Fragment from a rectangular iron plate perforated by a row of 3 flat headed copper alloy rivets running along one edge. BAACP01, SF -, ctx 458024, iron and copper alloy, length 48 mm

Structural objects (Fig. 15.5, no. 169)

With the exception of nails, only a very small number of structural items were recovered from the excavations. The assemblage comprises hinge pivots, plate hinges, hasps, staples and a handle. This probably indicates that the metalwork was salvaged from the building prior to demolition and that the nails were not considered worth retrieving and having been removed from structural timberwork they were dumped.

169-170 Hinge pivot with a circular section pintel and a rectangular section shank

(illus.) BAACP01, SF 1372, ctx 467030, iron, length 83 mm

BAAFL00, SF -, ctx 401013, iron, length 91 mm

171-172 Plate hinge both of the rectangular plates have a row of circular perforations running along the centre.

BAACP01, SF -, ctx 458024, iron, length 64 mm

BAACP01, SF -, ctx 461027, iron, length 127 mm

173 A looped hasp, curved along its length and with the remains of a hook at one end BAACP01, SF 1218, ctx 448001, iron, length 130 mm

174-175 Rectangular staple one arm is incomplete

BAACP01, SF 1162, ctx 480015, iron, length 24 mm

BAACP01, SF 1258, ctx 448001, iron, length 78 mm

176. A drop handle with a kidney-shaped frame and a perforated suspension loop. BAACP01, SF -, ctx 461001, iron, length 60 mm

Nails

A total of 653 nails were recovered from the LTCP BAACP01) and the FLB sites. Six different types of nail were represented in the assemblage. The nails have been counted and tabulated by context (Table 15.2).

177. Nail with a wide rectangular section shank tapering to a wedge-shaped tip, the head is square/rectangular, flat and slightly flanged (type 1)

178. Nail with a narrow rectangular section shank and a square, flat flanged head (type 2)

179. Nail with a narrow rectangular section shank and a circular/oval flat flanged head (type 3)

180. Small nail with a solid square head that tapers gently into the shank, possibly a horseshoe nail (type 4)

181. Nail with a solid rectangular head and a slender rectangular section shank (type 5)

182. Nail with a rectangular section shank and a T-shaped head the same width as the shank (type 6)

Lead objects (Fig. 15.5, no. 183)

183. (illus.) A circular seal matrix with a rear suspension tab BAAFL 00, SF 251, context 401013, lead, length 23mm.

Miscellaneous fragments

A large number of objects from all the phases of excavation have been categorised as miscellaneous this includes fragments of sheet, strip, rod and lengths of wire that are not recognised as a specific object or part of an object. A list of these miscellaneous items will appear in the archive.

Section 2 - Discussion by Site

The majority of the post-Roman objects were recovered from the LTCP site (BAACP01) but smaller assemblages of medieval and post-medieval material were also recovered from the MTCP, FLB, and the LBR sites. The assemblages are discussed by site.

The MTCP site (BAAMP99 and BAAMP00)

A total of 10 objects were recovered from the excavations on the MTCP site. Five of these came from the topsoil (301001), two were unstratified and the remaining three were intrusive in earlier features. The assemblage comprises two knives, four horseshoes, two vessel repairs, a buckle plate and a musket ball.

The knives (Cat. Nos 91 and 92) from contexts 301001 (topsoil) and 328279 (a Late Iron Age ditch) are both whittle-tang knives with fairly broad blades, neither example is complete. Both knives also have copper alloy shoulder plates one of which (Cat. No. 91) is decorated with four horizontal raised ridges with the design mirrored on the end cap, which is now detached. The four horseshoes are all incomplete and either come from the topsoil or from Romano-British contexts (336064 and 330207). The example from context 330207, a Romano-British ditch (Cat No. 121) has a lobate profile and three circular holes in each arm that are set in rectangular countersinkings. There is also a slight calkin at the tip of each arm. This type of horseshoe predominates throughout the 12th century but is replaced by a heavier more developed type sometime in the 13th century (Clark 1995, 96). Cat No. 129 from context 336064 (a Romano-British waterhole) also has three circular holes through the arm set in rectangular countersinkings but the profile is plain and the web is broader. This type predominated in the 13th century but declines in numbers in the 14th century (Clarke 1995, 96). Cat. No 136 from the topsoil (301001) is probably of the same type but has four nail holes through the surviving arm. The final fragment (SF 1094) also from the topsoil is undiagnostic.

Two paperclip rivets (Cat. Nos 72 and 73) were recovered from unstratified contexts. These folded strips of sheet metal would have been used to hold sheet metal vessel repairs in place (Margeson 1993, 93, fig 59, No.575) and are medieval/post-medieval in date. Cat. No. 42 is a folded sheet metal buckle plate recovered from the topsoil, with a recess for the pin and four rivet holes for attachment. A musket ball (SF 1050) was recovered from an unstratified context.

The LBR site (BAALB00)

The small assemblage from the LBR site dates mainly to the Romano-British period (see Scott, CD Chapter 14). However the assemblage includes three late medieval/post-medieval horseshoes from context 201023 (secondary fill of a Romano-British trackway). Two examples (Cat. No 128 and 146) have plain out-side edges, heavy calkins, and three nail holes in each arm that taper inwards in profile from the ground surface of the shoe. This is a late medieval feature (Clarke 1995, 88-97). The third example (Cat. No. 143), a large shoe with four holes in each arm set in a fullers groove is a 17th century or later type (Goodall 1990b, 1056).

The FLB site (BAAFL00)

A total of 78 objects were recovered from the excavations of the FLB, of which all the identifiable objects are medieval/post-medieval in date. The assemblage comprises 19 identifiable objects, 44 nails and 15 miscellaneous fragments. The majority (15) of the identifiable finds come from topsoil and subsoil layers. The functional categories represented in the assemblage are personal items, household objects, horsegear, hunting and structural objects. Diagnostic objects recovered from the top soil/subsoil layers 401013, 402019 and 403013 include buckles, horseshoes, knives, arrowheads, a key and a seal matrix.

The personal items include a distinctive buckle (Cat. No.39) of mid 14th-early 15th century date (Egan and Pritchard 1991, 78-82) with an oval frame and rigid composite plates (only the forked spacer survives). A possible annular brooch (Cat. No. 46) decorated with cable design is similar to examples from London dating to the late 13th-early 14th century (Egan and Pritchard 1991, 248-250).

The horsegear comprises four horseshoe fragments two of which are undiagnostic. The remaining two horseshoes Cat. Nos 127 and 130 include a near complete example from context 407013 (the cobbled surface of a track). They both have plain profiles with three nail holes in each arm outline and Cat No. 127 has a calkin at the tip of the arm. This type of shoe is a late medieval form introduced in the late 13th -mid 14th century and becoming universal by the 15th century (Clarke 1995, 96-97).

The three knives comprise one complete whittle-tang knife (Cat No. 84) and two fragmentary scale tang knives. The whittle-tang knife has a pronounced triangular-shaped blade and a centrally placed tang this form dates from the late 13th - late 14th century (Cowgill *et al.* 1987, fig 55, no.28 and fig 60, no.88). The scale tang knives (Cat. No. 103 and 104) have perforations through the tang for securing the scales.

The key (SF 250, Cat No. 77) has a ring bow and a hollow stem. The bit, although damaged, is simple; it is a common form of key mainly in use from the 11th -14th centuries (Goodall 1990a, 1001-1036). The two arrowheads (Cat. No. 164-165) are both socketed barbed and tanged arrowheads, which could have been used for either military or hunting purposes (Goodall 1990c, 1070-1074, fig. 344, No. 4014)

A circular seal matrix (SF 251) dating from the 13th or early 14th century with a rear suspension tab was recovered from context 401013. The legend is difficult to decipher and two possibilities are posited; either + S' ION TOVRLE or +S'ION POVRTE. In both cases there is little argument about the 'S' being an abbreviation for 'sigillum' ('seal of') and for 'ION' probably being an abbreviation for Iohannis (John). The alternatives offered for the surname differ because most of the first letter is obliterated, leaving only the descender. This first letter has been interpreted as either a 'T' for 'Tourle' or a 'P' for 'Pourte' the second contentious letter is the penultimate one which has been deciphered either as an 'L' or a 'T' (as it appears to have a cross bar).

Documentary records give a reference to a John Tourle but unfortunately it relates to 18th century Sussex.. However a John Pourte does appear in the records as a witness to a certificate of debt between two London merchants in 1316 (NA C241/82), and possibly the same John Pourte was a witness to deeds in Aveley in 1338, 1339 and 1348, and Wennington Marsh in 1342, 1344, 1345 and 1347 (ERO D/DL/T1/21, 71, 72, 101, 107, 108, and 124). Aveley and Wennington are in south-west Essex near to West Thurrock. In c.1280 a William Pourte made a grant and was mentioned in an abutment in Hatfield Regis, less than 10 miles from Stansted (ERO D/DBa T1/23 and 33).

The LTCP site (BACCP99 and BAACP00)

The majority of the metal objects recovered from the sites are Romano-British in date (see Scott, CD Chapter 14). However there are three objects in the assemblage that date to the late medieval/post-medieval period: an arrowhead and two horseshoes. The large but very damaged barbed and socked arrowhead (Cat. No. 157) was recovered from context 114038, the final deposition layer in the cut of Late Romano-British enclosure ditch. This type of late medieval/post-medieval arrowhead is commonly known as a ‘straight broadhead’ and was used to hunt large game such as deer and wild boar. The horseshoe (Cat. No. 135 from context 114043, a post-medieval subsoil) has a plain outline, three rectangular nail holes in each arm and a folded calkin at the end of one of the arms. This is a type of shoe common in the 13th and 14th centuries, but superseded in the 15th century (Clarke 1995, 96). The second shoe (Cat. No. 144) recovered from topsoil has narrow webs and three rectangular holes in each arm set in a fullers groove, which is a post-medieval introduction (Goodall 1990b, 1056).

The LTCP site (BAACP01 - The hunting lodge)

The majority of the post-Roman metalwork recovered from the Stansted Airport excavations comes from the LTCP site (hunting lodge). The assemblage comprises 949 objects, of which 908 are identifiable (653 of these being nails). The functional categories represented in the assemblage are personal accessories (146), domestic items (11), lock furniture (8), knives (25), tools (6), horsegear (32), objects associated with hunting (16) and structural objects (10 excluding the 653 nails).

A large number of the identifiable objects were recovered from modern ploughsoil, modern topsoil and subsoil layers. There are only 78 identifiable objects (other than nails) that were recovered from phased stratified contexts.

Personal accessories form the largest group of identifiable objects from the excavation, and lace tags (24), pins (64) and fasteners (7) predominate. Other finds include buttons (7), buckles (30), mounts (8) and a patten.

Lace tags are a common find in post-medieval contexts, as a result of the fashion for tighter fitting garments in the late medieval and early post-medieval periods (Egan and Pritchard 1991, 284). Stratified lace tags of type1 and type 2, (dating mainly to the 15th century, and to a lesser extent the 16th -17th centuries) were recovered from deliberate backfilling (467023 and 472001) of ditch 466020 and from 467014 (the backfilling of a phase 3 ditch that probably derived from midden 467008).

The majority of the 64 pins recovered from the excavation derived from unstratified contexts. The 26 stratified examples are all small wire pins with spiral wound or spherical heads (types 1 and 2). These are common finds in late medieval and post-medieval contexts and were probably used to secure light clothing. Nineteen pins came from deliberate backfills - nine were recovered from 459027 and 459028 (the backfill of hearth 459026), five pins came from phase 3 ditches that had been backfilled with material from midden 467008, whilst others came from 447011 (the backfill of latrine pit 447014) and from contexts 459007 and 459008 (deliberate backfills of pit 459005).

Other stratified examples were recovered from a packed clay floor surface (467042) within the phase 2 kitchen and an extended area of cobbling associated with the phase 3 farmhouse (472004).

Loop fasteners and hook and eye fasteners are also found in large numbers in medieval and post-medieval contexts, often associated with assemblages of pins and lace tags. They are believed to have been used to fasten light garments (Margeson 1993, 20, fig 10, no. 101). The two stratified examples were found in contexts associated with the phase 2 kitchens; 449078 is a backfilled depression probably associated with the use of the kitchens and context 472009 is a backfilled depression outside the kitchens probably associated with the demolition or modification of the buildings.

All seven buttons recovered from the excavations were from unstratified contexts. They are all post-medieval in date. All are of simple form, predominantly circular and discoidal with either integral wire loop attachments (Biddle and Cook 1990, fig 155, no. 1760) or short rectangular perforated shanks (Biddle and Cook 1990, fig. 155, no. 1752). There is one circular dished button with four holes at the centre for attachment, and a two-piece button consisting of a copper sheet metal cover over an iron back. The upper face has an embossed decoration on it.

A total of 30 buckles of iron and copper alloy were recovered the assemblage, including simple utilitarian forms (some of which may have been used on harness fittings rather than as dress fittings) and more ornate examples which include shoe buckles. Only nine buckles were from stratified contexts, three of which were deliberate backfills.

An iron pin (Cat. No. 44) from a large buckle frame (almost certainly associated with harness) was recovered from context 461001, the backfill of robber cut 461014. A simple D-shaped frame of utilitarian form (Cat. No. 21) was recovered from context 459008, the deliberate backfill of pit 459005, whilst a small annular buckle (Cat .No.14) probably used for securing light clothing (Hinton 1990c, 511; Margeson 1993 32, fig 18. Nos 206-217) was recovered from 467034, the deliberate backfill of phase 3 ditch 467038.

The primary and secondary fills of ditch 466020 produced two buckles. An iron trapezoidal buckle frame (Cat. No. 31) came from secondary fill 472003. Frames of this shape were used to secure straps of differing widths (probably harness) some have sheet metal rollers (Cat No. 32) to aid the movement of the strap through the frame. A double oval shoe buckle (Cat. No. 34) dating to the 17th century (Margeson 1993, 28, fig 17, no. 174) came from primary fill 452015; the frame has expanded pin rests that are decorated with raised bobbles in the form of a flower.

Four buckles were recovered from contexts associated with the phase 3 outhouse (1).
SF 1207 (Cat. No. 35) a late 16th-17th century shoe buckle (Zeepvat 1992, 142, fig. 53, no. 39) was recovered from cobbled surface 472004. It has four knops, one at each corner and lobes at the junction of the bar and frame. A 14th-15th-century cast rectangular buckle frame (Cat. No. 20.) came from the same context (Williams 1978, fig 22.10; Margeson 1993, 28, fig 14, no. 145), as did a late medieval locking buckle (Cat. No. 40). This has a rectangular frame and an off-centre combined bar and pin. The holes for the bar are flanged for extra strength and there is a groove in the outside edge by which the arm was held closed. A fourth buckle frame with an elongated D-shaped frame (Cat. No. 29) was recovered from mortar flooring 465029 within the phase 3 outhouse.
All the mounts recovered from the site are either from the topsoil or they are unstratified. The majority are circular, plain domed sheet metal mounts with separate rivets. They would probably have been used in combination with other mounts to form a decorative effect on girdles and other straps or possibly on purses and shoes (Egan and Pritchard 1991, 162). One large circular mount (Cat. No. 48) may (because of its size) have been used on horse harness rather than dress. One small solid, circular domed mount has two integral spikes on the flat back for attachment.

One complete bell and the fragmentary remains of three others were recovered from the topsoil/subsoil (448001 and 448002) and the secondary fill of a Late Iron Age ditch. Two types of bell are represented; cast crotals and sheet metal pellet bells. Crotals would have been used on harness; the smaller pellet bells could have been used to decorate dress or harness. Bells are a common find in the medieval and post-medieval periods (Hinton 1990d, 726).

A single patten fitting (Cat No. 61) was recovered from context 447004, the deliberate backfill of a robber cut associated with the demolition and abandonment of the site. Pattens were used as an overshoe in wet and muddy conditions and consisted of a wooden sole, beneath which projected an iron framework. This patten has a ring with

2 angled brackets to attach it to the wooden sole. A similar example recovered from Great Linford came from a 17th century context (Zeepvat 1992, 150-151).

A very small number of domestic items were recovered from the site. The assemblage comprises six thimbles, a needle, a spoon, a weight and fragments from three vessels. Only three of these objects are from stratified contexts.

There are three forms of thimble present in the assemblage. They date from the late medieval period to the 18th century. Only one thimble (Cat. No. 65) is from a stratified context. It dates to the 17th century (Holmes 1988, 2) and has straight sides with machine applied indentations and was made in two pieces. The thimble was recovered from context 449026, the secondary fill of a ditch associated with the funnels of a deer drive (funnel 3). SF 1228 (Cat. No. 64) is intrusive in a Late Iron Age pit (context 450016). The remaining four thimbles (types 1 and 3) and the needle were recovered from topsoil or ploughsoil.

The remains of a small spoon bowl and a rolled lead weight (possibly used on a fishing net) were also recovered from the topsoil.

The three vessel fragments are all from cast metal vessels. The two stratified examples (Cat. Nos 70 and 71) are from deliberate backfills (contexts 462015 and 461027) associated with the abandonment and disuse of the site. The third and most complete fragment is from the topsoil.

The lock furniture includes seven keys and a leaf spring from a padlock bolt. The keys are all for mounted locks, with five from stratified contexts. A late medieval key (Cat. No 75), type 1, and the leaf spring (Cat. No.83) were recovered from context 466010, a secondary fill of later medieval pond 466001. A second key (Cat. No. 76) of late medieval date was recovered from context 472004 (sealing a phase 3 cobbled surface). The remaining three keys (type 3 - Cat. Nos 79, 80 and 82) of late medieval /post-medieval date were recovered from all recovered from deliberate backfills associated with the abandonment of the site (contexts 447004, 467014 and 467020).

A large number of knives were recovered from the excavation. Whittle-tang and scale-tang knives are both represented, and many still have handles attached. Although the majority are from unstratified contexts, they form a coherent group of late medieval/post-medieval forms. There are 14 examples of whittle-tang knives with rod-shaped tangs, 6 of which have bolsters (a widening at the junction of the blade and tang introduced in the 17th century). Only 4 whittle-tang knives are from stratified contexts. The earliest knife (Cat. No. 85) is from context 467014, the deliberate backfill of a phase 3 ditch. The knife, which is probably of late medieval date, is in poor condition, but the tang and back of the blade run straight and the remains of the blade edge runs parallel with the blade back. The remaining three stratified knives are post-medieval in date. They all have bolsters and the remains of bone handles attached. SF 1381 (Cat No. 94, from 447012, the deliberate backfill of a phase 2 latrine pit) and SF 1401 (Cat. No. 96 from context 466022 the secondary fill of a post-medieval ditch) both have plain polished handles with hexagonal section. SF 1409 (Cat. No. 99 from context 447004, deliberate backfill of a robber cut associated with the demolition of the site) also has a handle with a hexagonal section but it is highly decorated with panels of fine incised cross-hatched lines (which would also improve the grip) and rows of ring and dot motif, a common type of decoration in the post-medieval period (MacGregor 1985, 170).

All of the scale tang knives are incomplete. Only five of the nine examples recovered are from stratified contexts and three of these are handle fragments only. SF 1329 (Cat. No. 106 from context 467001, the deliberate backfill of a phase 3 gully) is the most complete example with a large part of the blade surviving. The blade back continues in line with the back of the tang and the blade edge runs parallel, although the tip of the blade is missing. The tang has five non-ferrous tubular rivets through it - the hole closest to the pommel is much larger than the rest and may well have been left open to allow the knife to be suspended from a belt. The handle also has a non-ferrous shoulder plate and end cap, common features on scale tang knives (Ottoway 2003, 273). SF 1382 (Cat. No. 110, from context 472004, a cobbled surface) has little of the blade surviving but the tang has bone scales attached that are decorated with incised lines and ring and dot motif. An identical example was recovered from Denny Abbey, from a post-Dissolution context (Goodall and Christie 1980, 261, fig 56, no. 2). Handle SF 1196 (Cat. No. 109, from context 459013) is decorated in a similar way. The remaining three fragments (Cat. Nos 101, 102 and 105) from context 466019 (secondary fill of ditch 466020), context 466010 (secondary fill of later pond 466001) and context 459007 (deliberate backfill of pit 459005) are just incomplete blade and tang fragments with perforations through the tang to attach the scales, they have no other distinguishing features.

The majority of the knives recovered from the site are small examples with decorated handles that would have been designed to be used as table knives rather than carried around in scabbards. However there is a single fragment from a dagger chape (Cat. No. 113, recovered from topsoil context 449017). This fragment is the front half of a two piece-chape decorated with a crude open-work design and with a protruding knop at base. Chapes acted as terminals for scabbards, they developed from simple objects constructed from sheath binding into two piece objects that would have had a back plate soldered or brazed into place, this example is probably 15th or 16th century in date (Hinton 1990b, 1082-1083, fig 348, no. 4036).

A fragment from a folding knife (Cat. No. 112) was recovered unstratified (context 480080). The x-ray reveals a fragment of the folded blade inside the metal side plates. These plates have bone scales attached, which are decorated with a raised bobble design. This form of knife was a post-medieval development that evolved into the modern day penknife.

The tool assemblage comprises a very small number of mainly horticultural/ agricultural tools. They include a spade shoe, three fragments from large curved blades (probably sickles), the arm from a pair shears and a punch. Only the spade iron and the punch are stratified. The spade shoe (Cat No. 114 from context 457004, related to phase 3 outhouse 2) was designed to fit over the wooden blade of the spade and protect it from wear. This rectangular form is late 16th -17th century in date (Goodall 1990, 1056). None of the sickle fragments are from stratified contexts. The shears (also unstratified) are remarkably small, with a short curved arm at the top of a pronounced triangular blade; they are almost the size of scissors. The only other tool recovered from a stratified feature is a punch (Cat. No. 119, from context 458083, fill of posthole 458079). It has a circular flattened head (possibly distorted through use) whilst the shank is rectangular and it tapers to a wedge-shaped end.

The horsegear recovered from the site includes horseshoes (25), spurs (7) and harness fittings (discussed above under buckles). Only seven of the horseshoes were from stratified contexts the majority of them date to the late medieval or post-medieval period. There is one example of a medieval type (Cat. No. 120) with the characteristic lobate profile and circular nail holes in rectangular countersinkings, recovered from the topsoil (448001). All the stratified examples have wide arms (30 - 35mm) with plain outer edges and arched or U-shaped inner profiles. They have three or four rectangular nail holes in each arm. This type of shoe, introduced in the 14th century, has continued in use to the present day (Goodall 1993, 225). They were recovered from the deliberate backfills of pit 459005, phase 1 boundary ditch 457029 and from phase 2 cobbles 465023, phase 2 floor surface 465026, phase 3 cobbles 472004 and the secondary fill (466010) of the late medieval pond 466001.

The remains of seven sets of spurs were recovered from the site. They are all examples of rowel spurs, although the actual rowel itself only survives in one example. There are only two sets of spurs from stratified contexts. A near complete example, (Cat. No. 150) was recovered from context 466010, a secondary fill of the later medieval pond 466001. The arms of the spur curve very slightly to fit under the wearers ankle, and both arms terminate in a figure of eight shaped terminal. One terminal has a square bodied hook through it. The neck angles down and bifurcates almost immediately for what must have been a fairly large rowel. The other stratified example, SF 1328 (Cat. No. 149 from context 467001, the deliberate backfill of a phase 3 ditch) has only one arm surviving that barely curves at all and terminates in a figure of eight shaped terminal; the neck is long and the rowel is missing. Spurs with long necks were fashionable in the 15th - early 16th century (Ellis 1992, 176), when the general trend was towards elongating and pointing shoes. The unstratified examples include three spurs with short drooping necks, a feature which first appeared in the 16th century (Ellis 1992, 172).

A total of 11 arrowheads were recovered from the site. Two types of arrowhead are represented; the straight broadhead and the crescent-shaped arrowhead. They are both late medieval/post-medieval forms, and would have been used for hunting. Only two arrowheads (one of each type) were recovered from stratified contexts. The broadheads were used to hunt large game such as deer and wild boar. The long cutting edges would have caused a large wound that would bleed profusely and weaken the pursued animal (Jessop 1996, 199). The stratified example (Cat. No. 156) was recovered from context 465023; a phase 2 cobbled surface. The crescent-headed arrowheads are believed to have been used to hunt small game and in particular birds (Jessop 1996, 199). The spinning motion of the forked head would make it less likely to skid off the feathers of a bird. The stratified example (Cat. No.159) came from context 466010, secondary fill of the later medieval pond 466001)

A single fragment of rectangular iron sheet (Cat. No. 168) recovered from context 458024 (ploughsoil) has a row of flat headed copper alloy rivets running along one edge it is possibly a fragment from a brigandine plate. A brigandine is a garment in the shape of a doublet and hose, lined with metal plates riveted to the inside. The first reference to the use of these plates in England dates to 1397 and widespread use is attested from the second quarter of the 15th century until the mid 16th century. After this the manufacture of brigandines generally declined, but the use of old brigandines continued into the 17th century (Starley 2005).

With the exception of the large number of nails (653), a very small number of structural items and object associated with household furniture were recovered from the excavation. The assemblage comprises hinge pivots, plate hinges, hasps, staples, a handle and window came fragments. Stratified objects derive from the fill deliberate backfilling of a robber cut 461014 and brick lined well 461038. The paucity of structural items probably indicates that the metalwork was salvaged from the building prior to demolition and that the nails were not considered worth retrieving, and having been removed from structural timberwork they were discarded.

Conclusion

The large assemblage of metalwork recovered from the site appears to be functional and utilitarian in nature. There are no high status items, the personal objects include buckles and mounts for belts, straps and shoes but no items of jewellery or delicate objects of a more feminine nature. The domestic items include sewing equipment for repairing garments, vessels and vessel repairs but little else of a household nature. There are very few tools or agricultural implements to suggest large scale farming activities or crafts. It is the objects associated with horses and hunting that predominate; horseshoes, harness fittings (including buckles, mounts and bells) spurs, arrowheads, and knives reflect the use of the site as a hunting lodge. Structural items (with the exception of nails) and household furniture are practically non-existent implying that when the site was demolished and abandoned the metalwork was salvaged.

The majority of the stratified objects were recovered from episodes of deliberate backfilling associated with the demolition of phase 2 and phase 3 buildings and the ultimate abandonment of the site. There is little doubt that the finds assemblage originates from buildings where hunting and equestrian pursuits are taking place but the bulk of the metalwork can only be broadly dated to the 15th-17th centuries generally because they are functional objects whose form has changed little over time.

Table 15.1: Number of medieval and post-medieval metal objects by site

Site code	*Copper alloy*	*Iron*	*Lead*	*Total*
BAACP99/BAACP00	-	2	-	2
BAACP01	161	779	9	949
BAAMP99/BAAMP00	3	6	1	10
BAAFL00	5	72	1	78
BAALB00	-	3	-	3
Totals	169	862	11	1042

Table 15.2: Nails recovered from medieval and post-medieval contexts

Context	*Total No. of nails*	*undiagnostic*	*Type 1*	*Type 2*	*Type 3*	*Type 4*	*Type 5*	*Type 6*
447004	6				6			
447011	1				1			
448001	161	83	1		43	34		
449017	6	2		2	2			
449064	3	2	1					
449072	3				3			
450023	3			1	2			
450041	4				4			
452010	1				1			
453009	31	19			9	3		
453010	1			1				
453012	19	13			6			
453015	10	7			2	1		
455007	1				1			
457004	2			2				
457014	3				3			
457017	2				2			
458024	38	12	1	5	17	2	1	
458025	9	3			5	1		
458033	4	3			1			
459005	18				18			
459006	6	4	1		1			
459007	5	3			2			
459008	57	20		1	36			
459009	6	2			4			
459010	1	1						
459024	2	2						
459027	10	9			1			
459028	2	1			1			
459068	2				2			
460019	1				1			
461001	8	2			6			
461027	1			1				
461035	1				1			
465023	3	1		1	1			
465026	6			1	3	2		
465028	2	2						
465029	3	3						
465040	2	1			1			
465042	1				1			
466003	2				2			
466010	34	8	2	3	16	5		
466028	1				1			
466035	1				1			
467008	8	1		1	5	1		
467014	3		1		2			
467022	3				3			
467023	2	1			1			
467029	6	3			2	1		
467034	1	1						
468004	2	1			1			
472002	7	5			2			
472003	1				1			
472004	12			1	8	3		
472005	2	1			1			
472007	1				1			
472011	2				2			

480034	3	3						
480048	4				3	1		
480054	13	2		2	7	2		
480055	2				2			
480063	2			1	1			
480071	13	1			9	3		
480072	11	1			10			
480081	4	1			1	2		
480083	4	1			3			
480091	3	2			1			
480092	2				2			
480116	4	2			2			
401013	20	10			9			1
401023	7	7						
402019	9	8					1	
402020	1	1						
403001	2	1			1			
404003	1				1			
404020	1	1						
404022	1				1			
405012	1	1						
405048	1	1						
405065	1	1						
405069	2	1						1
406022	1				1			
406022	3	2						1
407001	2	2						
409021	1				1			
409028	1	1						
Totals	*653*	*266*	*7*	*23*	*291*	*61*	*2*	*3*

Table 15.3: Context summary table for the identifiable/diagnostic objects from the MTCP site

Context	*Phase*	*Copper alloy*	*Iron*	*Lead*	*Total No. objects*
1006	Unphased	Paperclip rivet			1
301001	Topsoil	Paperclip rivet, buckle plate	Knife, 2 horseshoes		5
328279	Late Iron Age		knife		1
336064	Romano-British		Horseshoe		1
330207	Romano-British		Horseshoe		1
Unstratified	Unphased			Musket ball	1
Total					10

Table 15.4: Context summary table for the identifiable/diagnostic objects from the FLB site

Context	*Phase*	*Copper alloy*	*Iron*	*Lead*	*Total*
401013	Unphased	2 buckles and a brooch	3 horseshoes, hinge pivot, key, knife	Seal matrix	10
402019	Unphased	Buckle	2 knives, an arrowhead,		4
403013	Unphased	-	Arrowhead		1
407013	Cut	-	Horseshoe		1

Table 15.5: Context summary table for the identifiable/diagnostic objects from the LTCP site (BAACP01)

Context	*Phase*	*Copper alloy*	*Iron*	*Total No. objects*
438001	Phase 3	Pin and a mount		2
447004	Demolition and abandonment		Patten, knife, key	3
447011	Phase 2 Latrine	Pin		1
447012	Phase 2 Hall		Knife	1
449026	Funnel 3	Thimble		1
449077	Phase 3 ditches	Fastener		1
452015	Phase 2 enclosure/Phase 3 Barn	Buckle, 2 Pins		3
457004	Phase 3 outhouse (2)		Spade shoe	1
457030	Phase 1 boundary ditch / Phase 2 enclosure		Horseshoe	1
458025	Phase 2 cobbles		Horseshoe	1
458083	Phase 2 bridge abutment		Punch	1
459007	Demolition and abandonment	Pin	Knife	2
459008	Demolition and abandonment	Pin	Horseshoe, buckle	3
459022	Demolition and abandonment	Pin		1
459027	Phase 2 Hall	7 pins		7
459028	Phase 2 Hall	Pin		1
461001	Well all phases/demolition and abandonment	Pin	Buckle and a drop handle	3
461015	Bricklined well	Pin		1
461027	Brick lined well/well all phases/demolition and abandonment		Vessel and hinge	2
462015	Funnel 3		Vessel	1
465023	Phase 2 cobbles		Horseshoe and arrowhead	2
465026	PM layer		Horseshoe	1
465029	Phase 3 outhouse		Buckle	1
466010	Later medieval pond		Spur, knife, Padlock bolt, key, 2 arrowheads and a horseshoe	7
466019	Phase 2 enclosure / phase 3 barn .		Knife	1
466022	Phase 2 enclosure / phase 3 barn		Knife	1
467001	Phase 3 ditch		Spurs and knife	2
467013	Phase 3 ditch	Pin		1
467014	Phase 3 ditch	Pin and 2 lace tag	Knife and key	5
467020	Phase 3 ditch		Key	1
467022	Phase 3 barn	Pin		1
467023	Phase 2 enclosure	Lace tag and 3 pins		4
467030	Phase 2 Kitchen		Hinge	1
467034	Phase 3 ditch		Buckle	1
467042	Phase 2 Kitchen	2 pins		2
472001	Phase 2 enclosure / Phase 3 barn	Lace tag		1
472003	Phase 2 enclosure		Buckle	1
472004	Phase 3 cobbles	Pin and 3 buckles	Knife, horseshoe	6
472009	PM layer	Fastener		1
480034	Phase 3 ditch		Buckle	1
Total number of stratified objects				78

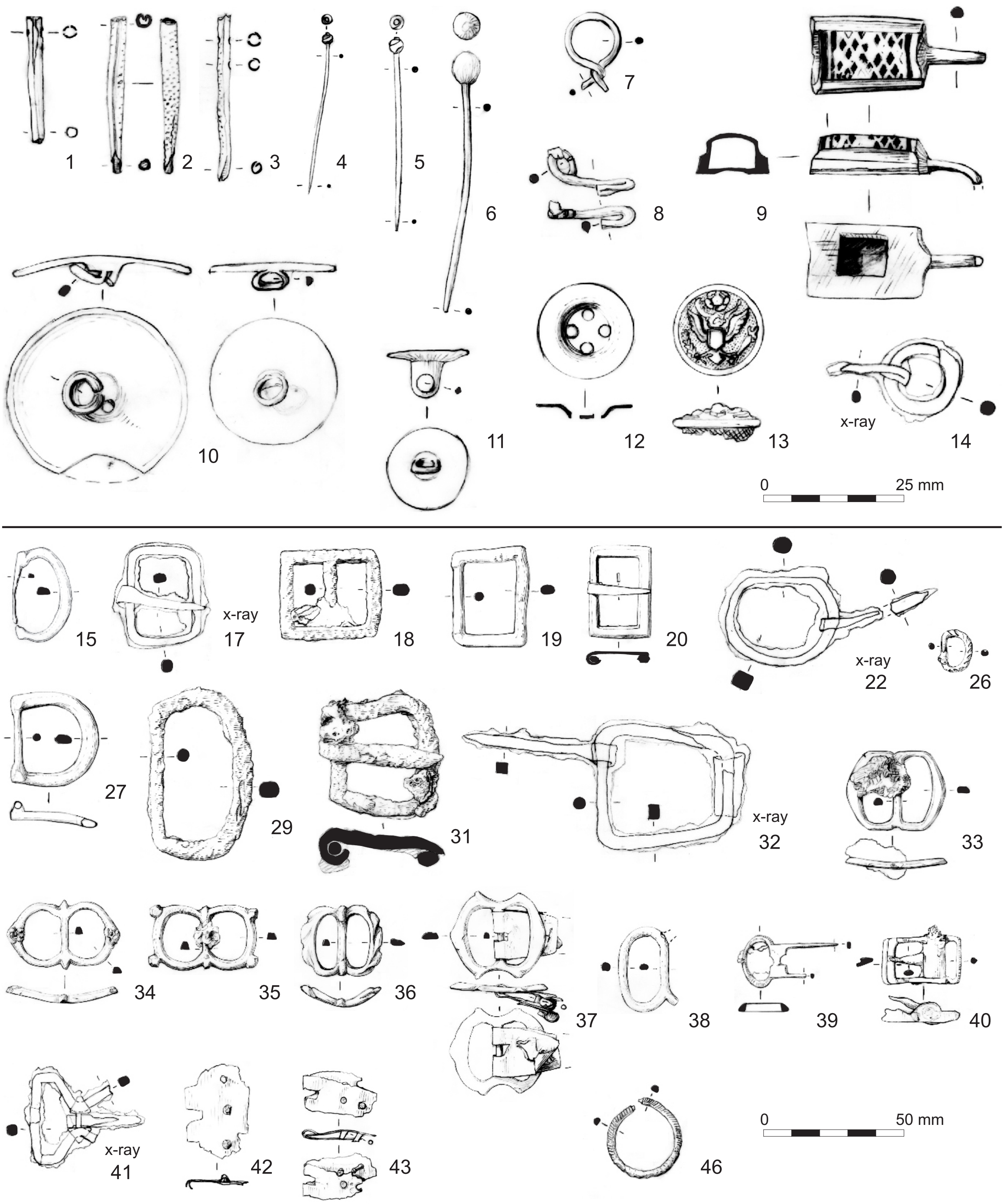


Figure 15.1: Selected metalwork (details in the catalogue)

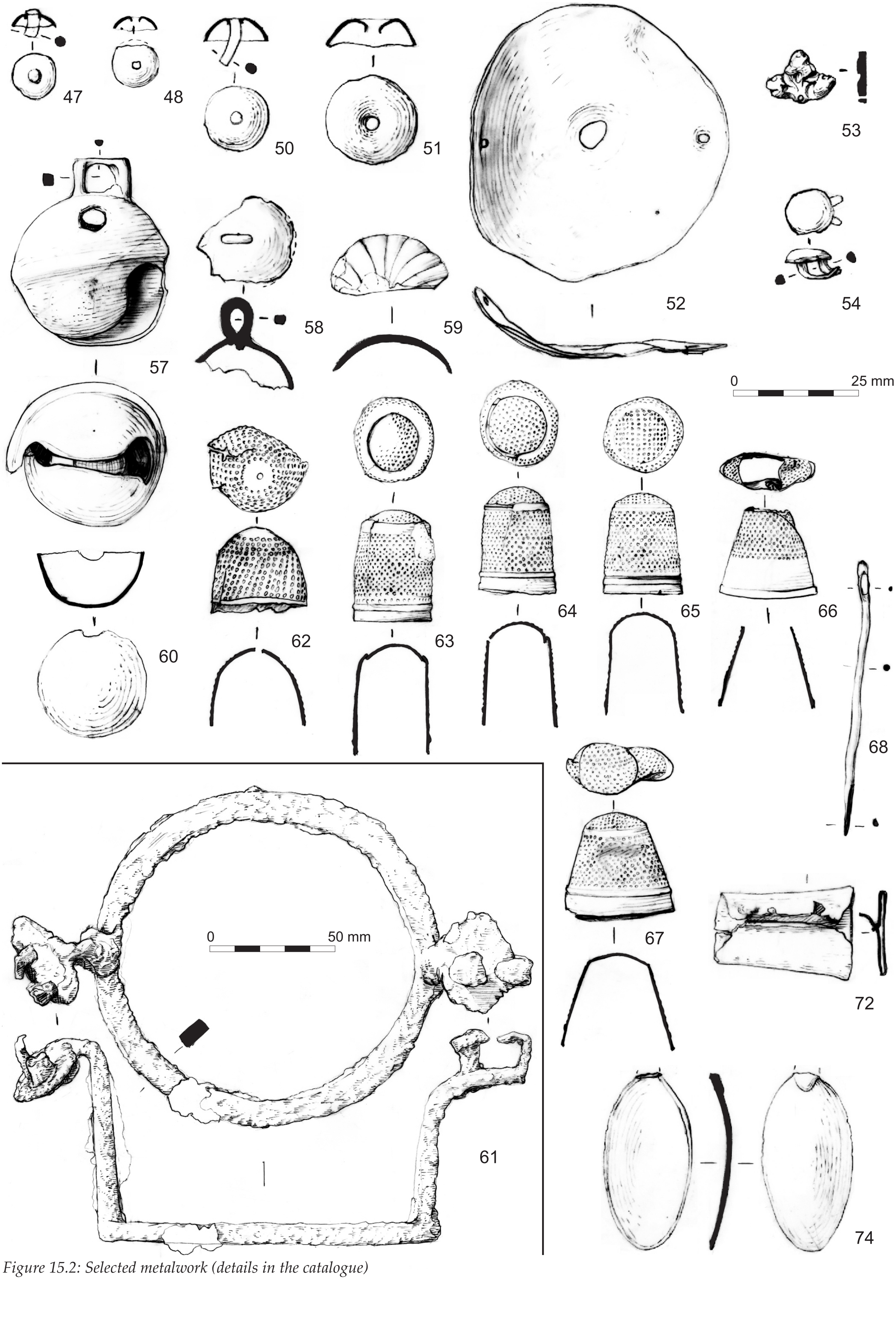


Figure 15.2: Selected metalwork (details in the catalogue)

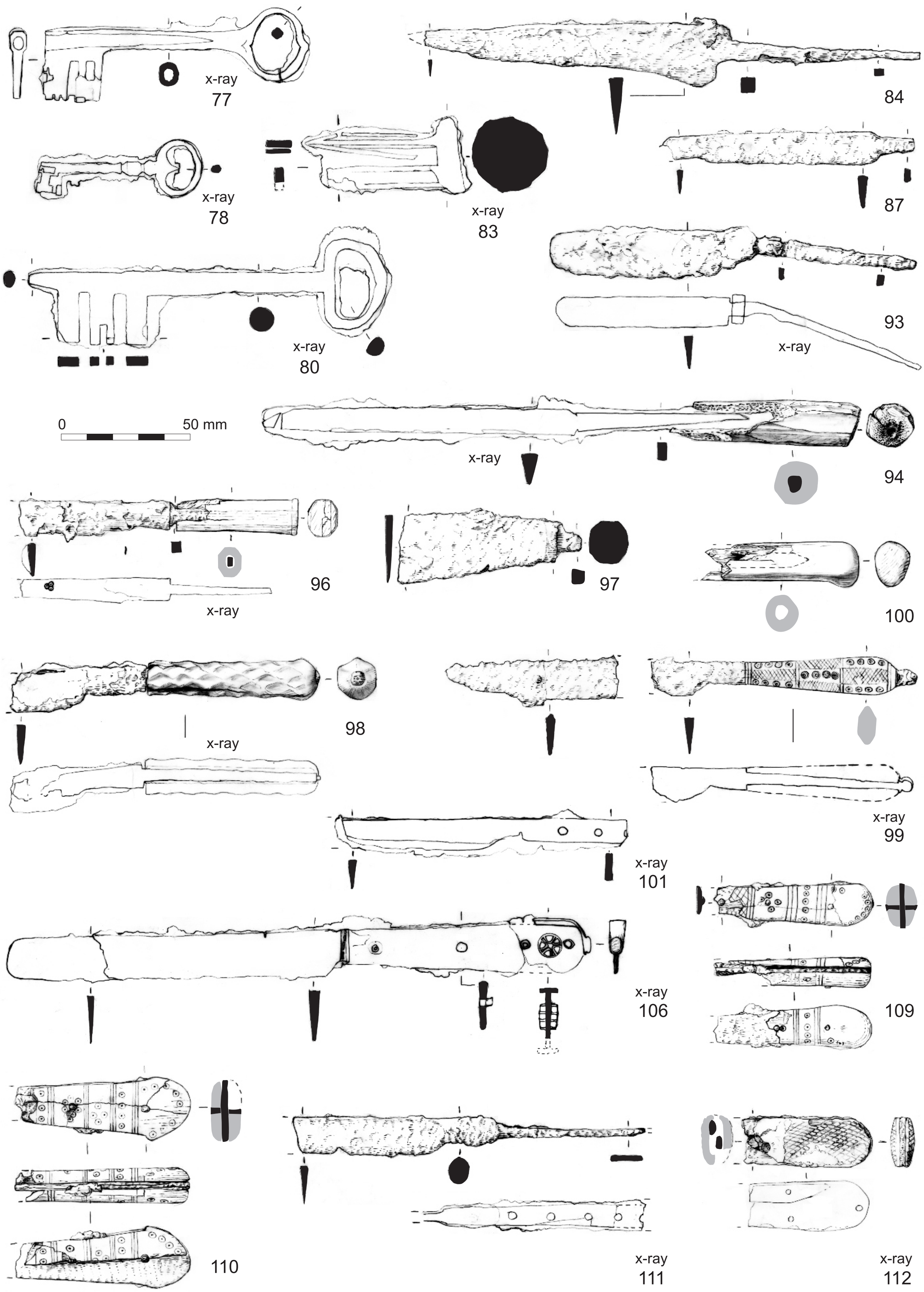


Figure 15.3: Selected metalwork (details in the catalogue)

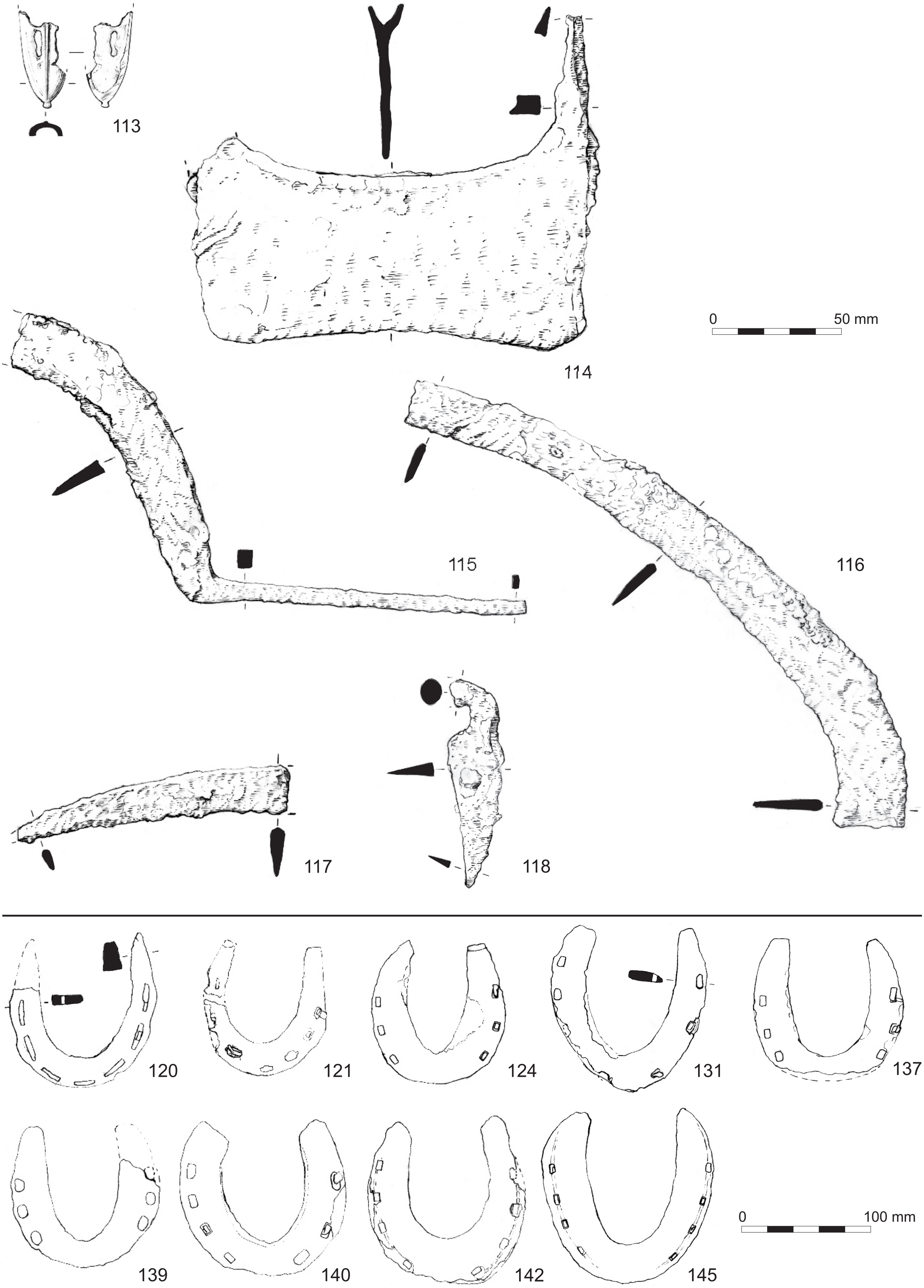


Figure 15.4: Selected metalwork (details in the catalogue)

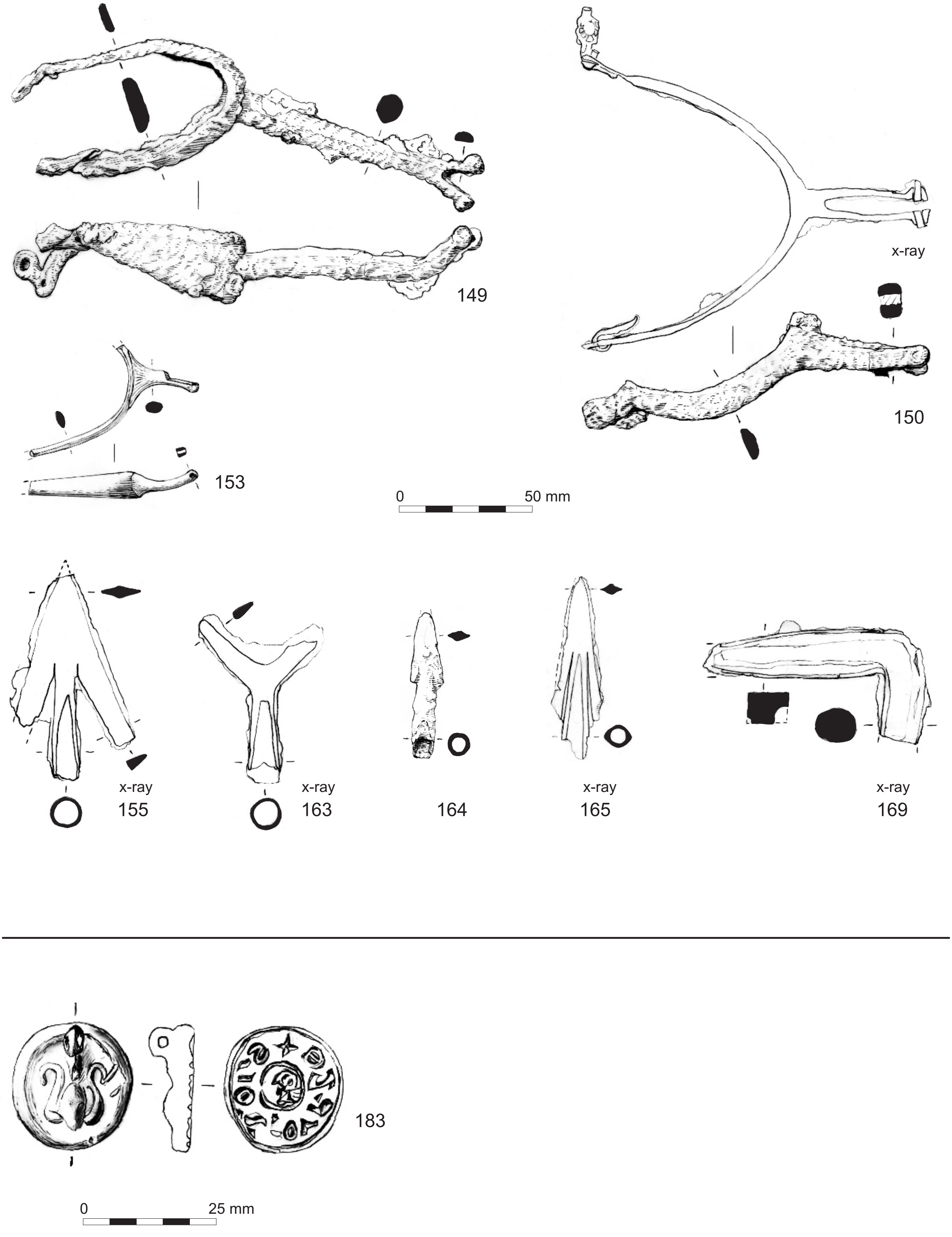


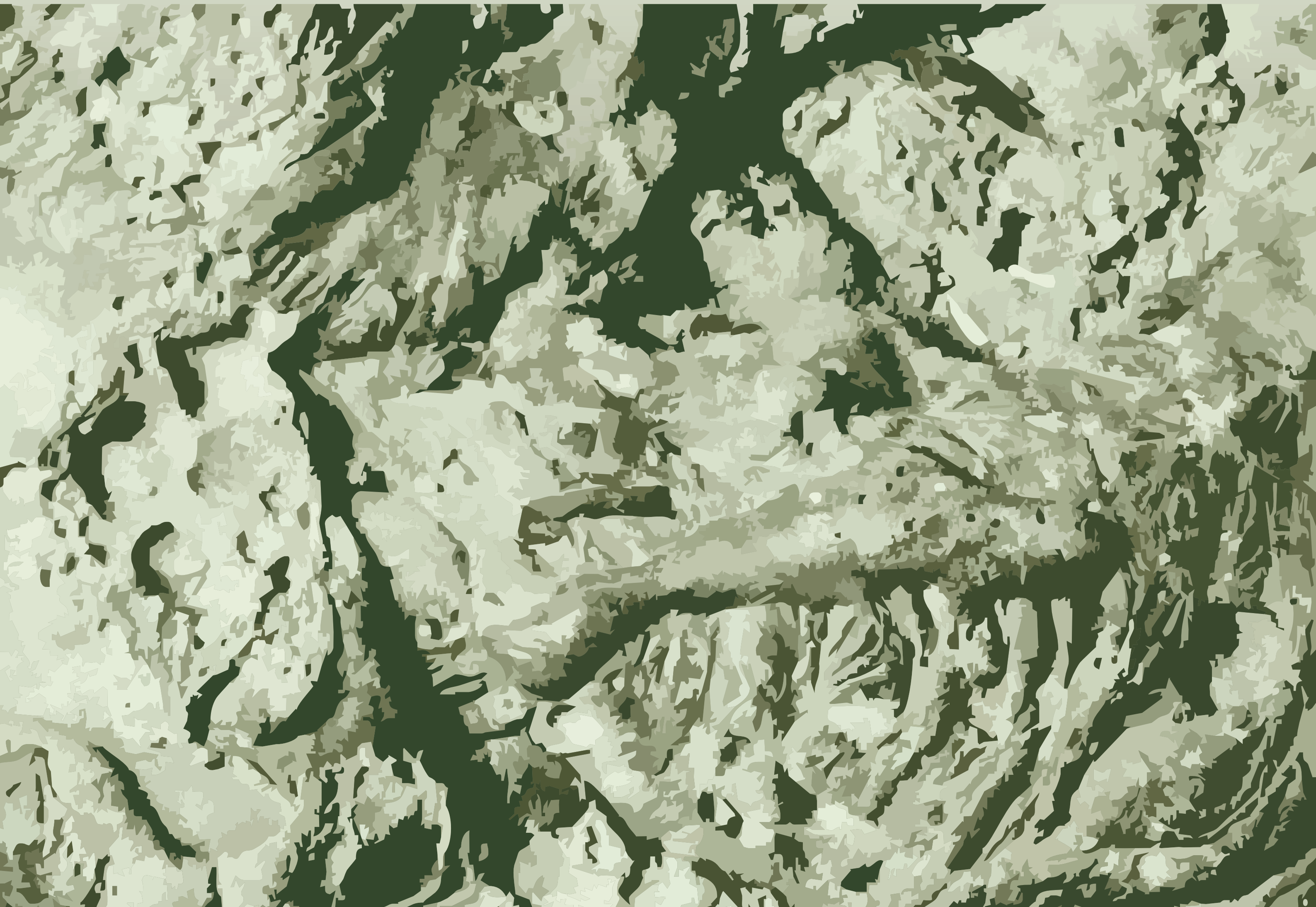
Figure 15.5: Selected metalwork (details in the catalogue)

Framework Archaeology

BAA Stansted London

CHAPTER 16

Slag



by Lynne Keys

16 Slag

Lynne Keys

A total of 11.3 kg of slag and related material were recovered - not a large amount for the size of the area excavated. There are, however, indications that smithing took place as a one-off in different periods. Some evidence was found in a Late Bronze Age hearth (MTCP); smithing took place on at least one occasion in the Late Iron Age (M11), certainly in the Late Iron Age/early Romano-British and Romano-British periods (LTCP). No evidence for smelting - the production of iron in a furnace using ore and fuel - was found anywhere in the excavated areas.

Methodology and Quantification

The material was visually examined and categorised on the basis of morphology alone. Each slag type in each context was weighed, smithing hearth bottoms being individually weighed and measured to obtain their dimensions for statistical purposes. Additionally a magnet was run through the soil in bags to detect micro-slags such as hammerscale. Quantification details are given in Table 16.2 below.

Metalworking evidence by period

Late Bronze Age

MTCP site
Hearth 340004, fill 340002. Described as being charcoal rich, the deposit contained some micro-slags and hammerscale spheres. There is the possibility it may have been used as a smithing hearth for high temperature welding.

Late Bronze Age/Early Iron Age

M11 site
Pit 434009, fill 434010. A small amount of magnetic micro-slags (runs etc.), a very small amount of undiagnostic slag, charcoal and some copper-alloy waste.

Late Iron Age/early Roman

LTCP site
Pit 136012, fills 138026, 138027, 136030. This feature contained two smithing hearth bottoms, some undiagnostic slag, lots of micro-slags and some flake hammerscale, all of which point to secondary smithing. The focus of activity is probably very near the pit, in a structure/or building nearby. The piece of flint with hole found in fill 138028 may be a weight but could have been used as a piece of the hearth through which the tuyure projected, protecting the bellows from the fire inside.

M11 site
Intervention 433026, fill 433028 (Ditch 433033). A smithing hearth bottom (indicating smithing), some vitrified hearth lining and cinder.

Pit 434011, fill 434012. In a deposit of burnt charcoal a small quantity of iron-rich slag and some micro-slags (runs and dribbles) were found.

Early Romano-British

LTCP site
Intervention 129035, fill 129025 (ditch 109214). A small amount of flake hammerscale, probably originating from ordinary smithing of iron objects.

Hearth 150028, fills 150026 and 150027. This hearth contained hammerscale spheres indicating it was probably used to carry out high temperature welding. Context description mentions the dark (charcoal ash) colour of the fill.

Late Romano-British

MTCP site
Intervention 333024, fill 333026 (ditch 333082). The smithing hearth bottom, undiagnostic slag and vitrified hearth lining indicate some smithing activity took place nearby.

Pit 333049, fill 333052. Some undiagnostic slag and vitrified hearth lining were found in the backfill of this pit.

Hearth 324002, fill 324001. The fill of this hearth contained very tiny hammerscale spheres. The pieces of quern and flint could have formed part of a raised fire bed or low superstructure of a ground level hearth where smithing took place.

Unphased

LTCP site
Pit 110129, fills 110130 and 110131. Some hammerscale spheres indicate high temperature welding or primary smithing of an iron bloom after smelting. As no other evidence for smelting was found it probably indicates the former.
Hearth 138058, fill 150041. Some hammerscale spheres.
Hearth 152021, fill 152022. Some hammerscale spheres.

Slag types and terminology

Activities involving iron can take two forms:
Smelting. the manufacture of iron from ore and fuel in a smelting furnace. The resulting products are a spongy mass called an unconsolidated bloom (iron with a considerable amount of slag still trapped inside) and slag (waste).
16 **Smithing** comprising:

a) *primary smithing* (hot working by a smith using a hammer) of the bloom on a stringhearth (usually near the smelting furnace) to remove excess slag. The bloom becomes a rough lump of iron ready for use; the slags from this process include smithing hearth bottoms and micro-slags, in particular tiny smithing spheres.

b) *secondary smithing* (hot working by a smith using a hammer) of one or more pieces of iron to create an object or repair it. As well as bulk

> slags, including the smithing hearth bottom, this generates micro-slags: hammerscale flakes from ordinary hot working of a piece of iron or tiny spheres from high temperature welding to join two pieces of iron.

Both these activities produce slag, some diagnostic of the process, others not. Some slag may be described as undiagnostic (6100 g recovered in total) because it was broken up during deposition, re-deposition or excavation. Other types of debris encountered in the slag assemblage may be the result of a variety of high temperature activities - including domestic fires - and cannot be taken on their own to indicate iron-working was taking place. They include materials such as fired clay (49 g), vitrified hearth lining (312 g), cinder (209 g) and fuel ash slag (109 g). However if found in association with iron slag, as they sometimes were, they may be products of the process.

The diagnostic slags (smithing hearth bottoms and hammerscale) all point to secondary smithing activity, the ordinary hot working of an iron shape by a smith or high temperature welding to join two pieces of iron. A smithing hearth bottom is plano-convex in shape and was formed as a result of high temperature reactions between the iron, iron-scale and silica from either a clay furnace lining or the silica flux used by the smith. Before it could grow large enough to block the tuyere hole (where the air from the bellows entered the hearth) it was removed and dumped in the nearest pit, ditch or unused area.

Table16.1: Smithing hearth bottom statistics (eight examples, total weight 2182 g)

	range	mean	standard deviation
weight (g)	106 - 1008	273	302
length (mm)	65 - 130	86	21
breadth (mm)	45 - 120	68	23
depth (mm)	20 - 55	28	116

Table16.2: Quantification details for the iron slag and related debris (dimensions in mm)

Site	context	< >	identification	Wt (g)	len	wid	dep.	comment
LTCP (BAACP00)	106057		undiagnostic	28				
	106066	547	micro-slags	0				& magnetic clay
	110075	255	fired clay	11				
	110075	255	fuel ash slag	1				
	110075	255	undiagnostic	32				
	110075	255	vitrified hearth lining	10				
	110082		undiagnostic	26				
	110109		stone	22				ironstone?
	110130	537	hammerscale	0				some spheres
	110130	540	hammerscale	0				limited amount spheres
	110131	413	hammerscale	0				some spheres
	113003		cinder	26				
	116007	109	clinker	1				
	129025	539	hammerscale	0				limited amount flake
	129031		cinder	1				
	129032	296	cinder	2				
	134064		undiagnostic	2				
	136030	311	cinder	4				
	138026		undiagnostic	138				
	138027	399	micro-slags	0				lots, & some flake
	138027	399	undiagnostic	6				
	138027		smithing hearth bottom	182	80	60	30	
	138027		undiagnostic	228				
	138028		smithing hearth bottom	106	60	50	20	
	138041		cinder	4				
	138051		fuel ash slag	18				
	138052		fuel ash slag	18				
	138053		cinder	6				
	139033	391	fired clay	11				
	140013		undiagnostic	88				
	143071		undiagnostic	30				
	150006	312	clinker	2				
	150020		undiagnostic	4				
	150026	543	hammerscale	0				spheres - a better sample
	150027	390	hammerscale	0				limited amount spheres
	150041	536	hammerscale	0				some spheres
	152022	563	hammerscale	0				some spheres
	157009		fired clay	4				
	157009		undiagnostic	32				
LTCP (BAACP01)	447012		iron object	132				
	449015		charcoal	8				
	449063		coal	48				burnt
	449063		nail	2				
	449063		undiagnostic	301				
	449064		coal	19				burnt
	449064		undiagnostic	26				
	449065		coal	10				burnt
	457039		undiagnostic	222				
	459020	828	coal	35				burnt
	459020	828	coal	64				
	459020	828	fired clay	14				
	459020	828	undiagnostic	240				

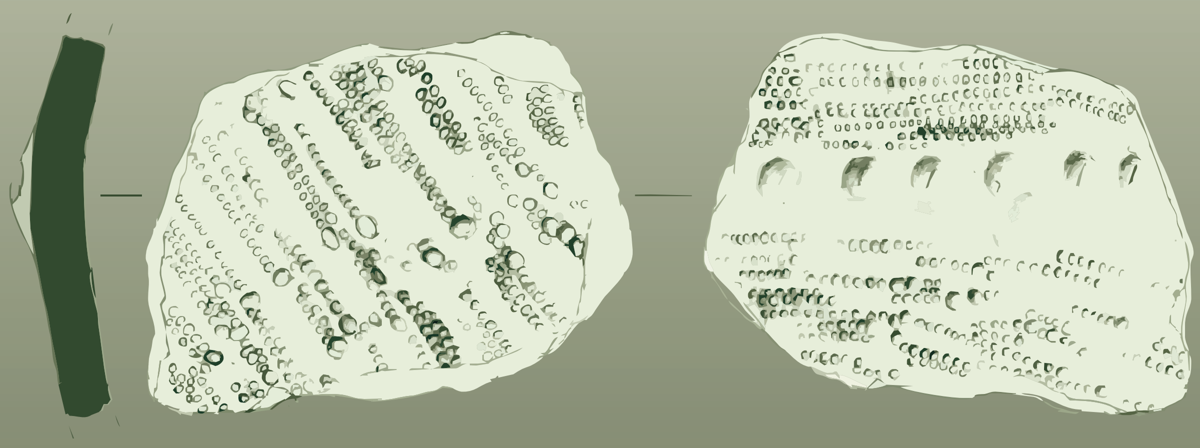
Site	context	< >	identification	Wt (g)	len	wid	dep.	comment
	459054		cinder	2				
	459054		undiagnostic	5				
	461001		coal	18				
	461001		glassy run	2				not ironworking?
	465034	850	undiagnostic	6				
	466023	839	cinder	6				
	466023	839	coal	1				
	466023	839	undiagnostic	6				
	467008	876	charcoal	2				
	467008	876	cinder	27				
	467008	876	coal	17				burnt
	467008	876	fired clay	4				
	467008	876	undiagnostic	182				
	467008		coal	44				burnt
	467008		coal	79				
	467008		undiagnostic	800				
	480081		undiagnostic	24				
	Trans. 1		coal	9				burnt
	Trans. 1		coke	2				
LTCP (BAACP99)	990101		Undiagnostic	4				
	990201		undiagnostic	1				
	990401		clinker	1				
	990401		undiagnostic	4				
	990501		cinder	2				tempered
	990501		undiagnostic	12				
	990701		undiagnostic	2				
	992301		coal	3				
	992301		undiagnostic	6				
	992305		undiagnostic	2				
	992401		clinker	4				
	992401		coal	4				
	992401		undiagnostic	358				
	992500		clinker	24				
	992500		coal	10				burnt
	992500		undiagnostic	92				
	992700		undiagnostic	138				coal as fuel
FLB (BAAFL00)	401006		undiagnostic	76				
	401013		Cinder	2				
	401016	5002	iron	1				iron sliver
	402020		undiagnostic	138				
	402027		undiagnostic	4				
	403001		cinder	20				
	403054		undiagnostic	4				
	405065		coal	4				
	405065		undiagnostic	58				
	406022		coal	22				
	406022		undiagnostic	456				
	406022		vitrified hearth lining	60				
	406022		vitrified hearth lining	60				
	407006		undiagnostic	116				
M11 (BAALR00)	420051		undiagnostic	6				
	423133	6155	cinder	1				
	430021		undiagnostic	4				iron rich
	431004	6105	cinder	2				

Site	context	< >	identification	Wt (g)	len	wid	dep.	comment
	431004	6105	undiagnostic	1				
	433028	6128	cinder	2				
	433028		smithing hearth bottom	226	90	75	25	
	433028		vitrified hearth lining	75				
	433042	6247	fired clay	1				
	433208		fuel ash slag	1				
	434010	6102	charcoal	2				
	434010	6102	micro-slags	4				some magnetic
	434010	6102	undiagnostic	3				
	434012	6103	charcoal	2				
	434012	6103	iron rich slag	1				
	434012	6103	micro-slags	1				magnetic
	434014	6104	charcoal	2				
	434021	6111	charcoal	1				
	434021	6111	cinder	1				
	434021	6111	micro-slags	8				one hammerscale sphere, charcoal
	434021	6111	undiagnostic	4				
	439060		fired clay	4				
	439060		undiagnostic	2				
	441007		coal	3				burnt
MTCP (BAAMP00)	309191		undiagnostic	50				
	310028	2073	fired stone	4				
	314067		undiagnostic	2				
	319199		undiagnostic	1				
	320060	2277	stone	0				
	320132		stone	14				ironstone?
	321055		cinder	1				
	321227		fuel ash slag	12				
	321227		vitrified hearth lining	4				
	321233		undiagnostic	30				
	321234		undiagnostic	24				
	324001		hammerscale	0				small spheres
	326046		undiagnostic	112				
	328167	2448	cinder	38				
	328167	2448	undiagnostic	2				
	328208		smithing hearth bottom	142	80	45	20	
	328221		stone	180				
	333026		smithing hearth bottom	160	85	60	25	
	333026		undiagnostic	76				
	333026		vitrified hearth lining	50				
	333052		iron-rich slag	14				
	333052		undiagnostic	268				
	333052		vitrified hearth lining	26				
	334006		undiagnostic	6				
	334012		undiagnostic	134				
	334012		vitrified hearth lining	1				
	334031		cinder	14				
	335012		undiagnostic	84				part of smithing hearth bottom?
	335022	2431	undiagnostic	14				
	335022	2432	undiagnostic	2				
	339042		cinder	4				
	339087		stone	12				ironstone?
	340002		hammerscale	0				limited micro-slags & spheres
	345025		cinder	12				
	349053		fuel ash slag	59				

Site	context	< >	identification	Wt (g)	len	wid	dep.	comment
	353009		undiagnostic	68				poss. smithing slag
	356015		iron object	1568				
	356015		undiagnostic	1128				
	360012		smithing hearth bottom	252	95	75	30	
MTCP (BAAMP99)	6526		vitrified hearth lining	12				
	6527	22	undiagnostic	4				
	6527		smithing hearth bottom	1008	130	120	55	
	6606		undiagnostic	50				poss. smithing slag
	6609		undiagnostic	14				poss. smithing slag
	6609		vitrified hearth lining	14				
	6615		undiagnostic	38				poss. smithing slag
	6617		smithing hearth bottom	106	65	60	20	
	6617		undiagnostic	70				poss. smithing slag
	7903		undiagnostic	6				
Total				11,335				

CHAPTER 17

Prehistoric pottery



by Matt Leivers

17 Prehistoric pottery

Matt Leivers

The prehistoric pottery assemblage studied here consists of 8,085 sherds weighing 58,040 g, recovered from six sites: the LTCP, MTCP, M11, FLB, SG and NP sites. Quantities of pottery recovered by site are given in Table 17.1.

Small quantities of Early Neolithic, Middle Neolithic, Late Neolithic, Early Bronze Age and Early Iron Age ceramics are present within the assemblage, with larger amounts of Middle Bronze Age, Late Bronze Age and Mid-Late Iron Age material.

Most published assemblages of prehistoric ceramics from Essex derive from either the northern side of the lower Thames valley, the central portion of the county around the Chelmer and Blackwater rivers, or the north-eastern area around Ardleigh. Given this, the assemblage from Stansted provides a relatively scarce opportunity to examine a substantial body of material from beyond the traditional 'core' areas of prehistoric activity in Essex (in addition to the material in Brown 2004; Every 2007).

Earlier prehistoric ceramics in Essex tend to be understood primarily in terms of their relationships to ceremonial earthworks. Although the Neolithic and Early Bronze Age pottery from Stansted is not abundant, its occurrence in an area in which large-scale architectural modification of the landscape did not occur has the potential to contribute to the understanding of the more prosaic aspects of life in Essex in the fourth and third millennia BC. In later periods, the much more frequent Middle and Late Bronze Age ceramics can contribute to an understanding of the relationship between Ardleigh and other Deverel-Rimbury ceramics (Brown 1995b), and the still obscure mechanisms by which Deverel-Rimbury pottery was superseded by the so-called Post-Deverel-Rimbury traditions which typify the Later Bronze Age (Needham 1996; Brown and Murphy 1997).

Methods

The material was analysed in accordance with Wessex Archaeology's recording system (Morris 1994), which follows the nationally recommended guidelines of the Prehistoric Ceramics Research Group (Prehistoric Ceramics Research Group 1997). Sherds were examined using a x20 binocular microscope to identify clay matrices and tempers, and fabrics were defined on those bases. Fabric analysis was undertaken by the author (LTCP, MTCP, FLB, SG, NP) and Anne-Maíre Denvir (M11). The author integrated the resulting fabric type series, and textual comments on the M11 material by Anne-Maíre Denvir were incorporated into this report.

A number of research aims were identified in the *Stansted Airport Project Design Update Note 2* (Framework Archaeology 2004b), and analysis was carried out with these in mind. The stated aims include the possibility of contributing to the debate concerning the dating and relative chronology of Neolithic pottery regionally and nationally; the chronological definition of Middle and Late Bronze Age settlement features; and the characterisation of apparently alternate strategies of structured deposition in the Middle and Late Bronze Ages.

In addition, analysis of the assemblage was intended to elucidate issues concerning the location of manufacture of vessels, assisting the understanding of local and non-local production; to characterise the range of forms present within chronological groups; and to identify any correspondences between those forms and observed or implied functions.

Condition

Condition of sherds was assessed on the basis of the degree to which edges and surfaces were abraded. The assemblage was dominated by sherds in moderate condition, with much smaller proportions of good, poor and very poor sherds. There were very few reconstructable profiles, despite the occurrences of probable single-vessel deposits. The presence of residues was also recorded.

Summary

A total of 67 fabric groups were defined, which have been grouped into eight chronological periods. The breakdown of ceramics by fabric group and chronological period is given in Table 17.2. Fabric descriptions are given below.

Early Neolithic Pottery (Fig. 17.1, nos 1-5)

On the MTCP 107 sherds weighing 506g were identified as Early Neolithic, in four fabrics (FL44, FL45, FL46 and QU52), all likely to be of local manufacture. None have any traces of slip, wiping or decoration.

The assemblage contained only four rims (all in FL44), three of which were recovered from the fill of a single feature (fill 506 of pit 344278). Each of these three rims (one of which had a post-firing perforation below it) was from a different bowl, none of which was represented amongst the plain body sherds recovered from the same feature. In total the pit contained portions of six vessels, three represented by single rim sherds and three by collections of less well-preserved plain body sherds (in FL45, FL46 and QU52).

Each of the three rims from 506 is plain, and two are of forms suggesting open bowls with necks above sharply carinated bodies, while the third appears to be from a neutral undifferentiated vessel.

The fourth rim was recovered from fill 1737 in feature 1738, a small pit which also contained six plain body sherds. In this instance two body sherds derived from the same vessel as the rim (in FL44) which is another open carinated bowl with a neck, while four smaller sherds were from a second vessel in FL45.

Four small sherds (three in FL44, one in QU52) were recovered from the fill of pit 323037. These sherds are too small to assign to a form, and their size and moderately abraded condition suggests that they entered the feature accidentally. However, *Corylus* charcoal radiocarbon dated to 3707 – 3636 BC[1], suggesting that the feature and pottery are contemporary.

On the LTCP only 25 sherds weighing 96g were identified as Early Neolithic, all belonging to a single vessel of fabric FL29. The material was recovered from the single fill (995107) of a small pit (995106). The fabric is likely to have been manufactured locally.

The group contains 23 plain body sherds. Two joining sherds from a rolled, flat-topped rim suggest a neutral form. Exterior surfaces are smoothed, and have no traces of any slip, wiping or decoration. The small size of the assemblage and predominance of plain body sherds precludes further reconstruction of the vessel's profile.

A further 33 sherds weighing 57g came from three tree-throws on SG. All are plain body sherds in poor to moderate condition, likely to belong to three different vessels.

Discussion

All of the Early Neolithic fabrics are similar to both Middle and Late Bronze Age flint-tempered pottery, and it is possible that further Early Neolithic sherds remain unidentified amongst the much larger Bronze Age assemblages (a problem encountered on other multi-period sites in Essex: see Brown 1988, 264; Hedges and Buckley 1978, 259).

The classification of Early Neolithic pottery in Britain remains confused. The continued use of contradictory type-names for perceived local variations with uncertain cultural and chronological significance has largely obscured understandings of how different ceramic traditions may have arisen and been used (Table 17.3). The most recent nomenclature in Table 17.3 allows for three overlapping pottery assemblages in the Early Neolithic of southern Britain: the Eastern, South-western and Decorated styles. This characterisation is quite misleading, and there is more likely to have been a background of plain bowl pottery of various kinds across the country, to which decoration is eventually added. Many assemblages contain both plain and decorated vessels, and decoration appears to have been used preferentially on particular vessel forms - principally heavy-rimmed shouldered bowls.

The very earliest Neolithic pottery (Herne 1988) is not present at Stansted, where the forms appear to be slightly later, more akin to decorated assemblages. Traditionally this material would be classified as a plain component of a Mildenhall-style assemblage. In Essex, this pottery is typified by deep open bowls with rolled rims. Carinated and closed forms are rarer, as are other rims (Hedges 1980). Deposits of pottery in pits are fairly frequent in the Early Neolithic in Essex, and parallels for the LTCP/SG material can be identified across the county. Examples are known from Springfield Lyons (Buckley and Hedges 1987, 3), Great Baddow (Brown and Lavender 1994), Lofts Farm (Brown 1988), Little Waltham (Drury 1978), Chigborough Farm (Adkins and Adkins 1985), Heybridge Basin (Brown and Adkins 1988), Asheldham (Bedwin 1986), North Shoebury (Brown 1995a) and elsewhere (Hedges 1980; Brown 1997). Few of these ceramics come from the Stansted region,

[1] All dates are give at 95.4% confidence

with the exception of Elsenham Cross, Pledgdon, where Warren recorded 'Windmill Hill Ware' in pits (Warren 1945). Such features are often interpreted as parts of "a pattern of shifting settlement in successive, small woodland clearances, dependant as much on wild plants as cereal cultivation" (Brown 1997, 94). This picture fits particularly well with the pollen evidence from Stansted Brook, which suggests no large-scale clearance until the Middle Bronze Age (Wiltshire 1991).

On the MTCP site it is possible that a different practice resulted in the deposits. The general dichotomy between the larger, well-preserved rim sherds and the smaller, more abraded body sherds (together with the fact that rims and bodies are often from different vessels) hints at a depositional practice common in the Early Neolithic elsewhere in Britain (Garrow 2006). It can be suggested that these pots were often used in special performances and acts of consumption, deposited with some formality, with selected sherds (particularly from the rim and carination) selected and carefully placed in pits.

Although too much should not be made of such a small assemblage, it is possible that the Early Neolithic ceramics from the MTCP site on the one hand and the LTCP and SG sites on the other represent different sorts of activity, distinct in terms of their fabric type, location, and depositional practice.

Chronology

In very general terms, the emergence of decoration in the Early Neolithic ceramics of the English south-east is a late development (Herne 1988), perhaps implying that the plain Stansted material lies at an earlier point in the decorated sequence. Radiocarbon dates on hazelnut shell from context 353012 in pit 344278 of 3637 – 3498 BC (NZA - 20960) and *Corylus* charcoal from the fill of pit 323037, most probably of 3707 – 3636 BC (NZA-20918), may support this assumption. However, two points should be considered in any consideration of the chronological significance of this material: firstly, the assemblage is very small; and secondly, decorated vessels did not replace plain ones. Whittle (1977) has typified the ratio of decorated to plain vessels in assemblages of his Decorated Style (which equates with the older 'Windmill Hill' nomenclature of which Mildenhall Ware is considered a sub-set: see Table 17.3) as 3:7. Given these factors, it is not possible to determine whether the absence of decoration is a chronological trait, or a deliberate choice by the users of the pottery.

The radiocarbon dates obtained for pits 323037 and 344278 are entirely typical Early Neolithic determinations, both nationally and within Essex (Fig. 17.2 Inf. http://ads.ahds.ac.uk/catalogue/resources.html?c14_cba).

Slightly earlier dates were obtained from a hearth pit with associated ceramics at Little Waltham. Comparable dates have been obtained from the Orsett causewayed enclosure, and from settlement at Bradwell-on-Sea Site 8 and The Stumble. At the latter site, the determinations came from a pit group containing pottery.

These determinations are spread across Essex and (with the exception of Little Waltham) basically contemporary, suggesting a human presence across the county by the mid-4th millennium BC.

Middle and Late Neolithic pottery (Fig. 17.1, nos 6-9)

Peterborough Wares (3350 – 2700)

A single pit (436070) on the M11 site produced 12 sherds (weighing 92 g) from a single Mortlake-type vessel in FL26. Four sherds were decorated fragments of rim, while the remaining eight were body sherds, of which two were plain and six decorated. The top of the rim and interior surface immediately below it are decorated with whipped cord maggots arranged transversely and horizontally respectively, while the concave neck bears the infrequent impressions of a blunt sub-circular implement (perhaps a small bone) on the exterior surface. Pit 436070 is dated to the Late Bronze Age by other ceramic associations, indicating that the Mortlake sherds must be residual. However, the likelihood that all 12 sherds derive from a single vessel indicates that the original depositional location was probably in the immediate vicinity.

A similar deposit came from tree-throw 504018 on SG, containing two sherds from a Mortlake-type rim decorated with incised lines in a chevron pattern, and ten body sherds decorated with finger-nail crescents. Thirteen plain body sherds came from a second vessel. The majority of the other Middle Neolithic pottery on SG was recovered from later features.

Only five sherds of Middle Neolithic pottery were recovered from the MTCP. These weighed 27g and derived from three vessels (fabrics FL41 and 42), identified as Peterborough Ware (although the second and third vessels are tentative assignations). Single rim and body sherds represented one vessel (FL41) with fingernail impressions on the exterior, rim, and interior immediately below the rim. Only one simple plain rim sherd of the second vessel (FL42) was recovered. These three sherds came from fill 320003 of tree-throw 320001, containing an assemblage of mixed date, and as such are unlikely to represent *in situ* Middle Neolithic activity. The third vessel (FL42) consisted of two sherds, one with an upright very slightly thickened rim. These sherds came from fill 316034 of pit 316032. It is difficult to assign the MTCP sherds to a Peterborough Ware sub-style with any degree of certainty, but the form of the FL41 vessel is more suggestive of Mortlake than of either Ebbsfleet or Fengate Wares.

Discussion

The Peterborough Ware element of Middle Neolithic impressed wares developed out of earlier Neolithic bowl traditions, perhaps originally representing one on the Early Neolithic decorated bowl styles in the lower Thames area (Smith 1956). Peterborough Wares elaborate on the existing styles of earlier Neolithic bowls, but have a much more restricted set of forms, dominated by the shouldered bowl with a cavetto zone beneath the rim. The decoration on these pots generally consists of multiple, repeated impressions, made using twisted and whipped cord, the ends of bird bones, round-toothed combs, finger-nails and finger-tips. Fabrics are almost entirely tempered with coarse flint.

Traditionally, three styles of Peterborough Ware are identified which were once thought to form a continuous developmental sequence. *Ebbsfleet Ware* is most like the earlier Neolithic forms. These vessels have simple rims and relatively long necks; the decoration is confined to the upper part of the vessel and is generally simple and restrained, with incisions and impressions. With *Mortlake Ware* the rim is elaborated into a kind of collar and the decoration becomes more profuse. Twisted and whipped cord impressions are used as decorative techniques, along with impressions of bird bones, stick and fingernail. The neck on Mortlake Ware is reduced to such an extent that it becomes a cavetto zone. Finally, in *Fengate Ware* the rim becomes a heavy collar. The neck is almost totally gone, and the base of the pot becomes flattened, sometimes forming a pedestal.

It is only in the last ten years that an adequate group of radiocarbon dates for Peterborough Ware has started to build up (Gibson and Kinnes 1997), demonstrating that the Ebbsfleet/Mortlake/Fengate sequence does not work, and that Fengate vessels may have been in circulation as early as Ebbsfleet. Moreover, they suggest that Peterborough Wares were in use by 3350 BC, and had gone out of circulation by 2500 BC, making them securely middle Neolithic.

The differences between the Ebbsfleet, Mortlake and Fengate styles and their relationships to earlier forms may lie not in their chronological relationship, but rather in their treatment and circumstances of use and deposition. Nationally, a picture is beginning to emerge to which the Stansted material can contribute. Within Essex Peterborough Ware (primarily of Mortlake-type) is well represented at the Springfield cursus (Buckley *et al.* 2001), and entirely absent at the Springfield Lyons and Orsett causewayed enclosures (*ibid.*; Hedges and Buckley 1978). This difference is of interest in terms of the ongoing debate concerning the relative dates, uses and depositional associations of the various Peterborough Ware sub-styles, and also in terms of the relationship between Peterborough and decorated earlier Neolithic ceramics. However, the association or otherwise of Peterborough Ware with major earthworks is at best incidental to the Stansted material. It is perhaps more significant that Peterborough Ware is not well-represented in Neolithic features and levels of more ephemeral Essex sites. At Great Holts Farm a small shallow pit contained Peterborough Ware, further pits at Elms Farm contained Mortlake Ware and others at Chigborough Farm contained unspecified Peterborough Ware (Brown 1997). Small quantities of unspecified Peterborough Ware were found at Great Clacton, 30 sherds from two Ebbsfleet vessels came from Waltham Abbey, a single unspecified sherd from Danbury and sherds of unspecified, Mortlake and Fengate wares from Wicken Bonhunt (Hedges 1980). It would appear that Peterborough Ware in Essex as a whole is rather under-represented in relation to (the at least partially contemporary) decorated earlier Neolithic pottery, a phenomena that is repeated at Stansted.

<u>Grooved Ware (2900 – 2400)</u>

Only four abraded sherds of Late Neolithic pottery weighing six grammes were recovered from the lower fill of a tree-throw on the MTCP. No other material was recovered from this feature, which consequently remains undated. It is impossible to identify such a small assemblage to type, or to comment on its significance.

Grooved Ware in Essex is not uncommon, and includes Clacton (from pits at Lyon Point and Newport) and Durrington Walls (from the Tye Field, Lawford 'henge' and the Springfield cursus) sub-styles. Large collections are not often found, and in this respect the Stansted material is not atypical.

Beakers (2700 – 1700)

Only four sherds weighing eight grammes from the LTCP have been assigned to the Early Bronze Age, three due only to the fabric type. All are grog-tempered, and form fabric groups GR4 and GR5. A single probable Beaker sherd with comb and cord impressions represents GR4. GR5 consists of three featureless sherds containing less coarse sand and more evenly oxidised than GR4. The diagnostic Beaker sherd came from the fill of pit 913804, which also contained Early to Middle Iron Age pottery in similarly small quantities. The three plain sherds came from truncated feature 469005, which was otherwise sterile. A single featureless body sherd from the MTCP has been assigned to this period on the basis of the grog-tempered fabric (GR6). It was recovered from the same tree-throw fill as the Middle Neolithic sherds.

More diagnostic Beaker sherds came from SG, although again numbers were low (only 14 sherds), condition poor, and some identified only by fabric (all GR5). Some were decorated with very abraded incised and impressed motifs. Little can be said about an assemblage of this size, which seems to be largely or wholly residual.

Middle Bronze Age pottery (Fig 17.3, nos 10-21)

The largest period assemblage dated to the Middle Bronze Age (3,093 sherds weighing 27,605 g), with ceramics belonging to the Deverel-Rimbury tradition recovered from the FLB (35 sherds weighing 186 g), M11 (162 sherds weighing 856 g), LTCP (346 sherds weighing 3,280 g), and MTCP sites (2,550 sherds weighing 23,283 g).

15 fabrics were identified (FL30 – 33, FL43, FL47-52, QU53-56), more or less sandy and (with the exception of FL43) all tempered with crushed calcined flint in varying quantities. FL43 was tempered with crushed calcined flint, quartz sand and – exceptionally – grog.

The Middle Bronze Age assemblage can be divided into three basic vessel types, which correspond to the standard tripartite division of Deverel-Rimbury ceramics into Bucket, Barrel and Globular (see below). In addition to these three basic types there are a small number of anomalous sherds belonging to vessels of different forms. One rim and a dozen plain body sherds in FL30 seem to belong to a small closed bowl. Four sherds in QU54 and QU56 are portions of metalworking crucibles. With the exception of one crucible sherd recovered from topsoil, all of the anomalous forms came from waterhole 309075 on the MTCP site.

The majority of the *in situ* assemblage appears to be domestic rubbish, either being deposited expediently in contemporary features in deliberate, unstructured waste disposal, or entering features and layers through processes such as manuring of fields.

There are two general exceptions to this pattern: the ceramics from waterhole 309075, which – while still possibly representing rubbish disposal – are more highly structured and consequently may have been more overtly meaningful to the Middle Bronze Age inhabitants of Stansted; and those vessels and fabrics associated with the barrow to the north of the main focus of settlement on the MTCP site. Both of these are discussed in more detail below.

Distribution

FLB

A very small number of coarseware sherds in FL30, FL31 and FL47, plus two fineware sherds in FL51 were recovered from the FLB site. While 21 of the 35 sherds were residual or from contexts which could not be closely dated, the remainder came from a pair of features which may have been associated with contemporary settlement in the area, represented by a single roundhouse. Ditch 403017 contained seven sherds of coarseware in FL30 and FL31 which probably entered the feature during backfilling in the Late Bronze Age (Late Bronze Age ceramics are also present). Pit 408013 (adjacent to the western edge of the roundhouse, and radiocarbon dated to 1,405 – 1,255 BC) contained fragments of two vessels. One was a medium-sized plain bucket-shaped jar in FL30 with a simple upright rim; the second a globular vessel in FL51 with similarly simple rim. Both are represented by a very small number of sherds, probably due to the feature being incompletely excavated.

M11

The M11 excavations produced a quantity of Middle Bronze Age ceramics from pits and other features in the north-western area of the site. The assemblage is largely undiagnostic, consisting mainly of plain body sherds and extremely small, undecorated simple rim fragments, but it can be divided into coarse bucket-shaped jars in FL30 and FL32 and fine globular vessels in FL51.

A large proportion of the assemblage (89 sherds weighing 565 g) was recovered from fills 425003 and 425004 of tree-throw 425005. The feature was located in an area without structures or evidence of domestic habitation, possibly indicating that the ceramics resulted from deliberate deposition away from habitation areas. The assemblage includes both coarse (FL30) and fine (FL51) wares. The FL30 fabric from 425005 is somewhat coarser than usual and shows no immediate signs of domestic usage. Some FL51 rim sherds showed evidence of burning and residual organics in the interior, suggesting different uses for the fine and coarse wares.

LTCP

On the LTCP site, the material appears to derive from exclusively domestic contexts: no features were indicative of individually deposited complete or near complete vessels, urned cremations, cremation cemeteries, or barrows. Sherds regarded as *in situ* in deposits contemporary with their use and deposition were recovered from a range of features (tree-throws, pits, ditches, postholes) spread in a broad east – west band across the LTCP site. No evidence of differential deposition of fabric types can be detected: the three coarseware fabrics present (FL30, FL32 and FL33) occur together, and every feature containing fabric FL31 (on this site a fineware only) also contains either one or two of the coarseware fabrics. The only distinction notable between coarse and finewares is that whereas coarsewares occurred as residual sherds in later features, finewares did not.

Average sherd content for Middle Bronze Age features on LTCP site was 16, and only three features contained sherd counts significantly above average. Posthole 124025 contained 37 plain body sherds from a single bucket-shaped vessel in FL33, which is likely to have been deposited in pieces in the void left by the rotted or removed post.

Intervention 116013 (ditch 138017) contained 50 sherds from five vessels, representing the whole range of coarse and finewares present on LTCP site. With the exception of just under half of a thin flat base in FL30, each vessel is represented by a small number of small, moderately abraded sherds probably representing domestic rubbish.

Pit 134001 contained 53 sherds representing at least six vessels (a coarse bucket-shaped jar in FL32, two in FL33 (one of which had an applied cordon with a groove along the upper surface), and three globular vessels in FL31, one of which had a very slight pinched-up cordon. The sherds are again relatively small and moderately abraded, with the exception of four larger sherds of the cordoned globular vessel, which may have survived better due to the higher quality of its manufacture. Further sherds from some of these vessels were recovered from the deposit sealing the pit, interpreted as a Romano-British disturbance. Rubbish disposal again appears to be the likely mechanism of deposition.

MTCP

On MTCP the assemblage can be divided into the larger proportion recovered from features associated with the enclosed Middle Bronze Age settlement at the south end of the excavation, and the much smaller group of sherds from a round barrow 560 m to the north.

84 sherds weighing 768 g were recovered from 14 fills of this barrow ditch (309238). Much of the material seems to have been deposited in the ditch during the erosion of the barrow mound, which was probably the original location of the ceramics. However, it is possible that some deposits were placed in the ditch originally, although there is nothing in the surviving ceramics to distinguish different depositional processes. Six sherds weighing 17 g are highly abraded and are intrusive, of Middle Iron Age date. The remaining 78 sherds are Middle Bronze Age, and consist of 26 sherds of a bucket-shaped vessel in FL30 (several of which have burnt residues on the interior); eight sherds of at least one FL31 globular vessel with smoothed surfaces; one sherd in a coarser variant of FL31 that may be a second vessel; seven sherds of a bucket-shaped vessel in FL33; 22 sherds of a bucket-shaped vessel in FL47, generally in poor condition; and 14 sherds of the only example of FL43 from any of the Stansted sites.

FL43 is exceptional amongst the Stansted Middle Bronze Age ceramics in that it contains grog amongst its tempering agents. The occurrence of grog in such limited quantities (a single vessel) and with a notable contextual association raises the question of why this temper was chosen in the manufacture of this vessel, why this vessel was chosen for deposition in this location, and indeed why there are no other Middle Bronze Age grog-tempered vessels in the Stansted assemblage. In purely technological terms, grog is an ideal – if not *the* ideal – tempering medium: as Cleal notes, "it is relatively easily crushed, is easy to use… provides a stable non-plastic …and does not suffer post-firing changes which would endanger or destabilise the pot" (1995, 192). As Cleal notes, one prerequisite for the use of grog in pottery manufacture is a ready source of the raw material, which – as she points out – is hardly scarce on Middle Bronze Age settlements where broken vessels are a common occurrence. Her suggestion "that there were social constraints on its use" (*ibid.*) is echoed by Gibson when he suggests that "the fact that it involves the destruction and pulverising of former pots may itself be a symbolical act referencing such concepts as continuity and rebirth" (2002, 32).

The abundance of available sherds on MTCP site which could have been transformed into temper suggests that the absence of such temper in the vast majority of vessels was a cultural choice on the part of the potters, assuming that manufacture occurred locally, as seems likely. Given this, the presence of the grog-tempered vessel in the barrow ditch suggests in turn either that this vessel was an import from an area in which grog-tempered vessels were more common, or that it was manufactured for a particular purpose or set of purposes which culminated in (but were not necessarily limited to) its deposition in the barrow. In terms of the first suggestion, grog-tempered vessels are more frequent in north-east Essex, where they tend to occur as a part of the Ardleigh sub-style: Brown (1995b, 129) tabulates 41% of vessels from the Ardleigh urnfield as grog-tempered, with other sites in the region having between 10% and 62% grog-tempered. In terms of the second possibility, Gibson's suggestion concerning the symbolism of grog may be appropriate in this instance, where the vessel was associated with funerary activity. It is of course possible that the vessel was both an import and selected for its symbolic meanings.

The rest of the MTCP site assemblage came from within the Middle Bronze Age settlement at the southern end of the site. Sherds were recovered from roundhouse gullies and postholes, from ditches, and from pits and waterholes.

The largest single assemblage was recovered from feature 309075, which originally may have been a waterhole, immediately to the east of the roundhouses. The fills of this feature contained 1,081 sherds weighing 12,025 g. 979 sherds weighing 11,498 g were from coarsewares including bucket and barrel-shaped jars, a small bowl, and a crucible, while 102 sherds weighing 527 g were from globular vessels. The occurrence of fabric types by stratigraphic group is given in Table 17.4.

The sequence of fills in the feature began with a water-lain deposit containing no pottery. A series of fills interpreted as material weathered from the pit's edges while it stood open contained a small quantity of generally small sherds deriving from several bucket-shaped and globular vessels. This material has the characteristics of casual discard or inclusion by chance, and is very different in nature from deposits higher in the stratigraphic sequence. The weathering deposits also contained an anomalous group consisting of two small sherds (six grammes) of Late Bronze Age pottery and four larger sherds (42 g) of what appears to be the footring base of a small bowl of

Middle or Late Iron Age type. The inclusion of these ceramics in these stratigraphically early fills cannot be adequately explained and may result from excavation or post-excavation error.

The fills above the weathered material are mostly deliberate deposits, and contain very large amounts of pottery, animal bone and flint. The nature of these deposits varies between layers of burnt material and backfills, both of which contained large quantities of ceramics. The most significant single fill consisted of a dump of 188 sherds deriving from three vessels (309114). One sherd weighing nine grammes came from a globular vessel decorated with rough horizontal incisions. This sherd was moderately abraded, unlike the remaining 187 sherds (3,837 g) which were in good condition and derived from two bucket-shaped vessels. Neither of these pots was deposited complete: each is represented by a single rim sherd, and there are only five base sherds amongst the bulk of the pottery. It seems most likely that the vessels were broken elsewhere (presumably in the settlement) and that certain portions were then selected for deposition in the pit.

This appears to be the case for the majority of the layers containing large numbers of sherds: the lowest such deposit for instance contained an assemblage which included 60 sherds weighing 754 g again deriving from two bucket-shaped vessels, and another 33 sherds weighing 397g from a third bucket-shaped pot. None of these vessels were represented by rim or base sherds. One very clear example of the deposition in the waterhole of sherds selected from a vessel broken elsewhere is provided by the only instance of an Ardleigh-style jar. Three sherds of this vessel weighing 352 g were recovered from the upper fills of pit 319033, located 10.5 m to the north-west of the waterhole, while a further three sherds weighing 19 g were recovered from 309077, which represents one of the final back-fillings.

This same stratigraphic group also contained two sherds weighing 10 g in QU54, derived from a small metalworking crucible, in form an over-fired bowl with a pinched spout. A further sherd of this same vessel (weighing 17 g) was recovered from 309105 (the uppermost fill of the waterhole). With the exception of a single sherd of a second crucible in FL56 recovered from topsoil, these sherds are the only evidence of Bronze Age metalworking from the Stansted sites.

Two other anomalous pot types were recovered from the waterhole, both in 309081, radiocarbon dated to 1,382 –1,122 BC. The first is represented by six sherds in FL30 (including a rim decorated on the top with fingernail impressions) from a closed vessel with a diameter at the mouth (120 mm) significantly smaller than the maximum girth around the body. This vessel has a very thin wall (9 mm maximum surviving thickness) and may be a barrel-shaped vessel of unusual form, a simple sub-biconical vessel, or even a small bowl. Whichever form (and there is too little of the vessel surviving to choose between them), the pot seems to be unique within the Stansted assemblage. The second vessel is represented by 10 sherds in FL47 weighing 134 g deriving from a barrel-shaped jar. The only other certain example of such a vessel on the Stansted sites is that recovered from 320057, a deposit in the pit cut through the fills of the feature containing the glacial erratic boulder in the centre of the Middle Bronze Age settlement (see below).

It is clearly not by chance that so much pottery was deposited in the waterhole, nor is it accidental that there are a significant number of fabrics and forms found only there, or in a very limited number of similarly significant contexts elsewhere on the MTCP settlement. Clearly the waterhole was a focus for a series of acts which involved the deposition of large quantities of pottery, and the associations of animal bone and burnt material in these deposits suggests some form of food preparation or consumption which it is tempting to interpret as ceremonial in nature.

Ethnographic accounts demonstrate that waste materials can be highly significant in the conceptual definition of cleanliness and dirtiness, the sacred and the profane, the pure and the tainted, and so on. It is also clear that the ways in which different cultures define waste materials are very variable. The modern understanding of rubbish as dirty and as something to be cast away is very different from much more complex ways of distinguishing between materials. Thus the Kenyan Marakwet see ash, chaff and animal dung as entirely separate materials which must never be put together (Moore 1982). Similarly, Welbourne has shown that the Endo don't consider broken pieces of pottery to be refuse, and that the places where they are deposited are far from being thought of as rubbish dumps (Welbourne 1984).

That the waterhole deposits are not simply rubbish disposals is indicated by the inclusion of the very rare barrel-shaped vessels, the metalworking crucible, and sherds of the only Ardleigh-style jar from the site. The inescapable conclusion is that the waterhole formed a focus for the controlled deposition of a range of materials undoubtedly of some significance in the lives of the inhabitants of the settlement on the MTCP site.

A second waterhole lay just within the eastern boundary of the settlement on the MTCP. This feature (323001) contained a much smaller quantity of pottery than 309075 (65 sherds weighing 495 g), but had a similar sequence of deliberate fills separated by periods of natural silting. Despite the similarity of the two features and the deposits within them, waterhole 323001 does not seem to have been a major locus for significant deposition in the Middle Bronze Age (although in the Later Bronze Age the proportions of ceramics present in the two features is reversed).

One other feature is worth considering in the context of significance and depositional practice. This is 320046, a pit lying in the centre of the settlement on the MTCP site and containing a very large quartzite boulder. The original fills and later siltings of the pit (beneath and around the stone) contained no pot, except for a single moderately abraded rim sherd from a bucket-shaped jar. However, at some point while the boulder was still visible a second pit (320047) was cut through the fills of the first. This second pit stood open for a time and began to silt up; one of these silts contained four sherds in poor to moderate condition derived from two bucket-shaped jars and a globular vessel, likely to have entered the pit through chance. Above these silts are a sequence of three deposits which appear to be deliberate fills. The lowest of these contained 31 sherds weighing 191 g from a bucket-shaped jar in FL32, and six sherds weighing 46 g from two globular vessels in FL48 and FL51. One small sherd in QU27 came from the middle layer, but the uppermost fill contained a significant quantity of ceramics. These included nine sherds of a bucket-shaped jar in FL30 with fingernail impressions on the rim and fingertip impressions on the shoulder. Eleven sherds came from a globular vessel in FL31, the well-finished surface of which is uncommon in that fabric. 63 rim, base and body sherds represented four bucket-shaped jars with wiped surfaces in FL32; one of these vessels had a small raised boss below the rim and a second had a row of fingertip impressions on the shoulder. A single rim sherd came from a barrel-shaped vessel in FL32, a form otherwise only represented in waterhole 309075. Five sherds in FL51 came from a highly burnished globular vessel decorated with square-toothed comb impressions.

It has been suggested that this layer accumulated naturally over a period of time, with the cultural materials present within it deriving from residual background scatters in the general area. The condition of the pottery tends to belie this interpretation: most sherds are only moderately abraded, and some are in good condition (better indeed than the majority of sherds in rubbish pits). On the basis of the pottery, it seems more likely that small deposits of material were placed in the feature sequentially, with the small number of abraded sherds (all from a single globular vessel in FL31) perhaps entering the feature naturally, or from elsewhere.

The rest of the *in situ* assemblage from the MTCP site came from roundhouse gullies and post-holes, from ditches, and from pits. Much of this material seems to be rubbish disposal or material derived from use in manuring. Some of the pits however have indications that rubbish disposal may have had a formal element, with some selection of material and structure to deposition, rather than simply being a means of disposing of unwanted debris.

Discussion

Deverel-Rimbury assemblages tend to divide into three basic vessel types: the so-called Bucket, Barrel and Globular Urns. It should be noted that the traditional nomenclature of the Deverel-Rimbury type series contains within it the functional assumption of vessel-use as a container for cremated human remains: this applies to all three vessel types as indicated by the term *urn*. It is however by no means the case that Deverel-Rimbury ceramics were used exclusively in funerary contexts, and as such the urn label is misleading. Consequently, at Stansted this term has been rejected in all instances where the ceramics are not associated with human remains, or in which there is no reasonable expectation that funerary activity may have occurred. Functionally neutral terms such as jar or vessel are preferred.

In Essex, Deverel-Rimbury ceramics fall primarily into two regional groups: Ellison's Lower Thames Valley grouping (Ellison 1975) in the centre and south and the Ardleigh group (Erith and Longworth 1960) in the north-east.

<u>Ardleigh Group</u>

Deverel-Rimbury assemblages of the Ardleigh style consist of bucket-shaped and globular jars. The former are typified by frequent fingertip rustication, 'horseshoe' handles and a high proportion of grog amongst the otherwise predominantly flint-tempered fabrics (Brown 1995b, 127). Radiocarbon dates for the type span the period 2199 – 1510 cal. BC to 1510 – 1270 cal. BC (at 98% confidence) at the Brightlingsea cemetery (*ibid.*) and 1420 – 950 cal. BC at Chigborough Farm (*ibid.*), suggesting that this style at least begins in the Early Bronze Age, and continues to be used until the end of the Middle Bronze Age. A chronology of types has been suggested, with profusely-decorated, grog-tempered vessels with internally or externally expanded or 'T'-shaped rims lying early in the sequence (Brown 1999 fig 73.136). Late Ardleigh style ceramics tend to be relatively plain, and can have rows of perforations below the rim (Brown 1999 fig 69.116). Dating places some of these plain vessels in the second half of the second millennium BC, and towards the end of the period vessels become very similar to plain jars of the Late Bronze Age, and may indeed demonstrate a continuity of Ardleigh ceramics into that period.

Ardleigh-type Globular vessels have thin walls and well smoothed and burnished surfaces. Lug handles are sometimes present, and can be either plugged through the vessel wall or simply luted onto the exterior.

Lower Thames Valley Group

Vessels of this group belong more firmly within the main Deverel-Rimbury tradition. As a type, this material is unlikely to date prior to 1600 BC, and is unlikely to have become widespread prior to 1500 BC, with a *floruit* between 1500 and 1150 cal BC (Needham 1996). Dates for the southern central group in Essex span the range 1600 – 930 BC (Brown 1995b, 130-1).

The jars of this group are plainer than the Ardleigh type, with decoration primarily consisting of rows of finger-tip impressions or applied cordons on the body, and finger impressions on the rim (Dacre and Ellison 1981 fig 19.E3). Globular fineware vessels are a much less frequent component of assemblages, but do occur, and in Essex are sometimes replaced by stamp-decorated bowls (Brown 1995b).

Bucket-shaped jars tend to have the thickest walls (which are - as the name implies – usually straight and flared) and to be the most coarsely tempered of the Deverel-Rimbury series. Size and capacity vary considerably, from 2,000 to 40,000 cm^3 (Barrett 1980, fig 2). Surfaces can be slipped or wiped, but are more often left rough. Rims are generally simple and upright, with rounded and flattened forms prevalent. More elaborate forms are scarce, but include rims with a slight bevel, thickened forms, 'T'-shapes, and closed rounded types. Decoration on the tops of rims is limited to either fingertip or nail impressions. Body sherds can have fingertip impressions on the shoulder, below the rim or elsewhere, incised horizontal lines, raised bosses, and pinched-up or applied cordons, some of which are decorated with fingertip or nail impressions. Pre-firing perforations sometimes occur below the rim.

Barrel-shaped jars were first defined by Calkin (1962, 19-24) as convex-bodied, with more or less concave necks, flat or internally-bevelled rims (some expanded outwards), and either plain or decorated at the shoulder or rim with fingertip or nail impressions. Lugs are entirely lacking, but fine horizontal and vertical cordons are common. The most characteristic features were the thinness of the wall, the finer flint temper, and the often-vesicular fabric.

Globular vessels generally represent the fineware component of the Deverel-Rimbury tradition, with better finished (nearly always smoothed, some burnished) surfaces, thin walls and much finer, better-sorted temper. As the name suggests, vessels tend to be bulbous, and can have pronounced necks. Size and capacity again varies, from 3,000 to 35,000 cm^3. Rims are predominantly simple, upright and flat, some with a slight bevel. A few bevelled rims are slightly everted. Decoration consists mainly of tooled or incised lines forming geometric motifs dominated by zigzags between horizontal lines, while some sherds have slight, pinched-up cordons. Opposed lugs are also common.

Deverel-Rimbury ceramics are well represented in Essex (Brown 1995b). In general terms, assemblages divide into two types, with cremation cemeteries in the north-east containing large quantities of complete or near-complete Ardleigh-type vessels, while settlements in central and southern Essex are typified by vessels belonging to Ellison's Lower Thames Valley group (Ellison 1975; 1980). The main characteristics of Ardleigh-type vessels and assemblages include horseshoe handles, fingertip rustication, a variety of decorative motifs, the presence of globular vessels, the frequency of grog as a temper and (more generally) the occurrence of large cremation cemeteries. Central and southern vessels and assemblages on the other hand tend to be typified by applied cordons, finger-impressed rims, single horizontal rows of fingertip impressions on the body, an absence of globular forms, the presence of stamp-decorated bowl-like forms, the absence of grog as a temper, and the isolation of ring-ditches and funerary deposits.

The Stansted assemblage does not fit exclusively in either group. Only one of the vessels is of Ardleigh type, but the assemblage contains finewares - the absence of which is a defining factor of the Lower Thames Valley group (Ellison 1975) - and has no stamp-decorated bowls. The very low incidence of grog temper on the other hand allies the assemblage to the south/central group. Both horseshoe handles and applied cordons are present, and grog is very scarce. In his discussion of Essex Deverel-Rimbury ceramics, Brown excluded the four known sites in north central Essex from his discussion, as "the location of the sites makes it uncertain to which group they belong" (Brown 1995b, 133 n7). The Stansted material belongs to this anomalous group (which includes Shalford, Bocking, Braintree and Bulmer Tye), as does the group of sites on the A120 (Every 2007).

These uncertainties aside, the Stansted pottery is clearly a domestic assemblage. Settlement sites in Essex are not common, and in 1996 Brown was able to identify only a single possible Middle Bronze Age building, from Howells Farm (Brown 1996, 26). One recurrent feature of the known settlement sites is placed deposits of ceramics in pits, rather than simple rubbish disposal (Brown 1996, 27), and the Stansted material again conforms to this pattern, indicating a further link with Lower Thames Valley type assemblages.

In terms of chronology, the most closely dated material is the Ardleigh assemblage from Brightlingsea, where five dates span the range 2199 – 1270 BC at 98% confidence (Brown 1995b, 128). These dates can be associated with grog-tempered, horseshoe-handled, highly decorated Ardleigh Urns, which on this basis would belong as much in the Early as the Middle Bronze Age. Later vessels seem to lose all three of these features, and Brown suggests that later pottery from the northern area becomes more similar to the southern and central material (*ibid*., 129), or indeed that the southern and central material is itself later. Dates for the southern central group span the range 1600 – 930 BC (*ibid*., 130-1). The dated Stansted material falls in the range 1,413 – 1,122 BC.

The Stansted assemblage as a whole spans the period 1700 – 1100 BC. This range begins rather earlier than would be expected for a Lower Thames Valley assemblage, and it is highly significant that two of the earliest dates - 1690 – 1520 cal. BC (NZA23237) and 1610 – 1430 cal. BC (NZA23242) - are associated with material from the lower fills of the barrow ring ditch on the MTCP. Fills immediately above those providing the dates contained the only Middle Bronze Age grog-tempered pottery from the excavations. Although the quantity of sherds is small, and the determination a *terminus post quem*, it is notable that this early date is associated with one of the indicators of Ardleigh-type ceramics, in a context that would be entirely usual for such vessels in the Ardleigh core area.

Pottery in direct association with these radiocarbon dates consists of 25 plain body sherds of a coarse bucket-shaped vessel in FL30 (several of which have burnt residues on the interior). Eight sherds of a globular vessel in FL31 are in a similar early stratigraphic position.

The rest of the assemblage falls in the range of 1520 – 1122 cal. BC, entirely within the range of both Ardleigh and Lower Thames Valley assemblages elsewhere in Essex.

<u>Chronology and phasing</u>

The series of radiocarbon dates from broadly Middle Bronze Age features provides the opportunity to bring a finer chronological resolution to the contemporary ceramics, and by extension to features which are otherwise undated.

Periods
Correlating the dates with the fabric groups associated with them allows the formulation of a three-period chronology of Early to Middle Bronze Age settlement at Stansted.

Period 1 – c. 1700 cal. BC – c. 1500 cal. BC
Period 2 – c. 1500 cal. BC – c. 1300 cal. BC
Period 3 – c. 1400 cal. BC – c. 1100 cal. BC

Each period can be identified by a *fabric type assemblage*, the second and third of which add to the existing suite of fabrics (Fig. 17.5).

Period 1 clearly falls within the Early (rather than Middle) Bronze Age, but the associated ceramics belong unequivocally to the Deverel-Rimbury series. The material in question is that from the barrow and surrounding ditch on the MTCP, and a number of possibilities arise: either the dates and ceramics are correct and contemporary, indicating a potentially early beginning for Deverel-Rimbury in the area; the true date of the deposit lies at the upper end of the range, towards 1500 cal BC; or some archaeologically invisible process has resulted in the ceramics and the timber from which the date was obtained ending up in the same deposit. This latter is possible if – for instance – the timber derives from some structure or component within an Early Bronze Age mound, into which Deverel-Rimbury ceramics were inserted at the beginning of the Middle Bronze Age, subsequent to erosion or deliberate levelling removing mound deposits (containing both timber and pottery) into the ditch.

Periods 2 and 3 are securely Middle Bronze Age, and contain the standard Deverel-Rimbury ceramic suite, dominated by large bucket-shaped vessels with a much smaller quantity of globular types. General trends observable through time include the slight increase in quartz-tempered fabrics, the thinning of vessel walls, and the proliferation of decorative techniques. Both globular and bucket-shaped vessels show form changes over time, both within fabric groups and with new forms introduced with new fabrics.

Forms

Bucket-shaped vessels

The progression of bucket-shaped vessels is difficult to typify, due to the small numbers of diagnostic forms in Periods 1 and 2. However, Period 1 (FL30) ceramics generally have thick walls, flat rims and are not decorated.

In Period 2 bases with and without feet are present. FL30 remains undecorated, but FL32 has applied cordons with finger-tip impressions, while FL33 has applied cordons with linear grooves, and fingernail or tip impressions on rims, which are either flat and upright or pointed and out-turned.

Period 3 contains the greatest form changes. Decorative schemes proliferate, with applied horseshoe and straight cordons (some straight examples decorated with finger-tip impressions), finger nail impressions on rim tops and outside edges, and finger tip impressions on bodies. New fabric FL47 has pinched-up cordons. Rims similarly become more varied, with flat, round, expanded and 'T'-shaped forms, on upright, out-turned and closed vessels.

The most immediately obvious addition to the repertoire in Period 3 is the series of small (often 'knobbed') cups and/or dishes, mostly in FL30 but also in FL32 and FL33. These are small and thin-walled, and there is a similar thinning of walls in most fabric groups (although thick-walled vessels remain).

Globular Vessels

Over time a number of changes are visible within the Globular series. There are both new form traits associated with new fabrics (feet on FL51 vessels for instance) and form changes within fabric groups through time.

FL31 vessels begin in Period 1 as relatively thick-walled, with strong demarcation of the bipartite form, and simple decorative schemes at the shoulder. Bases have no feet.

In Period 2, FL31 vessels remain strongly bipartite, but the shoulder is now marked by a pinched-up cordon and walls are thinner. FL51 vessels have bases with feet. Walls are generally thinner. Rims are upright and rounded or flat.

In Period 3, vessels can be very thin walled. Decorative schemes are dominated by panels of chevrons between horizontal lines. Rim forms become more elaborate and varied (everted, flat, inturned, rounded, 'Y'-shaped), and forms are much more weakly bipartite, or even bulbous. These changes apply to all fabrics.

Distributions

Having identified both *period type assemblages* and *chronologically significant forms*, it becomes possible to examine assemblages from undated features. An assemblage size of >24 sherds was set as the necessary minimum, and assemblages with non-Deverel-Rimbury components (typically Later Bronze Age or historic fabrics) were only included where the later materials were in very small quantities (<3 sherds weighing <5g) or were clearly intrusive from later features cutting Middle Bronze Age ones.

Nine features were identified with assemblages fulfilling these criteria. In combination with the radiocarbon determinations, these give a sequence of settlement across the airport, as in Figure 17.6.

<u>Late Bronze Age pottery (Fig. 17.4, nos 22-29)</u>

The Late Bronze Age marks a decline in the quantities of ceramics recovered from the sites, both in terms of sherd numbers (2,029 compared to 3,093 Middle Bronze Age sherds) and more particularly total weight (14,632 g compared to 27,605 g Middle Bronze Age). There is however a marked continuity in type: the Late Bronze Age ceramics all belong to the so-called 'post-Deverel-Rimbury' tradition, in which plainware assemblages tend to become increasingly decorated (although the material is for the most part almost entirely plain). The chronological relationship between the Deverel-Rimbury and post-Deverel-Rimbury traditions need not be as straightforward as the names suggest, as there is some evidence that Deverel-Rimbury ceramics remained in currency in Essex into the Late Bronze Age (Brown 1996, 29 and see below).

Late Bronze Age ceramics were recovered from five sites: SG (11 sherds weighing 23 g), FLB (14 sherds weighing 35 g), LTCP (238 sherds weighing 938 g), MTCP (743 sherds weighing 4,500 g) and M11 (1,027 sherds weighing 9,147 g). When comparison is by site, rather than by the assemblage as a whole, the decrease in quantities from Middle to Late Bronze Age can be seen on the FLB, LTCP and MTCP/SG sites. On the M11 site however, the sherd count increases dramatically (from 162 to 1,027), suggesting a shift in the main focus of activity from the south-eastern limit of the BAA landholding to the south-western area.

The assemblage has been divided into ten fabrics, five flint-tempered (FL34 – 38) and five sandy (QU26, QU27, QU32, QU49 and QU50). The flint-tempered fabrics are mostly coarsewares, although there is some variation in wall thickness and surface finish within fabric groups, and FL36 and 37 are also present as a limited number of fineware sherds. Sandy fabric QU32 is a fineware, QU49 and QU50 are coarsewares, and QU26 and QU27 occur as both coarse and fine vessels, finewares in general having more effort expended over the preparation of temper, surface finish and (rarely) decoration.

Most vessels are represented by a limited number of body sherds which preclude the assignation to form (FL34 for instance is represented by a single plain body sherd). The only distinguishable sherds are a portion of a flat-topped lug or handle in fabric FL36, which appears to belong to a coarseware jar, and a second handled jar in FL35 (parallels for this form come from North Ring, Mucking (Bond 1988) and Lofts Farm (Brown 1988)). One abraded sherd has a pair of incised parallel lines that may identify it as a Class IV bowl (Barrett 1980). These are usually well finished, but the sherd from Stansted is abraded and too little of the outer surface survives to allow identification of any treatment. A second abraded shouldered sherd in the same fabric has a row of possible fingernail impressions. A third sherd in this fabric is carinated, with a short neck and probably everted rim (the rim is missing). 12 sherds in fabric FL36 belong to a bowl (probably of Barrett's Class III as the fabric is reasonably coarse) with a simple slightly inturned rim and decoration consisting of at least one horizontal incised line on the body of the vessel. Two angled body sherds in fabric FL36 are perhaps from fineware bowls of Class IV. A heavy flat base with a foot marked by diagonal finger impressions in fabric FL37 has a possible parallel form in a grog-tempered vessel at the Broomfield enclosure (Atkinson 1995), and similar forms occur at Runnymede Bridge (Needham 1991). In both instances the bases belong to coarse jars. A simple plain upright rim in fabric FL36, another in FL37, two rims in fabric FL38 (two sherds upright and internally bevelled, one pointed and in-turned), and a simple everted rim in fabric QU27 all come from fineware vessels, probably bowls. The two near-complete FL35 vessels from the M11 site are plain coarseware jars with smooth shoulder and neck profiles, upright rims, and flat bases. The majority of reconstructable forms appear to be bipartite.

Distribution

<u>SG</u>

Only 11 sherds were recovered, weighing 23 g, in five fabrics (FL35, QU26, QU27, QU32 and QU49). Most sherds were residual in later features.

<u>FLB</u>

Only 14 sherds weighing 35 g in FL35, QU27 and QU32 were recovered from FLB, from two Late Bronze Age ditches. The material is probably refuse or midden material used in manuring.

<u>LTCP</u>

The distribution of the Later Bronze Age pottery on LTCP again reflects the low number and small average sherd weight of the assemblage: few sherds or groups of sherds came from features of Late Bronze Age date, most being residual in later deposits. Of those that were recovered from Late Bronze Age features, most were scattered across the excavated areas and not associated with any concentrated settlement evidence. The exceptions to this pattern include a scatter of pits around a pair of post-built structures at the north end of the LTCP site. One of these pits contained three sherds from two vessels, all of which were very small and can probably be considered as chance inclusions. Perhaps more significant is the assemblage from a group of features associated with a burnt mound and palaeochannel at the south end of the same trench. Although the sherd count was again low, with only six recovered, the sherds were much larger (9.5 g average) and the range of vessels greater: two were coarsewares in FL35, while the third was a fineware bowl in QU27.

MTCP

Most Late Bronze Age pottery from the MTCP site was recovered from features within the area of the Middle Bronze Age settlement, and from boundaries and other features in the surrounding landscape. Within the settlement area, many Middle Bronze Age features showed a continuity of use into the Late Bronze Age. Interestingly, the main waterhole immediately east of the settlement contains very little Late Bronze Age pottery (two sherds weighing 6 g from early weathering deposits, likely to be intrusive), whereas the smaller waterhole within the settlement contains rather more. This feature (323001) contained small portions of four Late Bronze Age coarseware vessels in FL35, FL36, FL37 and QU27, all recovered from deposit 323003, which is considered to have formed as a result of episodic dumping over a prolonged period. The significance of the waterholes has been discussed previously; if settlement continued into the Late Bronze Age on the MTCP site then some continuity of depositional practice could perhaps be expected also.

It is however incontrovertible that new forms of deposition were adopted at this time. A small group of five pits 174 m north-east of the settlement contained a range of material including animal bone, burnt and worked flint, fired clay and (in one instance) a small fragment of human bone. The two smallest features (316092 and 316094) contained either no pottery or a very limited number of very small sherds (nine weighing nine grammes), and another (309228) had only a single sherd weighing one gram in an assemblage otherwise limited to some struck flint. This feature may have been associated with the other four pits in some way, rather than being a depositional locus in itself.

The two remaining pits contained much larger quantities of pottery. 316085 contained fragments of six coarse vessels in FL35, FL36, FL37 and QU26, and two finer vessels in FL36. Most were represented by small groups of sherds which could not be identified to form, with the exception of the FL35 vessel, which was a jar. None of the vessels were deposited complete, as rim and angled body sherds were under-represented and there were no bases. Context 334059 contained fragments of six coarse jars in FL35, FL37, QU27 and QU49, and four fine vessels in QU32 and QU50. The coarse jars in FL37 and QU 49 were both represented by substantial numbers of body sherds, but once again rims and bases were under-represented or absent. The FL35 and QU27 vessels were represented by no more than three plain body sherds each. The fineware vessels were presented somewhat differently: the QU32 pot was represented by two rim sherds, while the three vessels in QU50 were represented by rims, body sherds and bases. The form of these was probably bowls. Three of the vessels (two coarse jars and a fine bowl) were decorated: a jar in FL37 with fingertip impressions on the shoulder, a bowl in QU50 with fingertip impressions on the rim and shoulder, and a vessel in QU49 with an incised horizontal line above the base.

<u>M11</u>

The M11 site was typified by the occurrence of Late Bronze Age pottery in features which were dated to the Middle Bronze Age or Early Iron Age. In part this is an effect of residuality and intrusion, but is equally the result of the attempt to delineate bounded ceramic traditions which in fact cross period divisions. Even so, a number of features could be more confidently identified as Late Bronze Age, and as in preceding periods these were clustered in the northern third of the site.

Many of these features contained small quantities of ceramics in terms of both sherd counts and weights in simple depositional contexts, and these can be considered as chance inclusions or simple waste. Three sets of features however contain either significantly greater sherd counts and weights, or more complex depositional patterns, and these are likely to have resulted from more formal sets of activities.

The first of these is a waterhole (430084) where 62 sherds weighing 1,116 g were recovered from various fills of the feature. The first episodes of deliberate deposition contained no pottery, but from the fills above them came a substantial portion of the base and body of a handled coarse jar in FL38 (from context 430063). This vessel had a base with a marked foot decorated with finger impressions, and had been deposited as a group of very abraded sherds. The anthropogenic materials in the fills of this stratigraphic group have been interpreted as casual or coincidental inclusions, but the nature of the pottery in 430063 makes this unlikely, and it is more probable that the deposits are of a similar nature to those in Middle and Late Bronze Age waterholes on MTCP. A later layer of deliberate backfill (separated from the former by a weathering layer) contained two sherds from a coarse jar in FL35 (from context 426033). A further small group of sherds from the final phases of waterhole silting came from FL35 vessels, and are more likely to represent accidental inclusions.

The second notable depositional context consists of two pairs of small pits. In each case, one of the pair contained a range of materials dominated by a very substantial quantity of pottery: pit 423113 contained 231 sherds weighing 3,533 g, and pit 423161 447 sherds weighing 2,807 g. In both instances single vessels were represented almost complete, and they had very probably been deposited as whole pots. Both of the vessels were plain coarseware jars in FL35, with smooth shoulder and neck profiles, upright rims, and flat bases. The accompanying pit of each pair contained the same suite of materials, but with virtually no pottery.

These paired pits, in which whole or nearly whole vessels were placed into the ground, have been found elsewhere in the Stansted area at the Social Club (SCS), Bury Lodge (BLS), Car Park (CIS), and particularly Duckend Farm (DFS) sites (Havis and Brooks 2004). At DFS, two pits produced large parts of three Late Bronze Age jars (*ibid*.).

Discussion

For the last quarter of a century, analyses of Middle and Late Bronze Age ceramic sequences in southern and eastern England have followed the model proposed by John Barrett, in which Deverel-Rimbury ceramics typifying the Middle Bronze Age are succeeded by post-Deverel-Rimbury traditions which continue into the Early Iron Age

(Barrett 1980). The most recent synthesis of Bronze Age chronology places the floruit of the Deverel-Rimbury series between the 16th and 12th centuries, with post-Deverel-Rimbury beginning as a largely undecorated style in the 12th century; decoration becomes prevalent by the 8th century (Needham 1996).

The emergence of Late Bronze Age ceramic traditions however remains poorly understood, both in terms of chronological position and the mechanisms through which the various Deverel-Rimbury traditions were replaced by the so-called post-Deverel-Rimbury plain ware assemblages, and by other less clearly understood traditions.

The Stansted excavations have provided a number of ceramic sequences which include Deverel-Rimbury and Late Bronze Age traditions[2] in closed and dated stratigraphic groups. These provide an opportunity to further examine this change, to place it in a local chronological scheme, and perhaps to investigate the circumstances in which this change was taking place and to which it contributed.

The apparent spread of Middle Bronze Age settlement across the airport raises the question of continuity into the 11th century BC and the Late Bronze Age. In ceramic terms, this is one of the most difficult periods to identify, as there are no agreed criteria for identifying assemblages falling between standard Deverel-Rimbury types and fully Late Bronze Age ceramics.

Elaine Morris has recently highlighted these problems in her discussion of the Green Park, Moore's Farm and Reading Business Park ceramics (Morris forthcoming). She provides a 'checklist' of holes in our understanding of this period:

Do Middle and Late Bronze Age types occur together, suggesting that 'post-Deverel-Rimbury' is an inaccurate label?

Can the two types be contemporary, either through curation of Middle Bronze Age forms or processes of transformation?

Are some Late Bronze Age assemblages more like Middle Bronze Age ceramics in their fabrics, forms and uses?

Are there regional variations?

She argues that it is "surprisingly common" to find assemblages of Middle Bronze Age pottery in association with atypical Late Bronze Age material belonging to a "long and variable continuum of transition" (*ibid*.). Her discussion of this transition in the Thames and Kennett valleys identifies a series of forms which occur in association with – but which in her terms are not – Deverel-Rimbury ceramics. The available radiocarbon dates for this group are singularly unhelpful in attempting to date the occurrence of types, but it is notable that some of the features Morris identifies

[2] The question of how to refer to Late Bronze Age ceramics remains a vexed one. Current convention is to distinguish between an early, undecorated phase of post-Deverel-Rimbury (dated in Needham's chronology to the period 1150 – 950 cal BC) succeeded by a decorated phase which had developed by the mid-8th century, and which is therefore properly Early Iron Age (Needham 1996). The reaction against the post-Deverel-Rimbury nomenclature is not new, but the label is not as misleading as is sometimes claimed, since it refers to a ceramic tradition which developed *after* Deverel-Rimbury had been the dominant tradition for some centuries, but which did not necessarily *replace* it. A greater problem is the way in which the label subsumes the variety which has become apparent in Late Bronze Age ceramics.

(thinner walls, finger-tipping on rims) are also features of Middle Bronze Age Period 3 identified at Stansted.

It is undoubtedly the case that the changes in fabrics and forms manifested in Stansted's Middle Bronze Age Period 3 presage the emergence of fully Late Bronze Age ceramics. There are however surprisingly few instances where demonstrably Period 3 features also contain standard Late Bronze Age plain wares. An ostensible disjuncture is surprising given the arguments advanced here and elsewhere for a *continuum* of ceramic development, and the demonstration of a process of change through the Middle Bronze Age. This is discussed further below.

Dating

Given the spread of Middle Bronze Age settlement across the airport, it is again surprising that it is only on the MTCP site that there is any significant quantity of Period 3 Middle Bronze Age and Late Bronze Age ceramics occurring together. On the LTCP, FLB, and M11 sites, only single features contain both types.

On the MTCP sites, 13 features contain both Middle and Late Bronze Age pottery. Of these, five contain over 24 sherds. It is probable that only two of these (pits 303015 and 303036) actually date to this transitional period, which may be significant given their proximity to ***Roundhouses 8 and 9***. A single radiocarbon date for a deliberate backfill mid-way up the sequence in the former pit places that event in Period 3 of the Middle Bronze Age.

What is interesting is that the majority of the features (whether or not they contain significantly sized assemblages) with Middle and Late Bronze Age pottery mixed through the stratigraphic sequences only contain a single fabric identified as Late Bronze Age (FL36) among Period 3 Middle Bronze Age assemblages. Five very small sherds of this fabric were associated with the Period 3 date from 303015, while two much larger sherds in the same fabric came from the context below, suggesting that FL36 begins as a component of the Middle Bronze Age Period 3 assemblage which is in fact the only recognisable element of a new ceramic that is a move towards – but is not yet – Late Bronze Age plain wares.

Late Bronze Age fabrics FL35 an FL38 appear in the uppermost fills of some of these features, and are perhaps the earliest true Late Bronze Age fabrics. The significance of these two fabrics is increased as they are both represented in the upper fills of intervention 430068 (waterhole 430084) on the M11 site. This feature has FL38 sherds from a handled coarse jar with a base with a marked foot decorated with finger impressions in a tertiary silting episode above stakes dated 1410 – 1210 cal. BC. Later fills contain only FL35 sherds.

Other forms are almost impossible to detect. One vessel has a flat base with a rounded wall/base junction; one has a flat-topped, tapering plain upright rim; walls are generally thin (one is burnished internally); the only observable profile is rounded.

Late Bronze Age

Late Bronze and Early Iron Age traditions are generally understood in terms of the six-fold class division proposed by Barrett (1980, 302-3). Class I in this scheme is the most frequent component, which includes coarseware jars, either plain or with applied cordons and finger impressions. Class II vessels are fineware jars with better surfaces and complex decoration. Bowls are represented by Class III, which are coarse, and the more frequent Class IV, which are well-finished. The bowls represent a "marked departure from the Deverel-Rimbury tradition" of large bucket, barrel and globular vessels (Barrett 1980, 302). Class V vessels are very scarce, being small cups. The remaining component identified by Barrett consists of dishes or lids.

In general Late Bronze Age assemblages in Essex are dominated by coarseware jars, with fineware bowls the second most common form. This is true across the county, with no suggestion of the regionalism evident in the varying Deverel-Rimbury traditions. Fabrics begin as predominantly flint-tempered, with an increase in sand temper through time.

All of these traits can be paralleled in the Stansted assemblage, but it is difficult to find exact parallels between sites, as individual assemblages tend to include numerous variations on the basic form types. Dating on the basis of parallels with Broads Green (Brown 1989) and Springfield Lyons (Brown 1987) would place the assemblage in the 9th –8th centuries.

However, the dating of the Stansted ceramics as currently understood does not support such a chronology. There are two groups of dated ceramics, one beginning in Middle Bronze Age period 3 and no longer apparent by the end of the 11th century, the second not emerging until the 8th century and continuing into the Early Iron Age. If short radiocarbon chronologies are used, the Late Bronze Age vanishes almost entirely, at least in ceramic terms.

The identification of FL36 as more properly belonging in Middle Bronze Age Period 3 – and the suggestions that FL38 and FL35 lie at the beginnings of the Late Bronze Age plain ware sequence are supported by a single radiocarbon date of 1260 - 1010 Cal BC (Oxford-OxA-15389) for pit 334059 on the MTCP, which dates the majority of the other Late Bronze Age fabrics (FL35, FL37, QU27, QU32, QU49 and QU50).

As noted above, this pit is particularly interesting as it contains a large ceramic assemblage containing six coarse jars (represented mostly by body sherds) and four fine vessels, at least some of which are bowls (represented by rims only or as near-complete pots). Two coarse jars were represented by substantial numbers of body sherds, but rims and bases were under-represented or absent. The others were represented by no more than three plain body sherds each. The fineware vessels were presented somewhat differently: one pot was represented by two rim sherds, while three vessels (probably bowls) were represented by rims, body sherds and bases. Three of the vessels (two coarse jars and a fine bowl) were decorated: a jar with fingertip impressions on the shoulder, a bowl with fingertip impressions on the rim and shoulder, and a vessel with an incised horizontal line above the base. A neighbouring pit has an assemblage containing six coarse and two finer vessels, both types represented by small sherd groups, without bases and with too few rims.

These pits (along with a third containing a single sherd of unidentifiable pottery and two smaller features containing cremated bone) are situated a considerable distance away from the Middle Bronze Age settlement. There is in fact no ceramic evidence that activity in or around the Middle Bronze Age settlement on the MTCP site survived beyond the end of the 11th century. With the exception of FL34 and FL38 (which remain without direct dates) every Late Bronze Age fabric is contained in 334059 or its undated pair. Where these same Late Bronze Age ceramics do occur on the settlement on the MTCP site, they tend to be in the upper fills of silting-up features (including roundhouse ring-gullies), suggesting that these had been abandoned by this time. The point at which the settlement was abandoned *may* be dated by the burial of the large stone in pit 320046, dated to 1050 – 830 Cal. BC (NZA20916). Such an abandonment would account for the absence of convincing Middle Bronze Age 3 – transitional – full Late Bronze Age ceramic sequences in individual features, and the total lack of assemblages dated to the 10th and 9th centuries.

On the basis of pottery it is difficult to argue for dense settlement anywhere within the excavated areas. Activity is best attested at the westward limits of the excavations, on the LTCP site, where a burnt mound and a scatter of pits and postholes contain Late Bronze Age ceramics; and on the M11 site, where a similar pit scatter is situated near a waterhole. On the MTCP site, a number of small pits contained large quantities of pottery.

Only on the M11 site is there any indication of continuity in ceramic type. Fabric FL35 on that site is dated to 790 – 410 cal BC (NZA23239); predominantly Early Iron Age. This anomaly is probably due to FL35 being the commonest of the Late Bronze Age fabrics, undoubtedly of local manufacture, and probably not very chronologically significant after its initial appearance. A very large proportion of assemblage groups on the M11 contain large quantities of FL35, and although undated, these are likely to be transitional Late Bronze Age/Early Iron Age.

Early Iron Age (Fig 17.7, nos 30-32)

The perceived decline in ceramics during the Late Bronze Age continues into the Early Iron Age, with only 863 sherds weighing 4,343 g recovered. No Early Iron Age pottery was found on the FLB site; two sherds weighing one gram came from NP; three sherds weighing 13 g came from SG; 90 sherds weighing 276 g came from the MTCP site; 178 sherds weighing 536 g were recovered from the LTCP site, and 590 sherds weighing 3,517 g from the M11 site.

Eleven fabrics were identified. The sandy fabrics which emerged in the Late Bronze Age had become predominant by the Early Iron Age (a phenomenon noted across Essex by Sealey (1996, 47)), and are represented by QU28, QU29, QU30, QU31 and QU57. Flint fabrics continue in smaller numbers as FL23, FL27, FL39 and FL40, and shell-tempered fabrics emerge for the first time as SH2 and SH3.

As with the Late Bronze Age assemblage, much of the Early Iron Age material is too fragmentary to allow forms to be reconstructed. The diagnostic pottery of the Early Iron Age in Essex belongs to Cunliffe's Darmsden-Linton style zone (Cunliffe 1991, 76), typified by carinated tripartite bowls (Sealey 1996, 47). Examples of similar bowls were recovered from LTCP. A flared rim sherd in fabric QU28 is from a bowl with a shoulder decorated with at least one horizontal groove. Two rims and a carinated sherd in fabric QU29 and a carinated, grooved shoulder in FL39 are from similar vessels. Neither is complete enough to confidently identify the tripartite form, but a tentative assignation to the Darmsden-Linton style is possible. A sherd in fabric QU31 has three incised horizontal lines that are comparable to Darmsden-Linton style decoration. The two rims in fabric FL40 are similar to a jar with a round or slightly angular shoulder, concave neck and everted rim from Lofts Farm (Brown 1988, 268 no 73). The 144 sherd of a vessel in fabric QU29 are from a shouldered jar or bowl with a slightly flaring rim and relatively short neck. The SH3 vessel from MTCP probably also belongs to the Darmsden-Linton tradition, being a small shouldered bowl. On M11 the forms appear to be mainly coarse jars and fineware carinated bowls of probable Darmsden-Linton type. At least one bowl with a pedestal base from context 424005 on M11 is of a type more common in the south of the Essex (Brown, 1996, fig 2).

Distribution

<u>MTCP</u>

On the MTCP site, two transitional Late Bronze Age/Early Iron Age pits contained quantities of Early Iron Age ceramics. Pit 1752 contained five small sherds weighing 6 g, from a vessel in QU31. Pit 340004 contained six sherds weighing 15 g from a vessel in FL40, and 53 sherds weighing 94 g from a vessel in QU31. The rest of the assemblage was residual material recovered from later features, and included four sherds from a Late Iron Age ditch (intervention 323025, ditch 344347) in shell-tempered fabric SH3.

<u>LTCP</u>

Early Iron Age ceramics were mostly recovered as residual sherds from later contexts, including three sherds in shelly fabric SH2, and 144 sherds weighing 391 g from a single vessel in QU29. These last were found in a Mid/Late Iron Age gully (intervention 114056, gully 102096). Only three pits and one linear feature of Early Iron Age date produced contemporary ceramics, and these were dispersed across the excavated areas. Six sherds weighing 34 g in QU28 came from intervention 137016, ditch 150070. These derived from a shouldered vessel with a short neck.

<u>M11</u>

Early Iron Age pottery was recovered from two significant groups of intercutting pits. The first lay in the north-west corner of M11 and consisted of features 436073, 436102, 436103, 436088, 436105, 436085, 436106, 436107 and 436091, with 436097 and 436099 close by but not stratigraphically connected. All except 436097 and 436106 contained ceramics. Two earlier pits in the sequence are at least Late Bronze Age in date, and it is probable that the whole group lies at the transition of the Bronze and Iron Ages, since all of the vessels from the pits are in flint-tempered fabrics (FL27, FL39 and FL40).

The second group of pits lies on the eastern edge of the site, and the stratigraphic relations of features are unfortunately less clear, as the range of fabrics is greater. 424007 contained both flint-tempered and sandy fabrics (FL23, FL39, QU57); 436005 and 436009 contained FL39 only; and 442014 and 443008 contained FL27 and FL39. The low incidence of sandy fabrics (38 sherds weighing 548 g, probably representing a single vessel) again suggests that this group of features should be dated to the Bronze Age/Iron Age transition.

The suggested chronology of flint-tempered Iron Age ceramics being replaced by sandy fabrics is supported by the sherds from intervention 435074, ditch 430082. This feature is dated to the Middle Iron Age, and contains only a single flint-tempered sherd in FL39, along with 74 sherds in QU28.

The ceramics from these pit groups and ditch are too abundant to be chance inclusions or accidental deposition, but the fragmentary condition and random distribution of sherds throughout the feature fills suggests that it results from simple refuse disposal rather than more from more formal depositional practice. The vessel forms from these features include large, open, carinated bowls, best typified as serving rather than cooking vessels. None of the vessels have any sooting or burning on the exteriors.

Discussion

There are two main problems in understanding the change from Late Bronze Age to Early Iron Age assemblages at Stanstead. The first is practical, and lies in distinguishing between Late Bronze Age and Early Iron Age fabrics when only featureless body sherds are represented. There is a *general* trend away from flint as the main tempering agent throughout the Late Bronze Age and Early Iron Age, and an associated increase in the proportions of sand- (and, in the Early Iron Age, shell-) tempered wares, but only shell is unique to the later period. Forms could be of more assistance in separating the two periods, but as with the Late Bronze Age assemblage, much of the Early Iron Age material is too fragmentary to allow forms to be reconstructed. In ceramic terms, the Early Iron Age is under-represented.

The second problem is chronological. We may expect that the Late Bronze Age plainware assemblages were reaching the end of their currency by 750 cal. BC (Needham 1996, 136), placing the change from plain to decorated Post-Deverel-Rimbury around the traditional Late Bronze Age to Early Iron Age transition. At Stanstead, there are no dated assemblages in the 10th or 9th centuries, and 11th and 8th century assemblages rely on the extremes of the 95% confidence range. It is possible therefore that fully Late Bronze Age assemblages are distinguished by their absence, making the understanding of the change to the Early Iron Age almost impossible.

In terms of the ‘style zones’ of Early Iron Age pottery identified by Cunliffe, the diagnostic Essex material in this earliest Iron Age belongs to either the Kimmeridge-Caburn or West Harling – Staple Howe groups of 700 – 600 BC, both typified by bipartite bowls and sharply shouldered jars with finger tip or nail impressions

(Cunliffe 1991, 66-8). These are succeeded by the Darmsden-Linton type (Cunliffe 1991, 76), of 600 – 400/300, typified by carinated tripartite bowls (Sealey 1996, 47) with grooved shoulders and (sometimes) footring bases. Other bowl forms and shouldered decorated jars occur (Cunliffe 1991, 76).

Cunliffe states that “the ceramic development of eastern England is surprisingly ill-understood” (*ibid*.), and this situation is exacerbated by the radiocarbon plateau of 800 – 400 cal. BC, which has the effect of flattening chronologies and rendering temporal sequences invisible.

These three factors (lack of diagnostic forms, chronological uncertainties, poorly-understood regional traditions) combine to make the transition from the Late Bronze Age to Early Iron Age almost impossible to detect within the ceramics. The currently available radiocarbon dating is limited by being based on only two determinations. Pit 423113 on the M11 site dated to 790 – 410 Cal. BC (NZA23239), and contained 231 sherds weighing approximately 3.5 kg, which represented a round-shouldered coarse jar. The profile and fabric (FL35) are both more comfortably Late Bronze Age than Early Iron Age. Pit 436091, also on the M11 site, dated to 800 – 520 cal. BC (NZA23240), and contained a small assemblage of 59 sherds weighing 542 g in four fabrics (FL27, FL39, FL40 and QU31), all of which are soundly Early Iron Age types.

These chronological peculiarities are paralleled on the Stansted Project excavations’ Social Club site (Havis and Brooks 2004 and above), where two adjacent pits gave dates of 1130 – 800 and 790 – 410 cal. BC. The ceramics from the latter include both plain and decorated Post-Deverel-Rimbury styles, and are therefore Earliest Iron Age, as the determination allows; the assemblage from the former however contains Darmsden-Linton, and is therefore dated some centuries too early (Brown 2004).

Parallels for this material are found across the whole of Essex, although not in any great quantity (Sealey 1996, fig 1). Brown noted the emergence of shell-tempered fabrics in the Early Iron Age at North Shoebury (1995a, 83), seen at both Stansted and in small quantities elsewhere (Sealey 1996), perhaps indicating similarities across the county, although the lack of haematite-coated wares from Stansted belies the seeming uniformity between assemblages. Drury suggested that groups characterised by Darmsden-Linton forms centred on the 5th century (1980b), with a date range of *c* 650 – 350 BC (Sealey 1996). Darmsden-Linton forms span the Early Iron Age: at Lofts Farm, an assemblage of such pottery was found in the upper fill of a Bronze Age well (Brown 1988), which Sealey has suggested dates to the late 7th century (1996, 47). Similar ceramics were found at the Stansted Airport Social Club Site, amongst an assemblage of contemporary pottery paralleling Darmsden-Linton forms (Brown 2004), where the forms suggested late developments of the 4th century (Sealey 1996, 47).

Middle Iron Age (Fig. 17.7, nos 33-38)

Middle Iron Age pot amounted to 1,569 sherds weighing 10,731 g, recovered from SG (51 sherds weighing 425 g), NP (100 sherds weighing 1, 554 g), MTCP (120 sherds weighing 1,626 g), M11 (345 sherds weighing 2,192 g), and LTCP sites (953 sherds weighing 4,585 g).

By the Middle Iron Age the sand-tempered tradition of the Early Iron Age had become exclusive: all 18 fabrics have quartzite or quartz sands as the predominant temper (QT1; QU33 – QU48 and QU51). This pattern of succession is seen across Essex, with sites in the north lacking the Glauconite temper found in the south of the county (Sealey 1996, 50).

The Middle to Late Iron Age transition is difficult to identify within the ceramics, and an arbitrary division in terms of the change from sandy to grog-tempered fabrics has been used to separate the Stansted material.

Amongst the quantities of featureless body sherds are some which support the Middle Iron Age date indicated by the fabrics through comparison of forms present in larger assemblages. The primary comparanda are from Little Waltham (Drury 1978), with other parallels amongst the assemblage from Woodham Walter (Rodwell 1987). The majority of identifiable vessels are rounded or shouldered jars or bowls. Several are of Drury’s Form 1 or 2: one shouldered sherd in fabric QU33 and two in QU37, and single rims in fabrics QU34, QU35 and QU36. QU34 is also present as a Form 8 rim. Identifiable sherds in fabric QU37 are from Form 14, 15b and c and 16 bowls. Rims are of varied form: simple upright, bevelled, everted, ‘T’-sectioned and thickened types occur. Bases are flat and simple: no footring or pedestal forms were noted. The only discernible form from M11 is a round-bodied bowl with an open rim.

Few sherds are decorated. A body sherd in fabric QU35 has faint comb decoration, while a rim in the same fabric has shallow impressions along its top. Sherds in QU36 have faint incised horizontal lines on the body and/or rim. Sealey notes that decorated vessels are a scarce in Middle Iron Age assemblages (1996).

A number of sherds from Southgate have either lightly tooled or more deeply incised and scored. This latter technique is characteristic of the East Midlands Scored ware tradition (previously referred to as Trent valley AB ware and Ancaster/Breedon ware) introduced in the 4th century BC (Elsdon 1993, 2). The identifiable vessel of this type is a large jar in a coarse fabric. The types of scoring – ranging from light wiping, probably with a pad of vegetable matter, to heavy incision – underlies the difficulty in determining whether the technique is decorative, functional or both. Some examples seem to be decorative, whereas others are more likely to be roughened to aid handling.

Distribution

<u>MTCP</u>

On the MTCP site most sherds were either intrusive in earlier features or residual in later ones. Only one Middle/Late Iron Age feature contained any quantity of contemporary pottery: intervention 323025, ditch 344347 held 59 sherds, including the entirety of fabric QT1 and five sherds in a light sandy fabric (QU48) from a small vessel apparently a crucible. Burning on the exterior and slag-like residues on the the interior support this interpretation.

<u>M11</u>

On the M11 site much Middle Iron Age pottery was residual or intrusive, but a significantly larger quantity was recovered from features associated with the Iron Age settlement. Much of this material came from ditches and gullies, with only a low incidence occurring in pits. No particularly notable groups were identified, and the assemblage has the appearance of normal domestic rubbish.

LTCP

On the LTCP site, just under one-third of the assemblage (268 sherds weighing 1091g) was recovered from features associated with the Middle-Late Iron Age settlement in the western field of the LTCP site (three roundhouses with surrounding ring gullies, some pits and linear features). The remaining sherds were recovered from the fills of later features, most of which formed parts of Late Iron Age enclosure ditches around the Middle Iron Settlement, and from Mid-Late Iron Age pits further to the east.

One of these latter features (pit 136129) stood out from the bulk of the ceramics from the LTCP site both in terms of the number and weight of pottery it contained. 129 sherds weighing 704 g were recovered. 119 of these (690 g) represented a single vessel in QU39. 109 were plain body sherds (some with a gentle shoulder), many of which had a burnt deposit adhering to the interior. Only ten sherds derived from the rim, which was plain, upright, and flattened with internal and external rolling in places. While undoubtedly a single vessel, the pot was not complete at the time of deposition: there are no base sherds in the assemblage, too few rims, and the surviving sherds are in too poor a condition to have been deposited as either a whole or newly broken vessel. Eight small, featureless, and moderately abraded sherds (7 g) from a second vessel in QU36 were also present. The deposit was sealed with a layer of burnt material containing a burnished body sherd and a fragment of a plain upright rim (together weighing 7 g) of a third vessel in QU40.

SG

With the exception of four sherds weighing 8 g, all of the Middle Iron Age pottery from the Southgate site came from pit 504011. Portions of at least five vessels were present, spread throughout the vertical extent, including large rim and body sherds from a coarse Scored Ware jar and other finer vessels with well-finished surfaces.

NP

Small quantities of pottery in moderate and poor condition came from ditches, probably representing accidental inclusions or casual discard. Two gully segments contained a similarly small quantity, including five sherds from a short-necked jar in good condition, likely to represent deliberate discard.

The most significant groups came from pit 508021 and tree-throw 508013. The former contained four large sherds (118 g) from two vessels of indeterminate form. The latter had a much larger assemblage (76 sherds weighing 1,287 g) containing portions of seven vessels, including four short-necked and two round-shouldered jars.

The condition of this assemblage ranges from good to poor, suggesting that it represents a collection of redeposited middened material.

Discussion

As Rodwell notes, "the dating of pottery of the Middle to Late Iron Age is still notably imprecise" (1987, 38). Drury suggested that Middle Iron Age forms developed early in the 3rd century, or slightly before (1980b), and typifies the ceramics as predominantly sand-tempered, with decoration limited to vertical scoring or rare finger impressions on rims (*ibid*.). Sealey places Middle Iron Age ceramics in the period *c* 350 – 50 BC (1996). The Stansted material conforms to this pattern, and contains almost none of the shell-temper noted on the A120 (Every 2007), which is more common in the south of the county. At the other end of the sequence, Rodwell identifies the emergence of grog-tempered fabrics as indicating transitional Mid-Late Iron ceramics, around the first half of the 1st century BC (1987, 37), prior to the emergence of wheel-thrown grog-tempered 'Belgic' ceramics (Sealey 1996).

Fabric Descriptions

CH1 moderate, poorly sorted to fine coarse chalk; sparse voids and mice [Middle Iron Age]

FL23 moderate, well sorted flint and quartzite temper, moderate iron and some sand probably naturally occurring [Early Iron Age]

FL26 common, medium to very coarse, poorly sorted, sub-angular to angular calcined flint temper [Peterborough Ware]

FL29 sparse to moderate, coarse to very coarse, moderately well-sorted, sub-angular to angular calcined flint temper; sparse, medium to coarse, moderately well-sorted, sub-rounded iron minerals probably naturally occurring [Early Neolithic Plain Bowls]

FL30 very common, medium to coarse, moderately sorted, sub-angular calcined flint temper; some coarse sand probably naturally occurring [Deverel-Rimbury coarse]

FL31 common, fine to coarse, moderately well-sorted, sub-angular calcined flint temper, often well finished [Deverel-Rimbury fine and coarse]

FL32 moderate, coarse to very coarse, moderately well sorted, sub-angular calcined flint temper [Deverel-Rimbury coarse]

FL33 very common to abundant, coarse to very coarse, moderately sorted, sub-angular and angular calcined flint temper [Deverel-Rimbury coarse]

FL34 moderate, coarse to very coarse, moderately sorted, sub-angular calcined flint temper; sparse, coarse to very coarse, moderately sorted, sub-rounded grog temper [Late Bronze Age]

FL35 common, coarse to very coarse, poorly sorted, sub-angular calcined flint temper; sparse mica probably naturally occurring [Late Bronze Age]

FL36 common, coarse to very coarse, moderately sorted, sub-angular calcined flint temper; some iron minerals and quartz sand probably naturally occurring [Late Bronze Age]

FL37 sparse, coarse to very coarse, well sorted, sub-angular calcined flint temper; sparse mica probably naturally occurring [Late Bronze Age]

FL38 common, coarse, well sorted, sub-angular calcined flint temper [Late Bronze Age]

FL39 sparse to moderate, medium to coarse, well sorted sub-angular calcined flint temper; some sand and mica probably naturally occurring [Early Iron Age]

FL40 sparse to moderate, medium to very coarse, moderately sorted sub-angular calcined flint temper; some mica probably naturally occurring [Early Iron Age]

FL41 moderate, medium to very coarse, poorly sorted sub-angular calcined flint temper; sparse mica probably naturally occurring [Peterborough Ware]

FL42 moderate, medium to very coarse, poorly sorted sub-angular calcined flint temper; sparse quartz sand and mica probably naturally occurring [Peterborough Ware]

FL43 sparse, coarse, well sorted, sub-angular calcined flint temper; sparse, coarse to very coarse, well sorted, sub-rounded grog temper; sparse quartz sand probably naturally occurring [Middle Bronze Age]

FL44 moderate, coarse to very coarse, moderately sorted, sub-angular calcined flint and quartzite temper; moderate quartz sand and sparse iron minerals probably naturally occurring [Early Neolithic Plain Bowls]

FL45 sparse to moderate, coarse to very coarse, moderately sorted, sub-angular to angular calcined flint and quartzite temper; moderate quartz sand probably naturally occurring [Early Neolithic Plain Bowls]

FL46 sparse to moderate, fine to very coarse, moderately sorted, sub-angular calcined flint temper; moderate quartz sand probably naturally occurring [Early Neolithic Plain Bowls]

FL47 moderate to common, fine to very coarse, moderately sorted, sub-angular to angular calcined flint temper; some sand probably naturally occurring [Deverel-Rimbury coarse]

FL48 sparse, fine to coarse, well sorted, sub-angular calcined flint temper; sparse mica and iron minerals probably naturally occurring [Deverel-Rimbury fine]

FL49 common, fine to coarse, well sorted, sub-angular calcined flint temper; moderate iron minerals probably naturally occurring [Deverel-Rimbury coarse]

FL50 sparse to moderate, fine to very coarse, poorly sorted, sub-angular calcined flint temper; iron minerals probably naturally occurring [Deverel-Rimbury coarse]

FL51 sparse to moderate, fine to coarse, well sorted, sub-angular calcined flint temper; some quartz sand and mica probably naturally occurring [Deverel-Rimbury fine]

FL52 common, fine to very coarse, well sorted, sub-angular calcined flint temper; moderate iron minerals probably naturally occurring [Deverel-Rimbury coarse]

FL99 calcined flint; crumbs too small to identify

GR4 moderate, fine to medium moderately well sorted, sub-rounded grog, sparse medium to coarse sub-angular calcined flint temper; some quartz sand probably naturally occurring [Beaker]

GR5 moderate, fine to medium moderately well sorted, sub-rounded grog, sparse medium sub-angular calcined flint temper; some quartz sand probably naturally occurring [Beaker]

GR6 moderate, fine to medium moderately well sorted, sub-rounded grog, sparse medium sub-angular calcined flint temper; some voids [Beaker]

QT1 moderate, coarse to very coarse, moderately sorted sub-angular quartzite temper; sparse iron minerals and mica probably naturally occurring [Mid – Late Iron Age]

QU26 moderate fine quartz sand probably naturally occurring; moderate, coarse to very coarse, moderately sorted, sub-angular quartzite/calcined flint temper [Late Bronze Age]

QU27 moderate fine quartz sand probably naturally occurring; sparse, coarse to very coarse, poorly sorted sub-angular to angular quartzite/calcined flint temper [Late Bronze Age]

QU28 sparse, fine to very coarse, poorly sorted, rounded to sub-rounded quartz sand probably naturally occurring; sparse voids probably organic temper [Early Iron Age]

QU29 sparse, fine to medium, moderately sorted sub-rounded quartz sand and some mica probably naturally occurring; sparse voids probably organic temper [Early Iron Age]

QU30 sparse, very fine to fine, well sorted sub-rounded quartz sand probably naturally occurring [Early Iron Age]

QU31 moderate, fine to medium, moderately sorted sub-rounded to sub-angular quartz sand probably naturally occurring; sparse to moderate, coarse to very coarse, moderately sorted sub-angular calcined flint temper [Early Iron Age]

QU32 moderate, medium to very coarse, moderately sorted, sub-angular quartzite and calcined flint temper; sparse mica probably naturally occurring [Late Bronze Age]

QU33 sparse, very fine to fine, well sorted, sub-rounded quartz sand probably naturally occurring [Middle Iron Age]

QU34 sparse, very fine to coarse, moderately sorted, sub-rounded quartz sand and sparse iron minerals probably naturally occurring; sparse, coarse to very coarse, well sorted sub-angular quartzite temper [Middle Iron Age]

QU35 sparse, very fine to fine, well sorted, sub-rounded quartz sand probably naturally occurring; sparse, medium to very coarse, moderately sorted, sub-rounded quartzite; sparse voids [Middle Iron Age]

QU36 sparse, very fine to medium, well sorted, sub-rounded quartz sand probably naturally occurring; sparse voids [Middle Iron Age]

QU37 sparse, very fine to medium, well sorted, sub-rounded quartz sand and sparse very coarse sub-rounded quartzite probably naturally occurring [Middle Iron Age]

QU38 common, fine, well sorted sub-rounded quartz sand and sparse mica probably naturally occurring, sparse, coarse, sub-angular quartzite [Mid-Late Iron Age]

QU39 moderate, fine, well sorted, sub-rounded quartz sand and sparse iron minerals probably naturally occurring; moderate voids; sparse, coarse, sub-angular quartzite temper [Mid-Late Iron Age]

QU40 moderate, fine, well sorted, sub-rounded quartz sand and some iron minerals probably naturally occurring; moderate, coarse, well sorted, sub-angular quartzite temper [Mid-Late Iron Age]

QU41 sparse, fine, well sorted, sub-rounded quartz sand, sparse mica, sparse iron minerals probably naturally occurring [Mid-Late Iron Age]

QU42 sparse, fine, well sorted, sub-rounded quartz sand and sparse mica probably naturally occurring; sparse voids [Mid-Late Iron Age]

QU43 sparse, fine, well sorted, sub-rounded quartz sand and sparse mica probably naturally occurring [Mid-Late Iron Age]

QU44 sparse, fine, well sorted, sub-rounded quartz sand and sparse mica probably naturally occurring; sparse voids; sparse, coarse, moderately sorted, sub-angular shell and calcined flint temper [Mid-Late Iron Age]

QU45 sparse, fine, well sorted, sub-rounded sand and frequent coarse iron minerals probably naturally occurring; sparse grog temper [Mid-Late Iron Age]

QU46 moderate, fine, well sorted, sub-rounded quartz sand and some mica probably naturally occurring; sparse to moderate, coarse, moderately sorted, sub-angular calcined flint temper [Mid-Late Iron Age]

QU47 frequent iron minerals, sparse voids; sparse fine well sorted quartz sand and coarse sub-angular quartzite [Mid-Late Iron Age]

QU48 frequent, fine, well sorted, sub-rounded quartz sand and some iron minerals probably naturally occurring; sparse, very coarse, sub-angular calcined flint temper [Middle Iron Age]

QU49 moderate quartz sand probably naturally occurring; sparse to moderate, fine to coarse, moderately sorted sub-angular calcined flint temper; sparse mica probably naturally occurring [Late Bronze Age]

QU50 moderate quartz sand probably naturally occurring; sparse, fine to medium, well sorted sub-angular calcined flint temper; sparse iron minerals and mica probably naturally occurring [Late Bronze Age]

QU51 abundant, fine, well sorted, sub-rounded quartz sand and moderate iron minerals probably naturally occurring; sparse, coarse, moderately sorted, sub-angular calcined flint temper [Middle Iron Age]

QU52 moderate quartz sand probably naturally occurring; sparse to moderate, coarse to very coarse, moderately sorted sub-angular to angular calcined flint temper [Early Neolithic Plain Bowls]

QU53 moderate very fine to fine quartz sand; some iron minerals; sparsely micaceous [Middle Bronze Age]

QU54 very fine sand; moderate voids; sparse quartzite [Middle Bronze Age crucible]

QU55 fine sandy fabric; sparse fine to very coarse, moderately sorted, sub-angular calcined flint temper [Middle Bronze Age]

QU56 sandy; sparse calcined flint; iron minerals [Middle Bronze Age crucible]

QU57 moderate, very fine to fine quartz sand probably naturally occurring; sparse voids; sparse, medium to coarse, moderately sorted calcined flint temper [Early Iron Age]

QU58 moderate, very fine to medium, well sorted sub-rounded quartz sand probably naturally occurring; sparse voids; occasional very coarse poorly sorted flint pebbles [Middle Iron Age]

SH2 common, medium to very coarse, well sorted shell temper [Early Iron Age]

SH3 moderate, medium to very coarse, well sorted shell temper; moderate, medium to coarse, well sorted, sub-angular quartzite [Early Iron Age]

List of Illustrated Vessels (Figures 17.1, 17.3-17.4, 17.7)

Early Neolithic (Fig. 17.1)

1. Two joining sherds from a rolled, flat-topped rim from a neutral bowl. Smoothed exterior surfaces; fabric FL29. PRN 339. Context 995107.
2. Rim sherd from carinated, necked bowl; fabric FL44. PRN 907. Context 1737.
3. Rim with post-firing perforation from probably carinated bowl; fabric FL44. PRN 910. Context 506.
4. Rim from probably carinated bowl; fabric FL44. PRN 911. Context 506.
5. Rim from probably neutral undifferentiated bowl; fabric FL44. PRN 912. Context 506.

Middle Neolithic (Fig. 17.1)

6. Rim and body fragments of a Mortlake-type vessel; fabric FL26. PRN 121-123. Context 436071. The rim and interior surface immediately below have whipped cord maggots arranged transversely and horizontally; the concave neck has infrequent sub-circular impressions on the exterior.
7. Rim and body sherd of a ?Mortlake-type vessel; fabric FL41. PRN 751. Context 320003. Fingernail impressions on the exterior, rim, and interior immediately below the rim.
8. Upright very slightly thickened rim from a Middle Neolithic vessel of unknown type; fabric FL42. PRN 785. Context 316034.

Early Bronze Age (Fig. 17.1)

9. Probable Beaker sherd with comb and cord impressions; fabric GR4. PRN 341. Context 913905.

Middle Bronze Age (Fig. 17.3)

10. Rim and body sherd from bucket-shaped jar. Rim has finger-nail impressions on the top, and finger-tip impressions on the outside. An applied horizontal cordon on the body has similar finger-tip impressions; fabric FL32. PRN 1539-40. Context 309114
11. Rim and body sherd from bucket-shaped jar. An applied horizontal cordon on the body has finger-tip impressions; fabric FL32. PRN 1541. Context 309114
12. Fragments of a plain bucket-shaped vessel; fabric FL32. PRN 1368-9. Context 303013
13. Rim with post-firing perforation and incisions on top, from thin-walled jar; fabric FL30. PRN 1020. Context 309107
14. Rim from large jar, finger nail impression on top; fabric FL32. PRN 1085. Context 309083
15. Sherds from a small over-fired metalworking crucible with a pinched spout; fabric QU54. PRN 1030. Context 309105
16. Rim sherd from small closed vessel, finger-nail impressions on outside; fabric FL30. PRN 1080. Context 309083
17. Rim sherd from large bucket-shaped jar, finger-nail impressions on rim top, finger-tip impressions on exterior; fabric FL32. PRN 1084. Context 309083
18. Body sherd with applied cordon, diagonal finger-nail impressions; fabric FL32. PRN 1095. Context 309082
19. Small knobbed cup; fabric FL33. PRN 1311, 1313. Context 303035
20. Body sherds from an Ardleigh-type jar, with profuse finger-tip and other impressed decoration on both surfaces; fabric FL33. PRN 1183. Context 319026
21. Globular vessel. Decorated at maximum girth by incised chevrons between multiple horizontal lines; fabric FL31. PRN 946-8. Context 312026

Late Bronze Age (Fig. 17. 4)

22. Small bi-partite plain bowl; fabric QU35. PRN 566. Context 109015
23. Everted rim from burnished bowl; fabric QU37. PRN 773. Context 323027
24. Short-necked jar with high, rounded shoulder; flat rim with cabled top; fabric FL35. PRN 11-12. Context 423114
25. Rim and upper body sherds of plain burnished bowl; fabric QU32. PRN 772. Context 323027
26. Rim and neck of short-necked shouldered jar, angle decorated with finger-tip impressions; fabric QU50. PRN 870. Context 334080
27. Base of jar; fabric FL37. PRN 478. Context 111038
28. Handle from coarse jar; fabric FL38. PRN 68. Context 430063

29. Rim and neck of short-necked shouldered jar, angle decorated with finger-tip impressions; fabric QU50. PRN 871-2. Context 334060

Early Iron Age (Fig. 17.7)

30. Small jar with pedestal base; fabric QU31. PRN 57. Context 424005
31. Flat base, decorated above the wall angle with incised horizontal and diagonal lines; fabric QU39. PRN 255-6. Context 434092
32. Sherds from a small vessel apparently a crucible; fabric QU48. PRN 786-7. Context 323027

Mid-Late Iron Age (Fig. 17.7)

33. Rim sherd from bowl, vertical combed decoration; fabric QU34. PRN 542. Context 132005
34. Body sherd with multiple parallel horizontal incised lines; fabric QU36. PRN 578. Context 150029.
35. Rim of small bowl; fabric QU40. PRN 677. Context 112052.
36. Rim and upper body of vessel, exterior has deep combed curving lines; fabric QU46. PRN 739. Context 151027.
37. Body sherd from globular vessel, scored exterior; fabric QT1. PRN 892. Context 323026.
38. Short-necked round-shouldered jar, vertical incisions on shoulder and more widely-spaced vertical lines on body; fabric QU42. PRN 715-6. Context 136121.

Table 17.1: Prehistoric pottery totals by site

Site	No. Sherds	Weight (g)
Long Term Car Park (LTCP)	1,749	9,446g
MTCP (MTCP)	3,888	30,405
M11 Slip Road (M11)	2,136	15,804
FLB (FLB)	59	228
South Gate Area 1A (SG)	153	603
Noise Pen (NP)	100	1,554
Total	**8,085**	**58,040**

Table 17.2: Prehistoric pottery fabrics by chronological period

Date	Fabric	No. sherds	Weight (g)	ASW (g)
EARLY NEOLITHIC	FL29	25	96	
	FL44	25	190	
	FL45	56	240	
	FL46	31	62	
	QU52	28	71	
	Sub-total EN	***165***	***659***	***3.99***
MIDDLE NEOLITHIC	FL26	12	92	
	FL41	27	50	
	FL42	19	33	
	Sub-total MN	***58***	***175***	***3.02***
LATE NEOLITHIC		***4***	***6***	***1.5***
EARLY BRONZE AGE	GR4	1	4	
	GR5	17	29	
	GR6	1	1	
	Sub-total EBA	***19***	***34***	***1.79***
MIDDLE BRONZE AGE	FL30	453	3,588	
	FL31	209	962	
	FL32	1,132	12,145	
	FL33	768	7,025	
	FL43	14	66	
	FL47	139	1,514	
	FL48	31	179	
	FL49	14	117	
	FL50	20	329	
	FL51	242	1,021	
	FL52	51	549	
	QU53	5	16	
	QU54	3	27	
	QU55	11	52	
	QU56	1	15	
	Sub-total MBA	***3,093***	***27,605***	***8.92***
LATE BRONZE AGE	FL34	1	25	
	FL35	1,082	8,474	
	FL36	197	1,023	
	FL37	284	2,287	
	FL38	93	1,062	
	QU26	89	241	
	QU27	60	206	
	QU32	32	92	
	QU49	117	885	
	QU50	74	337	
	Sub-total LBA	***2,029***	***14,632***	***7.21***
EARLY IRON AGE	FL23	6	13	
	FL27	92	512	
	FL39	353	1,708	

	FL40	23	330	
	QU28	110	504	
	QU29	161	484	
	QU30	1	8	
	QU31	71	131	
	QU57	39	587	
	SH2	3	15	
	SH3	4	51	
	Sub-total EIA	***863***	***4,343***	***5.03***
MID/LATE IRON AGE	CH1	2	12	
	QT1	37	833	
	QU33	10	101	
	QU34	34	171	
	QU35	123	534	
	QU36	273	1,333	
	QU37	122	816	
	QU38	58	467	
	QU39	511	2,649	
	QU40	47	450	
	QU41	12	65	
	QU42	54	242	
	QU43	30	320	
	QU44	17	119	
	QU45	10	68	
	QU46	103	787	
	QU47	73	461	
	QU48	5	25	
	QU51	4	35	
	QU58	42	818	
	Sub-total M/LIA	***1,569***	***10,731***	***6.84***
UNCERTAIN	FL99	***287***	***180***	***0.63***
TOTAL		**8,085**	**58,040**	

Table 17.3: the development of understanding Neolithic pottery

Kendrick/ Menghin (1925)	*Leeds (1927)*	*Piggott (1932)*	*Piggott (1954)*			*Smith (1956)*			*Smith (1974)*	*Whittle (1977)*
Grimston	**Windmill Hill**	or **Neolithic A**	**Western Neolithic**	Hembury Windmill Hill Yorkshire	Whitehawk Abingdon E. Anglian Grimston Heslerton	**Western Neolithic**	Hembury Windmill Hill	Whitehawk Abingdon Mildenhall	Hembury **Abingdon** **Grimston/Lyles Hill**	**South-western Decorated** **Eastern**

Table 17.4: Fabric group totals by stratigraphic group in waterhole 309075

Strat. Group	Coarsewares				Finewares			
	Fabric	Sherds	Weight	Vessels	Fabric	Sherds	Weight	Vessels
309076	FL30	3	20	1	FL51	4	6	1
	FL31	3	8	1	QU55	4	4	1
	FL32	8	40	1				
	FL33	2	34	1				
309077	FL30	20	84	2	FL31	5	17	1
	FL32	125	596	4	FL48	1	12	1
	FL33	5	241	2	FL51	14	77	3
	FL35	1	7	1				
	FL47	1	50	1				
309081	FL30	39	364	7	FL31	3	14	2
	FL32	127	1,314	11	FL48	11	86	2
	FL33	22	83	1	FL51	11	114	1
	FL47	29	313	4	FL52	1	3	1
	FL50	1	48	1				
	QU53	4	12	1				
309088	FL32	3	238	1	FL31	2	9	1
	FL33	84	900	5	FL48	2	2	1
					FL51	2	16	1
309092	FL30	2	17	1	FL31	3	5	1
	FL32	3	29	1	FL51	2	56	1
	FL33	1	5	1	QU55	2	16	1
309099	FL30	6	54	2	FL31	14	44	2
	FL32	32	168	2				
	FL47	3	16	1				
309105	FL32	3	40	1				
	FL33	9	149	3				
	QU55	1	11	1				
309113	FL30	12	90	3				
	FL32	12	67	2				
309114	FL32	187	3,837	2	FL51	1	9	1
309115	FL32	4	90	1				
309126	FL30	1	4	1	FL31	5	5	1
309127	FL30	2	18	1	FL31	1	3	1
	FL32	75	437	2				
	FL33	1	5	1				
	FL47	19	180	3				
	FL50	6	204	1				
309128	FL30	7	20	1				
	FL32	1	36	1				
	FL33	4	69	1				
	FL47	1	4	1				
	FL99	5	9	1				
309130	FL30	2	83	1	FL31	1	3	1
	FL32	109	1,328	4	FL51	5	13	1

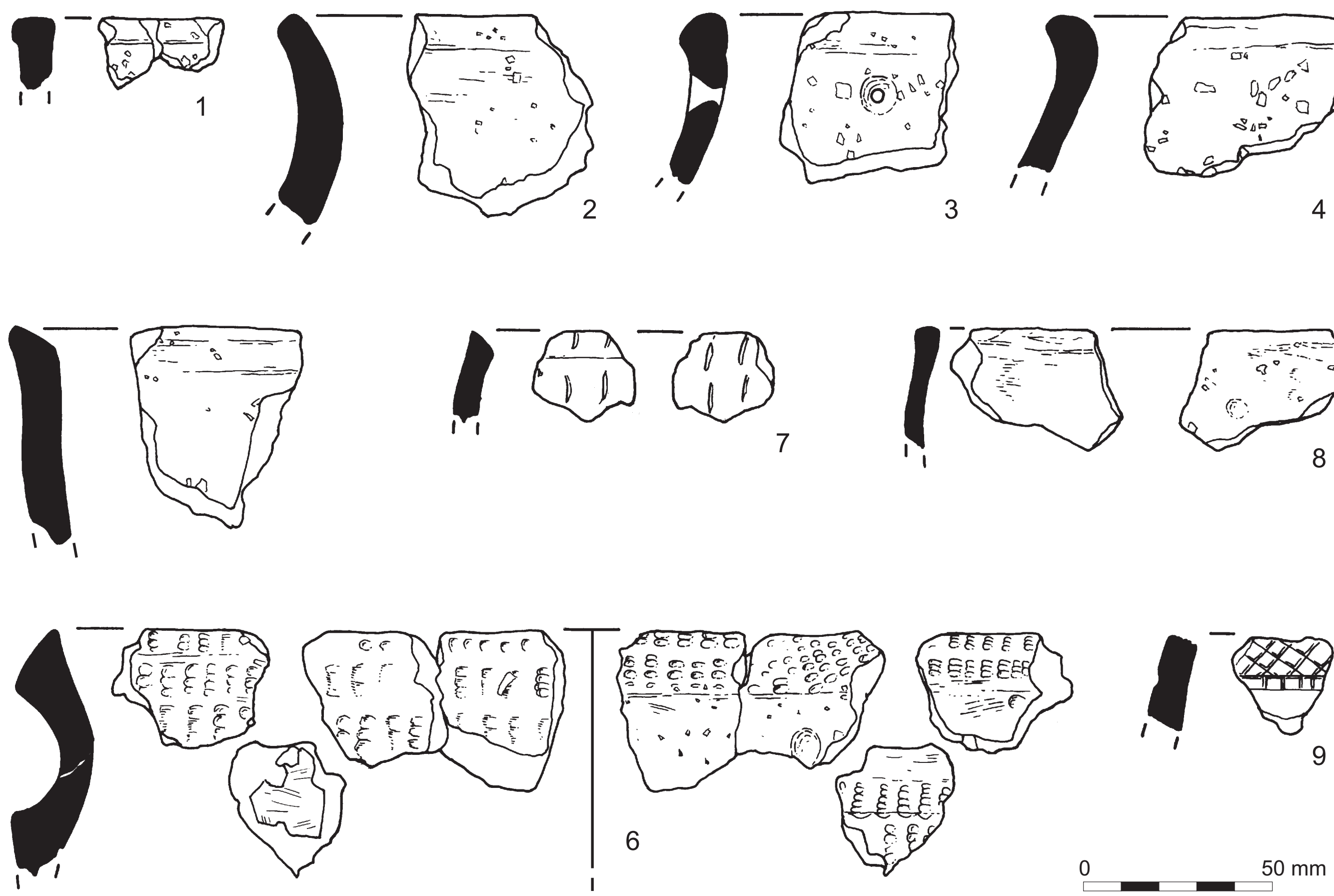


Figure 17.1: Selected Neolithic and Early Bronze Age pottery (details in the catalogue)

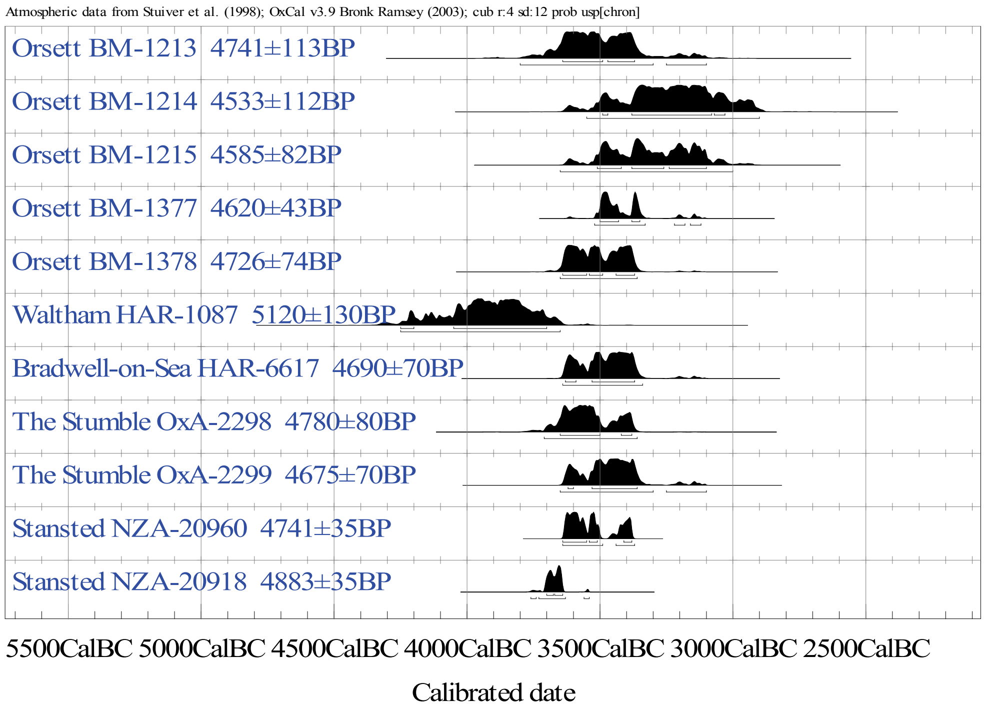


Figure 17.2: Essex Early Neolithic pottery dates

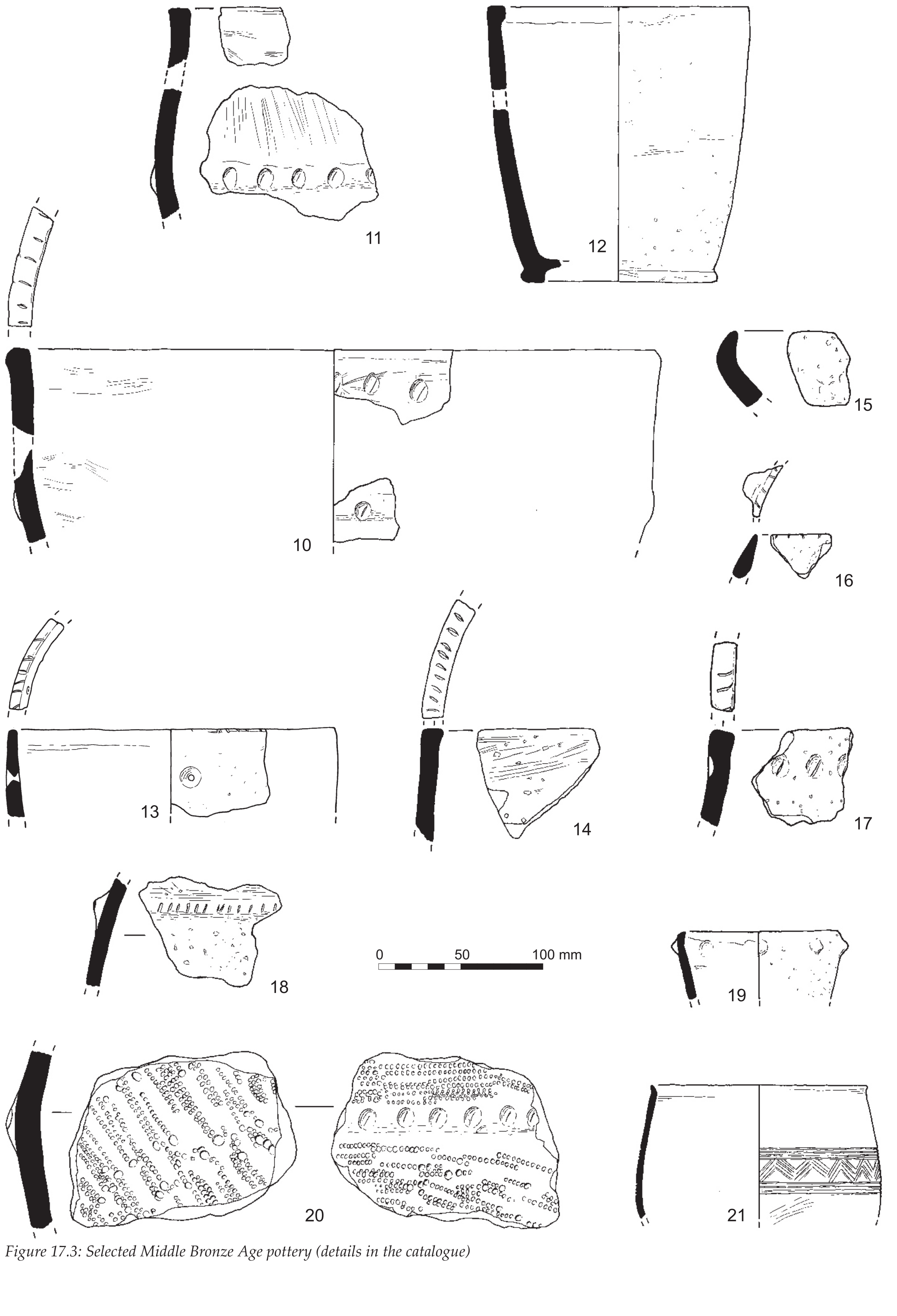


Figure 17.3: Selected Middle Bronze Age pottery (details in the catalogue)

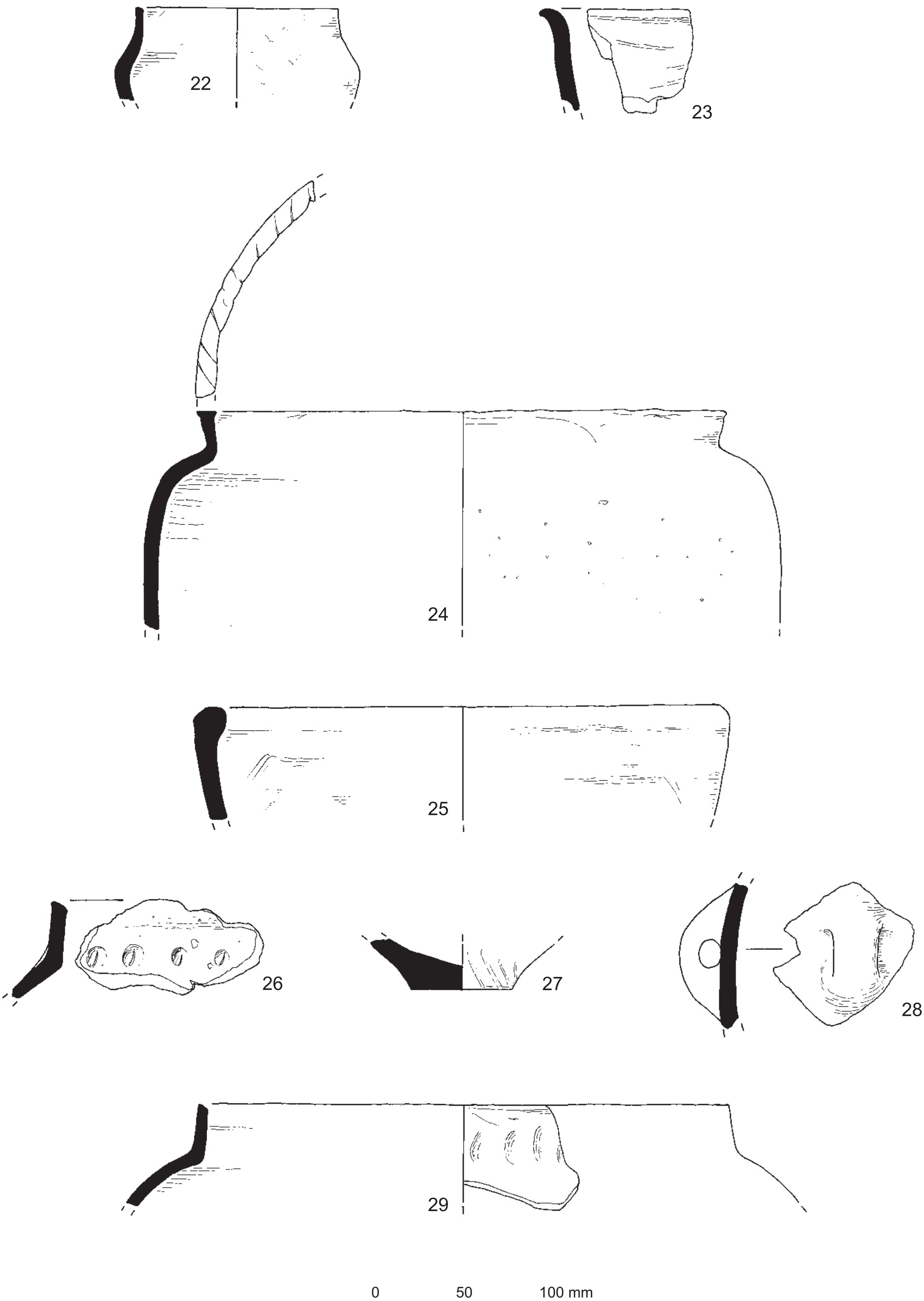


Figure 17.4: Selected Late Bronze Age pottery (details in the catalogue)

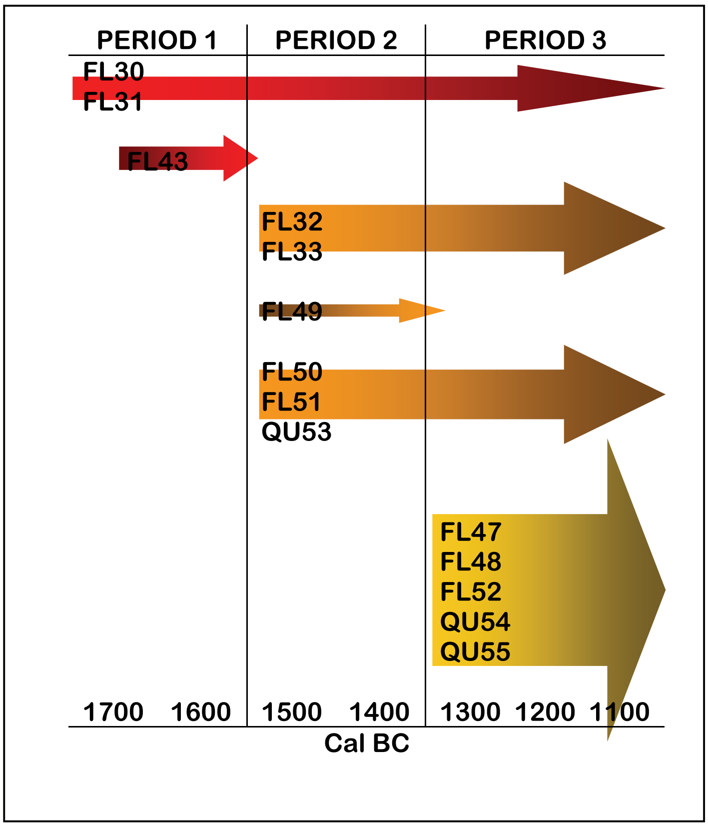


Figure 17.5: Period fabric type assemblages

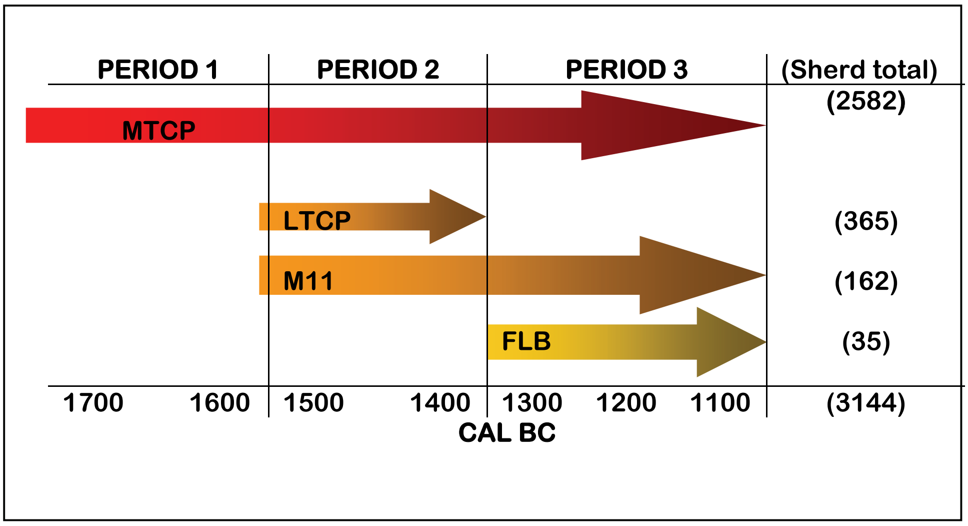


Figure 17.6: Chronology of settlement

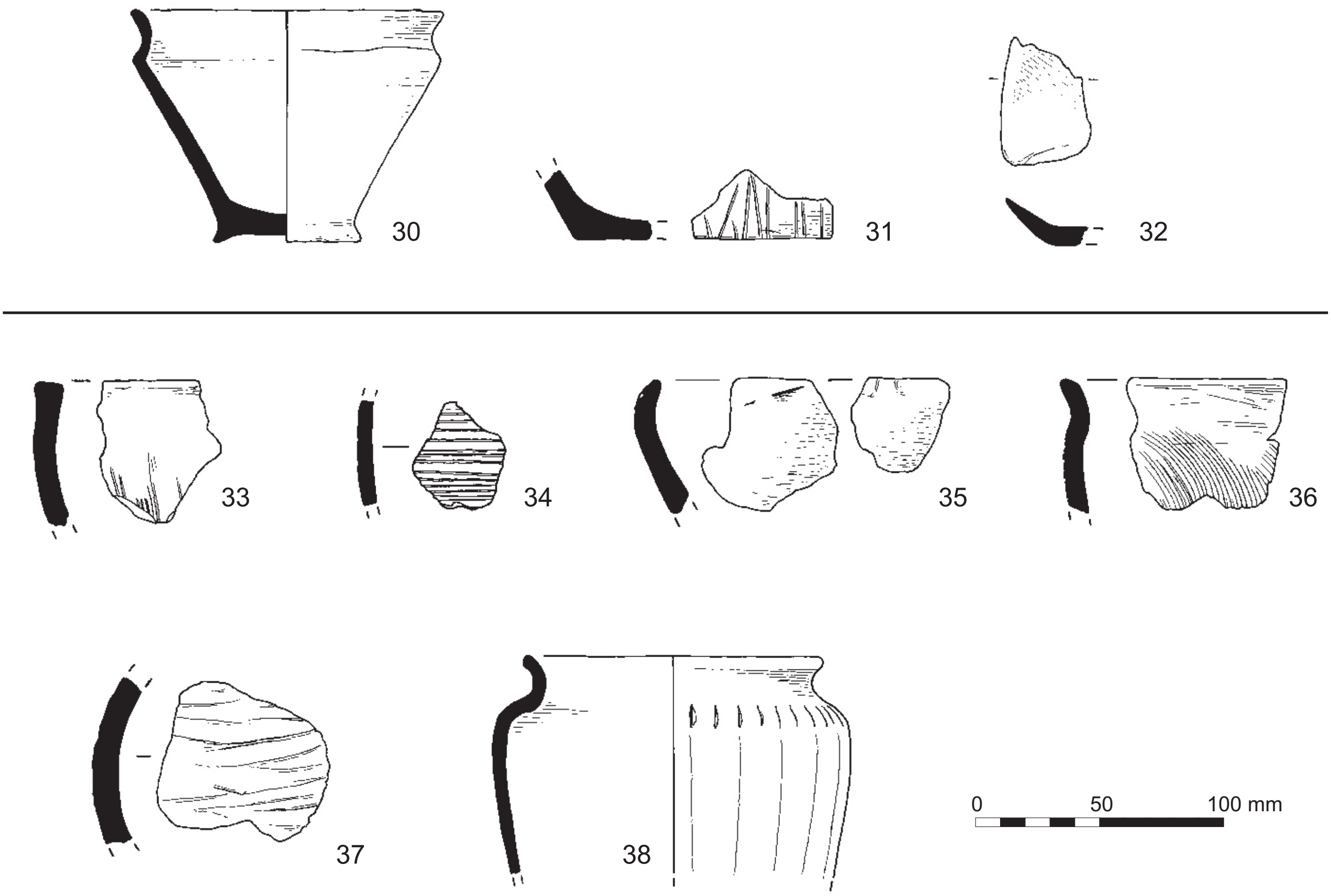
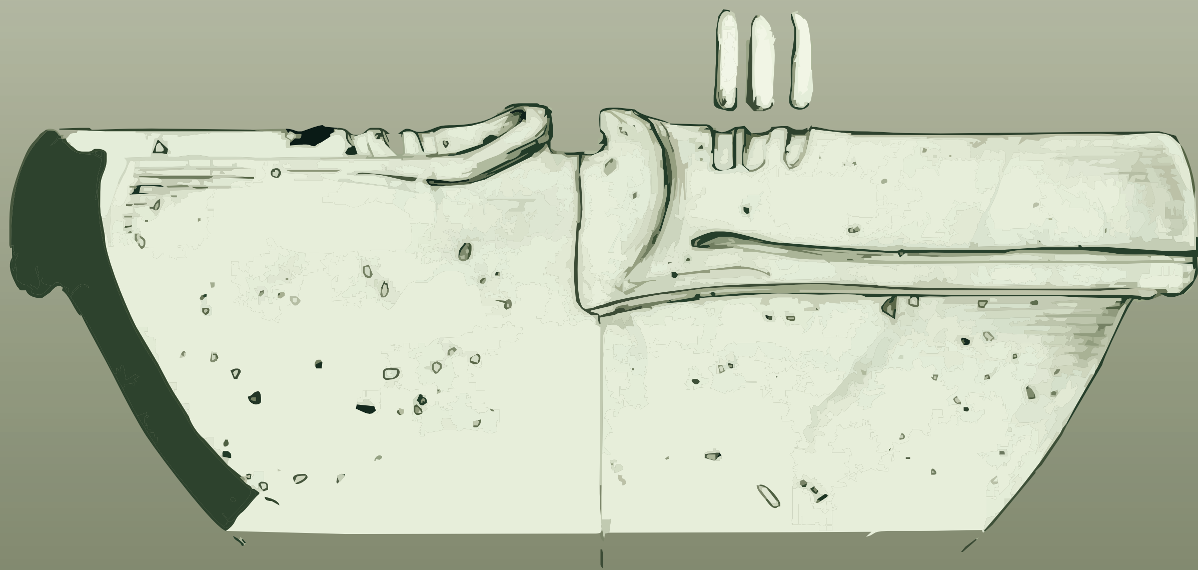


Figure 17.7: Selected Early-Late Iron Age pottery (details in the catalogue)

CHAPTER 18

Iron Age and Roman Pottery



by Dan Stansbie and Edward Biddulph

18 Iron Age and Roman pottery

Dan Stansbie and Edward Biddulph

A Late Iron Age and Roman pottery assemblage comprising over 29000 sherds, weighing 246 kg was recovered from six sites: the LTCP (BAACP99-01), the MTCP (BAAMP99-00), the M11 (BAALR00), SG (BAASG03), the LBR (BAALB00), and the Standby Runway site (BAASR00). The assemblages from each of these sites are discussed individually below. Pottery from each site is quantified in Table 18.1 and selected pieces are illustrated in Figures 18.4-18.6.

Contexts yielded groups weighing an average of 163 g. The average sherd weight was 8.4 g, suggesting that the condition of the pottery was fairly poor. Rims were often broken at the neck, making identification of forms - and, consequently, the close-dating of context groups - difficult. The assemblage spanned the mid 1st century BC to the late 4th century AD, with Late Iron Age pottery and pottery which could only be assigned a broad Roman date range making up the bulk of the assemblage at 40% by weight and 37% by weight respectively. However, some periods within the Roman date range were more heavily represented than others, with pottery from the mid Romano-British period being relatively scarce at 2% by weight and pottery from the early Roman, and late Romano-British periods being more common at 5% by weight and 6% by weight respectively.

Methodology

The pottery was sorted into fabric groups based on surface appearance and major inclusion types. Fabrics were identified using the series devised by the Essex County Council Field Archaeology Unit (ECC FAU), ensuring compatibility with other major Essex sites. A full list of fabrics is presented in Table 18.2. Detailed fabric descriptions have not been provided, but where possible reference has been made to the National Roman Fabric Reference Collection handbook (NRFRC; Tomber and Dore 1998), where comprehensive descriptions of traded wares can be found.

Typology follows Going's Chelmsford typology (1987, 13-54), with occasional reference to additions made by Wallace *et al.* (2004, 285-312) in his report on the pottery from the Essex County Council excavations at Stansted. This is supplemented by the *Camulodunum* series (Hawkes and Hull 1947, updated in Bidwell and Croom 1999, 468-487) and Thompson's 'Belgic' series (Thompson 1982) for the Late Iron Age material.

Throughout the report, occasional reference has been made to regional and international corpora, such as Young's Oxfordshire series (1977), Dragendorff's (and others) samian typology (cf Webster 1996), and Dressel's amphora types (cf Peacock and Williams 1986). Going's typology divides vessels into 18 classes. These are: A-platters, B-dishes, C-bowls, D-mortaria, E-bowl-jars, F-cups, G-jars, H-beakers, J-flagons, K-lids, L-cauldrons, M-strainers, N-funnels, P-amphora, Q-unguentaria, R-miniatures and S-miscellaneous; some of which are referred to in the text below.

The pottery within each context was sorted into fabric groups, which were weighed in grams. Assemblages were additionally quantified by sherd count, minimum vessel count (mv) and estimated vessel equivalence (eve), both based on rims (see Table 18.3 for quantification of the assemblage as a whole). Every individual database record (usually a 'sherd family' comprising, for example, rim sherds belonging to the same vessel, similarly decorated body sherds, or a group of undiagnostic fragments in the same fabric) was assigned an earliest and latest date. A hierarchical phasing scheme based on Wallace *et al.*'s (2004) Stansted scheme was applied. This meant the division of the pottery into four phases, namely: Late Iron Age, mid 1st century to early 2nd century, mid 2nd century to mid 3rd century and late 3rd century to late 4th century, although it should be noted that a number of context groups spanned two or more phases. Descriptions of the individual site assemblages (below) are based on pottery from deposits assigned to site phases (not ceramic phases). Pottery from post-Roman or stratigraphically unphased deposits have largely been ignored, though intrinsically interesting pieces have been brought into wider discussion where warranted.

Pottery from the LTCP (BAACP99 - 01) (Tables 18.4-18.5)

Late Iron Age

The site yielded a range of fabrics commonly dated to the Late Iron Age or earliest Romano-British period (50 BC-AD 70/80), together accounting for about 21% of the assemblage by weight. Contexts containing exclusively grog-tempered pottery were common and grog-tempered wares dominate the assemblage. Common variants of grog-tempered fabrics including coarse grog-tempered ware, flint and grog-tempered ware and red-surfaced grog-tempered ware were also present. Some fabrics other than grog-tempered ware, such as miscellaneous tempered Late Iron Age ware, certainly derive from Late Iron Age contexts, while others, including black-surfaced ware, early shell-tempered ware, and North Gaulish fine white ware were transitional between the Late Iron Age and the period immediately after the conquest.

Vessels comprise mainly jars, which account for 91% of the Late Iron Age assemblage by eve; these are supplemented by beakers at 1% of eves, platters at 2% of eves and lids at 3% of eves. The majority of jars are in grog-tempered fabrics and many of them can be assigned to Hawkes and Hull's (1947) *Camulodunum* type series and given a date range of between 20BC and AD70. These include *Cam* 254 saucepan-shaped jars, *Cam* 260 and *Cam* 256 ovoid jars, *Cam* 204 pedestal jars, *Cam* 229 jars with corrugated shoulders, and *Cam* 256 and *Cam* 263 'cooking' jars. However, some of the grog-tempered jars fit more easily within Going's Chelmsford typology. These include high-shouldered necked jars encompassed by Going's types G19, G20, G21 and G23, and neckless jars (G3), also assigned a date range of 20BC to AD 70 on the basis of fabric type. Butt-beakers (H7) were present in grog-tempered fabric. Grog-tempered platters included *Cam* 31 and A2 types. A shallow dish with an out-turned rim (B10), possibly copying samian form Drag. 36 and of mid 1st century date, was also recovered.

Early Roman

A larger range of fabrics dating to the early Romano-British period was recovered, although these account for a much smaller proportion of the overall assemblage at

17% by weight. The early Roman assemblage was dominated by grog-tempered wares, which remained important at 39% by weight. Black-surfaced and sandy grey wares, accounting for 41% of the assemblage by weight were, however, beginning to displace grog-tempered wares. Hadham grey ware, representing 9% of the assemblage, appeared during this time. White and buff wares arrived from Verulamium and Colchester, with a fine white fabric coming from north Gaul. Other fine wares included early Colchester colour-coated ware and south Gaulish samian ware. South Spanish amphorae complete the range of continental imports.

The increasing range of fabrics in this period is mirrored by a larger repertoire of forms, including new vessels associated with drinking such as flagons. Jars continued to dominate the group, contributing 75% of the assemblage by eves. These are supplemented by platters at 8% of eves, flagons at 1% of eves, beakers at 7% of eves, and bowls at 8% of eves. Jars include high-shouldered necked jars (G17-G20) in a range of fabrics including grog-tempered wares, sandy grey wares, black-surfaced wares and Hadham grey wares. Going G21 and G22 types were among the remaining necked jars. With the exception of a Drag. 18 platter in south Gaulish samian ware and platter A4 (a copy of Drag. 18) in sandy grey ware, the remaining platters comprise forms with convex or S-shaped profiles (A2), mostly in sandy grey wares but with some examples in Hadham grey ware and one in unsourced oxidised ware. Flagons comprised 'Hofheim' types (J1), which were present in buff and reduced wares. Beakers are predominantly butt-beakers (H7) in grog-tempered ware and unsourced oxidised ware, although these are supplemented by a globular beaker (H1) in black-surfaced ware and a similar globular beaker with lines of pushed out bosses on the body (H1.5) in micaceous fineware. Carinated beakers (H10) were also available. Bowls included an example with out-turned rim (C16) in unsourced oxidised ware, a large, wide-mouthed bowl (C33) in black-surfaced ware, and a *Cam* 45 tripod bowl in grog-tempered ware.

Middle Roman

Pottery continued to arrive at the site during the mid Romano-British period, though in small quantities; with only a few sherds recovered from contexts subsequently dated to AD 120-260. Material characteristic included central Gaulish samian ware, and bead-rimmed dish in sandy reduced fabrics. A decorated samian bowl (Drag. 37) was residual in a late Roman context. The paucity of middle Roman material suggests that activity declined at the site during the 2nd and 3rd centuries.

Late Roman

Late Roman pottery accounts for just 6% of the assemblage by weight. However, the group comprises a relatively wide range of fabric types. Sandy grey ware dominated the assemblage, taking a 39% share of the late Roman assemblage by weight. Hadham grey ware was also well-represented, accounting for 21% by weight. Other reduced wares included black-surfaced wares (from Hadham and other sources), which contributed 12% of the assemblage. The grog-tempered pottery present was entirely residual. Oxidised wares were mainly confined to buff wares and Hadham oxidised and unsourced red wares. Finewares included residual central and east Gaulish samian wares, and Nene Valley colour-coated ware, which contributed 3% of the late Roman assemblage by weight. The absence of Oxfordshire colour-coated ware and late shell-tempered ware - both late 4th-century indicators - suggests that the ceramic supply to the site ceased during the first half of the 4th century AD.

The late Roman assemblage is predictably dominated by jars, which account for 63% of the assemblage by eves. These were followed by dishes at 23% of eves and bowl-jars at 11% of eves. Jars included oval-bodied G24 types in sandy grey ware and everted-rim ‘cooking pot’ type (G9) in black-burnished ware. Bowls-jars comprise globular vessels with ledged rims (E2) in grey-sandy wares and Hadham grey ware. Dishes included plain-rimmed and flanged dishes of Going’s types B1, B3, B5 and B6. Roughly equal proportions of these were made in grey sandy-wares, black-surfaced wares and Hadham grey wares.

Pottery of a broadly Roman date

A large group of pottery has only a broad date range of 40-400 AD, either because of a lack of diagnostic forms or the presence of long-lived forms. This material accounts for 56% of the assemblage by weight. The Roman assemblage is predominantly made up of grey sandy-wares. Also important are Hadham grey wares and black-surfaced wares. These are supplemented by storage jar fabrics, and Colchester buff ware. The remaining pottery includes south Spanish amphora, black-burnished ware, fine grey ware, Hadham white-slipped grey ware, miscellaneous fine white-slipped grey ware, miscellaneous white-slipped sandy red ware and unsourced white-ware.

Like the Late Iron Age assemblage the Roman group is dominated by jars. These are supplemented by dishes and beakers, with bowls, flagons and lids also represented. Many rim sherds assigned to this group are broken at the neck, meaning that they can only be assigned to broad vessel classes and these included jars in Hadham grey wares and unsourced oxidised wares. However some vessels are assigned to more long-lived types such as Going’s G21 ‘Braughing jar’ which dominates the jar category in grey sandy-wares and black-surfaced wares. Also present are neckless jars (G9 and G24) in black-surfaced wares and grey sandy wares, one G9 jar in black-burnished ware and several storage jars (G44). A range of rimless shallow dishes (B1) were made in black-surfaced ware, grey sandy ware and Hadham grey ware. Beakers (H) are also present in the same range of fabrics. There are two bowls (C), one in Hadham grey ware and the other in unsourced oxidised ware, one flagon (J) in Colchester buff ware, and a lid (K) in grey sandy-ware.

Pottery from the MTCP (BAAMP99-00) (Tables 18.6-18.7)

Late Iron Age

Although still significant Late Iron Age material accounts for a smaller proportion of the MTCP assemblage than it does of the LTCP assemblage. The site yielded a range of Late Iron Age fabrics together accounting for 21% of the assemblage by weight. This material predominantly comprises grog-tempered fabrics, which account for over 80% by weight. Of other fabrics present none contributed above 4% by weight. These fabrics comprise early shell-tempered wares, and transitional sand-tempered wares, predominantly black-surfaced ware and sandy grey ware.

As seen at the LTCP site the predominance of grog-tempered wares is mirrored by the pre-eminence of jars as a vessel class, which accounted for 60% of the assemblage by eves. These are supplemented by platters at 23% of eves, and beakers at 17%. Jar types included *Cam* 218 necked jars with shoulder cordons, high-shouldered necked jars (G19 and G21) and neckless jars (G3). Beakers were present in the form of a butt-beaker (H7) available in unsourced oxidised ware. Platters were limited to A2 types in grog-tempered and black-surfaced wares.

Early Roman

The early Roman assemblage from the MTCP site comprises a wider range of fabrics than the Late Iron Age assemblage. In this regard it is similar to the assemblage from the LTCP site, although the nature of the fabrics present actually differs to some degree. The early Roman assemblage accounts for 16% of the total assemblage by weight. Grog-tempered wares continued to make an important contribution, accounting for almost 30% by weight. These are supplemented by black-surfaced wares, which contributed 15% of the assemblage, and sandy grey wares, which take a 13% share. Production of Hadham grey wares began during the second half of the 1st century, and the fabric takes a 10% share by weight here. Also present although in minimal amounts are early shell-tempered ware, grey fine wares, Hadham white-slipped oxidised wares, ‘London-Essex’ stamped wares, south Gaulish samian ware, and Verulamium region white-wares, though none of which accounting for more than 4% by weight.

The range of forms in the early Romano-British period increases concomitantly with the range of fabrics. Thus, while jars remain the dominant vessel class, they contributed 47% by eves, a drop from the Late Iron Age. These are supplemented by platters and beakers, which remain important at 17% and 19% by eve respectively. New vessels in this phase consist of cups, bowls, dishes, and flagons. The jars include necked, high-shouldered types (G19-G22), everted rim jars (G23) and neckless, high-shouldered jars (G3) in a range of fabrics, though principally black-surfaced wares, grey sandy wares, Hadham grey wares, and grog-tempered wares. Platter forms seen in this phase include *Cam* 22 vessels - available in grog-tempered and black-surfaced wares - and convex-profiled platters (A2) in black-surfaced and sandy grey wares. Drag. 18 platters in south Gaulish samian ware were also recorded. A variety of beakers are present, including butt beakers (H7) in unsourced oxidised ware and miscellaneous fine white-slipped grey wares, and a poppy-headed beaker (H6) in fine grey ware, which arrived during the late 1st or early 2nd century AD. Cups include a hemispherical vessel in early Colchester colour-coated ware (copying a Lyon ware prototype), and samian forms Drag. 27 and Drag. 46. A decorated body sherd from a Drag. 29 bowl was also present. Dishes comprised plain-rimmed vessels (B1) in sandy grey ware and black-surfaced ware, which arrived during the early 2nd century. Flagons include a ‘Hofheim’-type vessel (J1) in grog-tempered ware; other flagons, possibly ring-necked, were available in Colchester buff ware and Verulamium region white ware.

Mid Roman

The mid Roman phase was the least well supplied in terms of overall quantity of pottery, accounting for 3% of the assemblage by weight. Grog-tempered ware appears to have remained important in this phase, though all occurrences must have been residual by the 2nd and 3rd centuries. Removing this factor makes the contributions of black-surfaced wares, sandy grey wares and Hadham grey ware - otherwise little altered in proportional terms from the early Romano-British period - much more significant. Hadham oxidised ware was also important at 9%; the main period of use in this phase occurred during the first half of the 3rd century. Also present in small amounts were central Gaulish samian ware (which replaced south Gaulish products, although these continued to have a residual presence), Colchester buff ware, grey fine ware, and Hadham black-surfaced ware.

Jars continued to dominate the assemblage, but their overall proportion declined, largely to accommodate an increase in dishes, now 14% by eves, compared with 6% in the early Romano-British period. The level of beakers also increased, and lids were recorded. Platters disappeared entirely. A wide range of dishes was available. included bead-rimmed vessels (B2 and B4), plain-rimmed dishes (B1) and, by the mid 3rd century, incipient bead-and-flanged dishes (B5). A distinctive, splayed-rim dish, often decorated on the rim and copying samian form Drag. 36 (B10), was available in Hadham oxidised ware. Beakers included poppy-head types (H6) and a carinated beaker (H10). Jar rims were largely undiagnostic, but included lid-seated types (G5), oval-bodied vessels (G24), flasks (G40) and storage jars. A flanged-rim bowl (C1) and a deep bowl (C12) were also recorded.

Late Roman

Contrasting with the LTCP material, late Roman pottery from the MTCP site is the largest group, forming 17% of the assemblage by weight. The phase includes the greatest range of fabrics, though few of these contributed much more than 5% by weight. Locally-produced grey wares remained dominant. The proportion of black-surfaced wares declined, and the fabrics appears to have been replaced by burnished black-surfaced ware from the Hadham kilns. This was inevitably accompanied by sandy grey ware and Hadham grey ware. A significant development in this phase was increase in the level of Hadham oxidised ware - now representing 15% by weight - and the introduction of Oxfordshire products (including red colour-coated ware, parchment ware and a white ware mortarium fabric) and Nene Valley colour-coated and mortarium fabrics. Late shell-tempered ware reached the site from the mid 4th century onwards. Some 5% of the late Roman assemblage by weight was residual and included grog-tempered wares and samian wares.

The proportion of jars recovered to some extent - now at 51% by eves, compared with 42% in the mid Romano-British period - but were competing with dishes, which took an increased share of 30%. Fewer beakers were recorded, compared with the previous phase, and mortaria appeared for the first time. Dishes were mainly confined to plain-rimmed types (B1) and bead-and-flanged type B6, although residual bead-rimmed and incipient bead-and-flanged types were recovered. Jars, mainly available in local reduced wares, were dominated by oval-bodied type G24 and ‘cooking-pot’-type G9. Necked jar G27 was an exclusive late shell-tempered form; similarly, jars with a frilled rim (G26) were only present in Hadham oxidised ware. Wide-mouthed bowl-jars are a vessel class - of which necked types E5 and E6 were most important - were also strongly associated with Hadham oxidised ware.

In terms of the remaining vessel classes, a number of distinctive late Roman forms were recorded. These included a bead-rimmed flagon in Hadham oxidised ware, resembling an example from Colchester (Symonds and Wade 1999, fig 5.53.54), and sherds from face-flagons, also in Hadham oxidised ware. Bowls included a wall-sided vessel (Young type P24) in Oxfordshire parchment ware and a necked bowl with an out-turned rim (Young type C75) in Oxfordshire red colour-coated ware. A curving sided bead-rimmed bowl in Nene Valley colour-coated ware (Perrin 1999 type 239) was recorded, as well as sherds from a bowl with 'Romano-Saxon' decoration (Roberts 1982, type A19.2). Beakers were seen as undiagnostic rims or body sherds, but were nevertheless available in Hadham black-surfaced ware, Hadham oxidised ware, Nene Valley colour-coated ware and Oxfordshire red colour-coated ware. Mortaria appeared to be produced exclusively by the main late Roman industries. Wall-sided mortaria (D12) arrived from the Nene Valley, while bead-and-flanged mortaria (D5 and D6) arrived from Oxfordshire (Young type M22) and the Hadham industry.

Pottery of a broadly Roman date

Pottery belonging to this category comprised 35% of the assemblage by weight. The group is dominated by grey sandy wares. Also important are Hadham grey wares and unsourced oxidised wares. These are supplemented by south Spanish amphorae, black burnished ware, black-surfaced ware, unsourced buff ware, Colchester buff ware, Colchester buff-ware mortaria, fine grey wares, Hadham white-slipped grey ware, Hadham oxidised ware, miscellaneous white slipped sandy red wares, storage jar fabrics, samian wares and unsourced white wares.

Jars comprise the vast majority of identifiable vessels in this group and are supplemented by dishes, beakers and flagons. Other vessel forms comprise bowls, mortaria, bowl-jars and lids. Jars from this group include a variety of high-shouldered necked forms encompassed by types G21, G23, and G25 in black-surfaced ware, Hadham grey ware, Hadham oxidised ware and grey sandy-ware; along with neckless forms encompassed by types G9 and G24 in grey sandy ware, black-surfaced ware, Hadham oxidised ware and unsourced oxidised ware. Narrow necked jars (G40) in grey sandy wares and unsourced oxidised wares are also present, as are some storage jars (G42, G43 and G44). Dishes mainly comprise rimless shallow dishes (B1) in grey sandy wares, black-surfaced wares, Hadham grey wares and unsourced oxidised wares. There is also one flanged dish (B5) in grey sandy ware. Beakers (H) are present in grey sandy ware, grey fine ware, black-surfaced ware, Hadham grey ware, unsourced buff ware and unsourced oxidised ware although none are definable as a specific type. Flagons (J) are present in Colchester buff ware, grey fine ware, Hadham grey ware and unsourced oxidised ware, but also display a lack of diagnostic forms. Similarly no diagnostic bowl forms are present, although bowls (C) occur in grey sandy ware, Hadham grey ware and unsourced oxidised ware. There is also a wall-sided mortarium (*Cam* 501) in Colchester buff ware, a bowl-jar (E) in unsourced oxidised ware and two lids (K) in grey sandy ware.

Pottery from the M11 site (BAALR00) (Table 18.8)

Late Iron Age

The assemblage from the M11 site is overwhelmingly Late Iron Age in date, with Late Iron Age fabrics accounting for 98% of the pottery by weight. The assemblage is almost entirely grog-tempered, principally the fine fabric (GROG), but including coarse fabrics and a grog-and-flint-tempered fabric. Nearly all of the vessels recorded were jars. These included *Cam* 218 cordoned jars, *Cam* 229 jars with corrugated shoulders and *Cam* 256 oval everted jars in grog-tempered ware. Also present are *Cam* 260 everted rimmed jars with rilled bodies in red-surfaced grog-tempered ware. Also in grog-tempered ware are cordoned jars with short wide necks reminiscent of Thompson's type B3-4, bead rim jars of Thompson's type C4 and everted rim jars of Thompson's type C8-1. Although some jars are best described using Hawkes' and Hull's classification, others have greater affinity with Going's typology and these include neckless, high shouldered jars of type G3 (equivalent to *Cam* 256) in grog-tempered ware, and necked everted rim jars corresponding to types G19 and G21, also in grog-tempered ware. Although beakers are present in grog-tempered ware, red-surfaced grog-tempered ware and grog and flint-tempered ware, just one - a *Cam* 117 butt-beaker - was identifiable to a specific type.

Pottery of a broadly Roman date

A small amount of pottery comprising black-surfaced ware and storage jar fabric was dated to broadly to the Romano-British period.

Pottery from the LBR site (BAALB00) (Tables 18.9-18.10)

Early Roman

Material dating to the early Romano-British period accounts for 9% of the LBR assemblage. The range and proportion of fabrics is reasonably similar to that seen at the MTCP and LTCP sites. Grog-tempered wares were present, as might be expected, taking a 28% share of the early Roman assemblage by weight. Sandy grey ware also made an important contribution, while, surprisingly, the proportion of black-surfaced ware was less significant. Early Roman buff ware mortaria from Colchester, little seen at other sites, was nevertheless present here and may hint at an additional range of functions being performed at the LBR site during this period, although the piece may be intrusive. Hadham grey wares and white-slipped wares were present, as was south and central Gaulish samian ware, though all in small quantities

Jars dominate the early Roman group, accounting for 75% by eves. Mortaria and dishes each represent 10%, while cups take a 4% share. Jars include lid-seated vessels (G5) in black-surfaced ware, and a necked, 'Braughing-type' jar (G21) in sandy grey ware. Storage jar G44 was also present. Dishes included a south Gaulish samian Drag. 18/31 and a plain-rimmed grey ware dish. A Drag. 33 cup in central Gaulish samian ware was probably intrusive. The Colchester buff ware mortarium resembles hammerhead-type D11, which usually dates to the later 2nd and early 3rd centuries, and so may well also be intrusive.

Mid Roman

Pottery dating to the mid Romano-British period was relatively abundant at the LBR site, accounting for 44% by weight. The group is dominated by locally-produced reduced wares, with sandy grey ware taking the largest share of the mid Roman group at 34% by weight. Other notable wares included central Gaulish samian ware, and an early appearance - probably towards the mid 3rd century - of Oxfordshire white ware mortarium fabric. Nene Valley colour-coated ware was also present and arrived during the late 2nd century or first half of the 3rd century.

Jars were again predominant and were proportionally unchanged from the early Romano-British period. Forms were largely undiagnostic, though 'cooking-pot'-type G9 was identified. The level of dishes increased from the early Romano-British period; forms included bead-rim types (B4), the groove-rimmed B3 and plain-rimmed B1. A Drag. 31 dish was present in central Gaulish samian ware. Bead-and-flanged mortaria were available in buff ware (D4) and Oxfordshire white ware (Young M22).

Late Roman

Late Roman pottery accounts for 3% of the LBR site assemblage by weight. The group is dominated by sandy grey ware, supplemented by buff ware and Hadham grey ware. Forms include a plain-rimmed dish and a jar (no form identified).

Pottery of broadly Roman date

Grey sandy ware is the most common fabric, supplemented mainly by black-surfaced ware, Hadham grey ware and storage jar fabric. Other fabrics include unsourced oxidised ware, white-slipped Hadham grey ware, and buff ware. Jars dominate, but dishes and beakers were also present.

Pottery from SG (BAASG03)

Late Iron Age

The site yielded a small amount of pottery dated to the Late Iron Age. All of the pottery was grog-tempered. Vessels include a *Cam* 254 'saucepan shaped' jar in grog tempered ware, a neckless high shouldered jar (G3) also in grog-tempered ware and one vessel that could not be assigned to a specific type in grog and flint-tempered ware.

Pottery of broadly Roman date

Material identified as black-surfaced ware Hadham grey ware was also recovered. There were no identifiable vessel forms.

Pottery from the Standby Runway Site (BAASR)

Some 50 sherds of grog-tempered pottery belonging to the Late Iron Age or early Romano-British period was recovered from the site. A single vessel was identified - a *Cam* 254 saucepan-shaped jar.

Discussion

Chronology

The assemblage was large and in relatively good condition, with substantial key groups from individual contexts providing sufficient chronological checks for individual pieces. Dates of deposition may be regarded as reasonably secure and the range of pottery present provides a good idea of the chronological emphasis.

The assemblage was divisible into four distinct chronological groups or ceramic phases, which correspond loosely to those identified by Going (1992, 98-103) for Roman Britain as a whole and more specifically to those attested by Wallace *et al.* (2004, 312) for the Essex County Council sites, excavated during earlier fieldwork at Stansted airport. These chronological groups comprised a Late Iron Age phase, running from the late 1st century BC to the late 1st century AD (roughly 20 BC-AD 70), an early Roman phase, running from the late 1st century AD to the early 2nd century AD (AD 40-AD 130), a middle Roman phase, running from the middle 2nd century AD to the middle 3rd century AD (AD 140-AD 240) and a late Roman phase, running from the mid 3rd century until the end of the 4th century (AD 240-AD 400).

A substantial assemblage of pottery belonging to the Late Iron Age tradition attests to a considerable degree of activity during this period. Platters and jars largely in grog-tempered wares suggest that this activity was concentrated in the 1st century AD. A lack of amphorae would seem to reinforce the contention that Late Iron Age activity was confined to the 1st century AD and was certainly no earlier than the late 1st century BC, although a concomitant absence of imported Gallo-Belgic forms makes it impossible to be certain of the chronology. Whilst bearing these caveats in mind it would seem that the Late Iron Age phase is contemporary with that at the Essex County Council 'DCS' site (Havis and Brooks 2004), rather than with the earlier material from the 'ACS' site discussed by Going (2004, 139-65) which includes amphorae of Dressel 1A type (Going 2004, 141).

The early Roman assemblage also includes a substantial proportion of grog-tempered material and includes forms which may be assigned to Hawkes and Hull's *Camulodunum* typology. There is thus a degree of chronological overlap between the two assemblages. However, grey wares and black-surfaced wares dominate this group and the range of forms in these fabrics compares well with those seen in Wallace *et al.'s* early Roman 'group 2' at the 'DCS' site (Wallace *et al. 2004*,303). In contrast to the Essex County Council sites, however, the early Roman group at Stansted includes some Hadham white slipped ware, although it conforms with Wallace's group in the absence of Hadham oxidised ware. Fine wares are absent, with the exception of some south and central Gaulish samian and a barbotine decorated cup in central Gaulish glazed ware.

The sites were generally poorly supplied with middle Roman pottery and like the material from the Essex County Council sites much of it may have been residual (Wallace *et. al.* 2004, 310). Although black-surfaced wares, Hadham grey wares and grey sandy wares still dominate this group, the range of forms is notably different from that seen in the preceding group, with large numbers of beakers and dishes including deep bead-rimmed dishes and dishes with incipient flanged rims; both of which are diagnostic of the period. Continental and regional imports are far more prominent when compared to coarse wares, although this may be a function of the small size of the group. They include a range of beakers, cups and bowls in east and central Gaulish 'Rhenish' wares, Colchester colour-coats, Colchester buff wares and samian wares. Apart from the greater number of imports, one chronological indicator which separates this group from the early Roman material is the presence of Hadham oxidised ware, although this still only occurs in small amounts.

Late Roman groups are assigned to this phase largely on the basis of the predominance of Hadham oxidised wares, in which there is a range of bowl-jar forms, along with bowls and dishes. The presence of late shell-tempered ware, Nene Valley colour-coated ware and Oxfordshire red colour-coated ware also acted as a chronological indicator, and the range of forms seen in Nene Valley colour-coated ware and late shell-tempered ware compare well with those in Wallace *et. al*'s groups 3-5 from the DCS and DFS sites (Wallace *et. al.* 2004, 306-8). Like the assemblage from the DCS and DFS sites, the Stansted group includes very little 'exotic' material in the form of continental imports but unlike the DCS/DFS assemblage it contains no céramique à l'éponge (Wallace *et al.* 2004, 312). Alice Holt grey ware, absent at the DCS/DFS sites also fails to make an appearance at Stansted, but as Wallace *et al.* suggest (2004, 312) this should not be seen as too surprising given the small amounts found in the area. There are further similarities with 'DCS'/'DFS' groups 3-5, notably the presence of Portchester D ware and the relative lack of Rettendon-type wares (Wallace *et al.* 2004, 312).

Social and Economic Status

The Late Iron Age and Roman pottery from Stansted in general indicates settlements of moderate status, with a relative lack of regional and continental imports, and fine tablewares. In the Late Iron Age both the domestic and funerary assemblage was dominated by grog tempered wares, which exhibited a range of jar forms common to south-east England such as saucepan-shaped cooking pots and oval-bodied jars with everted rims and all over rilling. Terra rubra, terra nigra and North Gaulish white wares were scarce and there were few other Gallo-Belgic type imports. Indeed even imitations of Gallo-Belgic forms such as *Cam* 22 type platters were very restricted in their distribution. Additionally there were no amphorae, although as discussed by Going (2004, 141) for the Essex County Council excavations this may be a function of chronology rather than status. In the early Romano-British period the assemblage was dominated by locally produced grey sandy wares and Hadham grey wares, with necked and everted jar forms that had grown out of the local Late Iron Age traditions. Large numbers of G19 cordoned jars are particularly noticeable in this period. Once again regional and continental imports are relatively scarce, being largely restricted to Colchester buff wares and small amounts of south and central Gaulish samian wares. Drinking and eating vessels are most often butt-beakers or H1 globular beakers and A2 type platters. Whilst bearing in mind the caveats concerning the inference of status from pottery expressed in the section on the funerary pottery below, none of the early Roman pottery can be seen as particularly high-status, with pottery from the graves mainly comprising grey sandy ware jars and platters and beakers in black-surfaced ware. The middle Roman assemblage perhaps demonstrated signs of higher status, dominated as it was by platters and bowls rather than jars. Imported fabrics such as central Gaulish samian also played a more prominent role. However, the middle Roman assemblage is really too small to be taken as representative of a real former distribution. In the late Romano-British period the tradition of an assemblage dominated by locally produced wares re-asserted itself and the assemblage was now dominated by Hadham wares, both oxidised and reduced, grey sandy wares and black-surfaced wares. The dominant vessel form remained the jar, a pattern common on low, and middling status rural sites (see Fig. 18.1). Never-the-less continental and regional imports were stronger in this phase than they had been in any earlier phase, being represented by Oxfordshire and Nene Valley colour-coated wares and central, and east Gaulish ‘Rhenish’ wares. However, this greater diversity is perhaps a function of later Roman pottery in general and in particular the greater diversity of sources of fine ware, rather than a sign of the increasing social status of the inhabitants.

Detailed analysis of the assemblage by functional types throws more light on questions of social status. Indeed, Evans (2001) has argued that there are significant differences in the functional composition of assemblages from different kinds of site with ‘consistent variations between, principally, forts and towns on the one hand and basic rural sites on the other, with villas tending to fall between the two’ (Evans 2001, 28). A predominance of jars as compared to table wares (platters, dishes and bowls) is indicative of low status rural sites, although it is acknowledged that there is a chronological element to this, with earlier sites being much more jar dominated (Evans 2001, 28).

If we examine the functional composition of the Stansted assemblage (see Fig. 18.1), it becomes immediately obvious that the assemblage as a whole is dominated by jars, with 62% of vessels being classified as jars and only 25% being classified as open forms (platters, dishes, bowls and bowl/jars). This would seem to back up the claim that the occupation at Stansted was in general fairly low status. When compared with data from other Essex sites these figures are even more revealing. Data on the functional composition of assemblages expressed as percentages of eves was collected from four sites: Great Holts Farm (Martin 2003), Great Dunmow (Going and Ford 1988), Chelmsford (Going 1987) and Stansted ‘DCS’ (Wallace *et al.* 2004). These data were expressed as a scatter chart similar to those used by Evans (Evans 2001).

Figure 18.2 demonstrates clearly that the Stansted assemblage contained a higher percentage of jars than either Great Holts Farm, Great Dunmow or Chelmsford and a lower percentage of open forms than Great Holts Farm or Great Dunmow. All three of these assemblages might be expected to be of relatively high status when compared to Stansted, as Great Holts Farm was a villa, Great Dunmow was a small town and the Chelmsford assemblage largely came from the mansio. It is interesting that the assemblage from Stansted displayed a higher percentage of both jars and open forms than that from Chelmsford. This may be explained by the sheer variety of vessel classes from Chelmsford which would account for each vessel class forming a lower percentage of the assemblage as a whole. As expected the proportion of jars from

Stansted compares well with that from Stansted 'DCS' (both are around 60% of eves), although the proportion of open forms from Stansted is considerably lower, perhaps indicating that Stansted DCS was of a slightly higher status. Overall a detailed examination of functional vessel classes backs up the more impressionistic assertion that this is an assemblage indicating moderate to low status rural occupation.

The value of Samian ware for assessing site status remains a matter of debate, although proportions of decorated to plain wares may be of some use (Biddulph 2007a; Woolf 1998, 201-2; Willis 1998, 105). Understanding of status at Stansted might be further enhanced using this method. Biddulph (2007a) argues that rural sites have the lowest proportion of decorated samian as a proportion of samian eves, but that more than 10% is typical, basing his argument upon data provided by Willis (1998, table 3). At Stansted 15% of samian by eves was decorated and this compares quite well with other sites in the region. Decorated samian accounted for 10% of samian vessels represented at Great Dunmow (Wallace 1997, 69-70), and 20% at Rayne (Cheer 1989, table 2). In contrast only 4% of samian vessels were decorated at nearby Strood Hall (Little Canfield) on the route of the A120 Trunk Road. The samian therefore appears to show, that while not of very low status, the occupation of Stansted was consistent with other moderate to low status rural settlements in the region.

Pottery from the burials

A total of 84 pottery vessels were recovered from 43 graves, located in several different areas of the site. The burials spanned the 1st century AD through to the mid 2nd century, with the earliest group of burials deposited in the Late Iron Age. Twenty-eight of the 43 graves contained jars which may have functioned as repositories for the cremated bone. Many of these had suffered damage through post-depositional disturbance and had lost their typological traits. Twelve jars could be assigned specific types: one grave yielded a 'saucepan-shaped jar' (*Cam* 254), four yielded necked everted rim jars (G19-G22), one grave yielded a tall jar with rippled or corrugated shoulder, in grog-tempered ware of Thompson's type B2-3, one yielded a narrow necked jar (G40), another contained a necked high-shouldered jar (G23), one contained a grog-tempered wide mouthed jar with lid-seating (*Cam* 250) and one contained a grog-tempered pedestal jar (*Cam* 204). At Strood Hall, beakers and flagons were also pressed into service as cinerary containers (Biddulph 2007b), as was one butt-beaker from grave number 11 at the 'DFS' site (Havis and Brooks 2004, 190). At Stansted two beakers were the only vessels other than jars to be identified as cinerary containers. However some vessels were in poor condition and the presence of a cinerary vessel in Verulamium region white ware suggests another container other than a jar.

Ancillary vessels were deposited in 27 graves. Each grave contained an average of 1.9 vessels, a figure comparable with the two vessels per grave recovered from Strood Hall (Biddulph 2007b). The majority of graves therefore contained two vessels or fewer, although eight graves contained three vessels, four graves contained four vessels and three graves contained between five and seven vessels. The ancillary vessel assemblage was weighted strongly towards drinking vessels (beakers, cups and flagons) which represented 32% by vessel count. Of the 27 graves that yielded ancillary vessels, 12 provided for drinking by the deposition of at least one vessel suitable for that purpose and sometimes two or more. Graves 349139 and 330033 contained two such vessels, and graves 328052 and 330041 contained three. Nine per cent of ancillary vessels could be classed as eating or table vessels (platters and dishes) and these were recovered from five graves. An analysis of functional vessel class similar to that carried out for the assemblage as a whole reveals interesting differences in terms of functional vessel class between the funerary assemblage and the assemblage as a whole. In contrast to the wider assemblage the funerary assemblage is dominated by drinking vessels and open forms are nearly as frequent as jars (see Fig.18.3). This compares well with the funerary assemblage from the DCS/DFS sites (Wallace *et al.* 2004, 241), which is contemporary with the Stansted (Framework) cemetery. Here open forms account for 24% of eves compared to 23% for jars and 32% for drinking forms (cups and beakers) (see Fig. 18.3). The apparent discrepancy between Stansted and the DCS/DFS sites in terms of numbers of jars and open forms may be explained by the fact that many vessels were in poor condition at Stansted and were therefore unidentifiable. The difference between the two sites is therefore probably not as stark as it may appear from Figure 18.3.

The contrast between the funerary and non-funerary assemblage highlights well the complexity of inferring status from pottery. On an ostensibly low to moderate status site we have a funerary assemblage that taken in isolation on the basis of functional vessel types could be seen as indicating moderate to high status. Clearly the significance of the choice or number of vessels deposited for social status is a complex issue and other non ceramic grave goods may be a surer indicator of wealth. Suffice it to say that it is not necessarily the case that higher numbers of ancillary vessels, or a wider range of functional types of vessel meant that the occupant of the grave had a higher social status, but see Biddulph on funerary assemblages in Essex for a fuller discussion of this issue (Biddulph 2005, 39).

Catalogue of Illustrated Pottery (Figs 18.4-18.7)

Early Roman (AD 43-120/30)

Context 129025. Late 1st century AD

1. Platter (Going A2). Fabric HAR.
2. Platter (Drag. 18). Fabric SGSW.
3. High-shouldered jar (Going G18). Fabric HAR.
4. High-shouldered jar (Going G19). Fabric HAR.
5. Necked ‘Braughing’ jar (Going G21). Fabric GROG.
6. Necked ‘Braughing’ jar (Going G21). Fabric HAR.
7. Globular beaker (Going H1.5). Fabric MIC.

Late Roman (AD 260/70-410+)

Context 6606. Mid to late 4th century AD

8. Plain-rimmed dish (Going B1.3). Fabric BSW.
9. Plain-rimmed dish (Going B1.3). Fabric HAB.
10. Bead-and-flanged dish (Going B6). Fabric HAR.
11. Wall-sided bowl (Young P24). Fabric OXP.

12. Wall-sided mortarium (Going D12). Fabric NVCM.

13. Bowl-jar. Fabric HAX.

14. Jar. Fabric HAX.

15. Oval-bodied jar (Going G24). Fabric HAR.

Context 350022. Mid to late 4th century AD

16. Plain-rimmed dish (Going B1). Fabric HAB.

17. Plain-rimmed dish (Going B1). Fabric HAB.

18. Plain-rimmed dish (Going B3). Fabric GRS.

19. Bead-rimmed bowl or dish (Going B4). Fabric HAX.

20. Bead-and-flanged dish (Going B6). Fabric HAR.

21. Beaker with 'Romano-Saxon' decoration (Roberts C14.12). Fabric HAX.

Vessels of intrinsic interest

22. Rouletted bowl. New Form. Fabric SILT. Early-mid 1st century. Context 361002.

23. Jar or beaker base with x-graffito scored before firing. Fabric GROG. Mid 1st century. Context 155010.

24. Deep bowl imitating Drag. 37 (Going C12). Fabric RED. Late 1st-early 2nd century. Context 360008.

25. Bag-shaped beaker (Going H20). Fabric HAX. Mid-late 2nd century. Context 345034.

26. Wall-sided or collared mortarium (*Cam* 501); potter's stamp at spout. Fabric BUFM. Mid-late 2nd century. Context 1709.

27. Beaker with face-mask. Fabric CGRHN. Late 2nd-early 3rd century. Context 328268.

28. Jar or dish base with complex x-graffito incised after firing. Fabric GRS. Mid 2nd-mid 4th century. Context 301001.

29. Handled mug (*Cam* 124). Fabric GRF. Mid 2nd-mid 4th century. Context 301001.

30. Dish base with graffito cut after firing. Fabric HAB. 3rd-4th century. Context 354009.

31. Shallow dish, new form. Fabric HAX. Late 3rd-4th century. Context 315120.

32. Narrow-necked flagon; graffito on base incised before firing. Fabric HAX. 4th century. Context 359025.

33. Jar base with x-graffito scored after firing. Fabric HAR. 4th century. Context 136006.

34. Necked jar (Going G27), with three notches in the rim cut after firing. Fabric LSH. Mid-late 4th century. Context 362022.

35. Dish base with graffito incised after firing. Fabric HAB. Mid-late 4th century. Context 354031.

36. Bowl with 'Romano-Saxon' decoration (Roberts A19.2). Fabric HAB. Mid-late 4th century. Context 354031.

Pottery from graves

Grave 1718.

37. Jar. Fabric HAR. Context 1720.

Not illustrated: Unidentified vessel, fabric GRS

Grave 143075. Late Iron Age

38. Necked 'Braughing' jar (Going G21). Fabric GROG. Context 143076.

Grave 151004. Late Iron Age

39. Base from pedestal jar. Fabric GROG. Context 151006.

Grave 328006. Mid 1st to early 2nd century AD

40. Cinerary urn. High-shouldered jar (Going G19). Fabric BSW. Context 328007.

Grave 328008. Mid 1st century AD

41. Cinerary urn. High-shouldered jar (Going G19). Fabric HAR. Context 328009.
42. Butt-beaker (Going H7). Fabric RED. Context 328009.
43. Beaker. Fabric HAR. Context 328009.
44. Narrow-necked jar or flagon. Fabric GROG. Context 328009.

Grave 328012. Late Iron Age

45. Cinerary urn. Necked jar (*Cam* 218). Fabric GROG. Context 328013.

Grave 328014. Mid 1st century AD

46. High-shouldered jar (Going G18). Fabric GROG. Context 328015 (backfill).

    Not illustrated: Beaker (Going H10)

Grave 328018. Mid 1st century AD

47. Butt-beaker (Going H7). Fabric GRS. Context 330013.

    Not illustrated: Unidentified vessel, fabric GROG

Grave 328032. Mid 1st century AD

48. Cinerary urn. Flagon. Fabric VRW. Context 328031.

    Not illustrated: Unidentified vessel, fabric GROG

Grave 328036. Mid to late 1st century AD

49. Platter (*Cam* 22). Fabric BSW. Context 328037.
50. Narrow-necked jar (Going G40). Fabric RED. Context 328037.
51. Butt-beaker (Going H7). Fabric MWSGF. Context 328037.
52. Beaker base with internal potter's stamp, ?copying *terra nigra*. Fabric BSW. Context 328037.

Grave 328038. Early to mid 1st century AD

53. High-shouldered jar (Going G20). Fabric GROG. Context 328039.
54. Necked jar. Fabric GROG. Context 328039.

    Not illustrated: butt-beaker (Going H7), fabric GROG

Grave 328044. Mid 1st century AD

55. Platter (Going A2). Fabric BSW. Context 328051.
56. Necked jar (Going G22). Fabric GROG. Context 328046.
57. Beaker. Fabric GROG. Context 328049.

Grave 328052. Early to mid 1st century AD

58. Platter (*Cam* 22). Fabric GROG. Context 328066.
59. High-shouldered jar (Going G20). Fabric GROG. Context 328058.
60. Cinerary urn. Cordoned jar. Fabric GROG. Context 328054.
61. Cordoned jar or beaker (Thompson B2-3). Fabric GROG. Context 328063.

Not illustrated: Butt-beaker (Going H7), fabric RED; beaker, fabric GROG

Grave 330018. Mid 1st century AD

62. High-shouldered jar (Going G20). Fabric GRS. Context 330017.
63. Cinerary urn. Jar. Fabric BSW. Context 330017.

Grave 330022. Early to mid 1st century AD

64. Platter (*Cam* 26). Fabric GROG. Context 330023.

Not illustrated: Cinerary urn, unidentified vessel, fabric GROG

Grave 330033. Mid to late 1st century AD

65. Cup (Drag. 27g). Fabric SGSW. Context 330034.

Not illustrated: Flagon, fabric RED

Grave 330036. Late Iron Age

66. High-shouldered jar (Going G19). Fabric GROG. Context 330037.

Not illustrated: Beaker, fabric GROG; up to two unidentified vessels, fabric GROG

Grave 330038. Mid to late 1st century AD

67. Platter (Going A2). Fabric GRS. Context 330039.
68. Carinated beaker (Going H10). Fabric BSW. Context 330039.

Not illustrated: Cinerary urn, jar, fabric STOR

Grave 330041. Mid 1st century AD

69. Everted-rim beaker. Fabric BSW. Context 330045.
70. Butt-beaker (*Cam* 116). Fabric GROGRS. Context 330048.
71. Lid (Hawkes and Hull 1947, plate LXXXV, no. 3). Fabric GROG. Context 330049.

Not illustrated: Beakers, fabrics BSW; beaker, fabric GRS

Grave 330052. Mid 1st century AD

72. Jar. Fabric BSW. Context 330056.

Not illustrated: Cinerary urn, unidentified vessel, fabric GROG

Grave 332014. Mid 2nd century AD

73. Dish (Drag. 18/31). Fabric CGSW. Context 332015.

Not illustrated: Unidentified vessel, fabric GRS; Cinerary urn, ?flagon, fabric VRW.

Grave 349126. Mid 1st century AD

74. Cinerary urn. Jar or beaker. Fabric HAR. Context 349128.
75. Jar. Fabric GROG. Context 349130.

Grave 349136. Mid to late 1st century AD

76. Platter (Drag. 18). Fabric SGSW. Context 349135.

Grave 349139. Mid to late 1st century AD

77. Hemispherical cup (Going F1). Fabric COLCE. Context 349150.

78. Cinerary urn. Beaker. Fabric GRS. Context 349146.

79. Beaker. Fabric GRS. Context 349152.

Not illustrated: Bowl (*Cam* 250), fabric ESH; flagon, fabric COLB; unidentified vessel, fabric BSW

Table 18.1: Quantification of Roman pottery by site

Site code and name	No. Sherds	Weight (g)
LTCP (BAACP99, BAACP00 and BAACP01)	11,043	103,712
MTCP (BAAMP99 and BAAMP00)	16,073	117,840
M11 (BAALR00)	1,069	11,316
LBR (BAALB00)	1,036	12,014
SG (BAASG03)	89	280
Standby Runway (BAASR00)	49	457
Total	29,359	245,619

Table 18.2: Fabric codes

ECC FAU codes	NRFRC codes	Chelmsford codes	Description
ABAET	BAT AM 1-3	55	South Spanish amphora fabric
AITAL	ITA AM 1	-	Italian amphora fabric
BB1	DOR BB 1	40	Black-burnished ware category 1
BB2	CLI/COL/COO/MUC BB 2	41	Black-burnished ware category 2
BSW	-	-	Black-surfaced ware
BUF	-	31	Unsourced buff ware
BUFM	-	31	Unsourced buff ware mortaria
CGRHN	CNG BS	8	Central Gaulish Rhenish ware
CGSW	LEZ SA 2	-	Central Gaulish samian ware
COLB	COH WH	27	Colchester buff ware
COLBM	COH WH	27	Colchester buff ware mortarium fabric
COLC	COL CC 2	1	Colchester colour-coated ware
COLCE	COL CC 1	-	Early Colchester colour-coated ware
EGRHN	MOS BS	9	East Gaulish Rhenish ware
EGSW	-	-	East Gaulish samian ware
ESH	-	50	Early shell-tempered ware
GRF	-	39	Fine grey ware
GROG	SOB GT	-	Fine/medium grog-tempered ware
GROGC	-	-	Coarse grog-tempered ware
GROGFL	-	-	Fine/medium grog- and flint-tempered ware (not in ECC series)
GROGRF	-	-	Fine red-surfaced grog-tempered ware
GROGRS	-	-	Red-surfaced grog-tempered ware
GRS	-	47	Sandy grey ware
HAB	HAD RE 2	35	Hadham black surfaced ware
HAR	HAD RE 1	36	Hadham grey ware
HAWG	-	-	Hadham white-slipped grey ware
HAWO	-	14	Hadham white-slipped oxidised ware
HAX	HAD OX	4	Hadham oxidised ware
HAXM	HAD OX	4	Hadham oxidised mortarium fabric
LESTA	-	19	'London-Essex' stamped ware
LSH	HAR/ROB SH	51	Late shell-tempered ware
MIC	-	-	Miscellaneous micaceous ware
MICW	-	-	Miscellaneous tempered Late Iron Age coarse wares
MWSGF	-	-	Miscellaneous white-slipped fine grey wares
MWSGS	-	-	Miscellaneous white-slipped sandy grey wares
MWSRS	-	15	Miscellaneous white-slipped sandy red wares
NGWF	NOG WH 1-2	-	North Gaulish white fine ware
NGWFS	NOG WH 3	-	North Gaulish white fine sandy ware
NVC	LNV CC	2	Nene Valley colour-coated ware
NVCM	LNV CC	2	Nene Valley colour-coated mortarium fabric
NVM	LNV WH	24	Nene Valley white ware mortarium fabric
NVP	LNV PA	-	Nene Valley parchment ware
OXP	OXF PA	30	Oxfordshire parchment ware
OXRC	OXF RS	3	Oxfordshire red colour-coated ware
OXRCM	OXF RS	3	Oxfordshire red colour-coated mortarium fabric
OXWM	OXF WH	25	Oxfordshire white ware mortaria
PORD	OVW WH	-	Portchester 'D' white ware
RED	-	21	Unsourced oxidised wares
RET	-	48	Rettendon-type wares
SGSW	LGF SA	-	South Gaulish samian ware
SILT	-	-	Silty ware
STOR	-	44	Storage jar fabric
TN	GAB TN 1-2	-	*Terra nigra*
TR	GAB TR	-	*Terra rubra*
TSG	-	-	Unsourced samian wares
UPOT	-	-	Unidentified pottery
UWW	-	-	Unsourced white wares
VRW	VER WH	26	Verulamium region white ware
VRWM	VER WH	26	Verulamium region white ware mortaria

Table 18.3: Quantification of pottery (MV = Minimum number of vessels; eve = estimated vessel equivalence)

Fabric	Sherds	% sherds	Weight (g)	% wt	MV	% MV	EVE	% EVE
ABAET	11	<1%	3506	1%	1	<1%	0.3	<1%
AITAL	1	<1%	15	<1%				
BB1	26	<1%	548	<1%	5	<1%	0.8	<1%
BB2	16	<1%	153	<1%	2	<1%	0.67	<1%
BSW	2531	9%	18746	8%	431	13%	20.66	9%
BUF	96	<1%	644	<1%	5	<1%	0.79	<1%
BUFM	1	<1%	66	<1%	1	<1%	0.15	<1%
CGRHN	13	<1%	23	<1%	1	<1%	0.31	<1%
CGSW	72	<1%	1045	<1%	16	<1%	2.53	1%
COLB	214	1%	802	<1%	6	<1%	1	<1%
COLBM	9	<1%	616	<1%	2	<1%	0.29	<1%
COLC	42	<1%	409	<1%	7	<1%	0.7	<1%
COLCE	20	<1%	58	<1%	1	<1%	0.36	<1%
EGRHN	3	<1%	7	<1%				
EGSW	7	<1%	143	<1%	1	<1%	0.25	<1%
ESH	185	1%	1326	1%	11	<1%	1.06	<1%
GRF	423	1%	2930	1%	50	1%	5.56	2%
GROG	11151	38%	82022	33%	463	14%	56.25	24%
GROGC	556	2%	14853	6%	18	1%	1.53	1%
GROGFL	86	<1%	507	<1%	5	<1%	0.56	<1%
GROGRF	93	<1%	145	<1%	2	<1%	0.13	<1%
GROGRS	204	1%	1898	1%	10	<1%	1.69	1%
GRS	5348	18%	42571	17%	703	21%	53.2	23%
HAB	245	1%	4997	2%	52	2%	5.82	2%
HAR	3183	11%	24030	10%	773	23%	35.83	15%
HAWG	23	<1%	139	<1%	1	<1%	0.1	<1%
HAWO	42	<1%	208	<1%	2	<1%	0.13	<1%
HAX	1294	4%	8374	3%	403	12%	16.76	7%
HAXM	21	<1%	1071	<1%	186	6%	0.92	<1%
LESTA	80	<1%	464	<1%	2	<1%	0.71	<1%
LSH	428	1%	3140	1%	37	1%	3.97	2%
MIC	6	<1%	98	<1%	2	<1%	0.23	<1%
MICW	338	1%	2249	1%	8	<1%	0.67	<1%
MISC	3	<1%	1	<1%				
MWSGF	115	<1%	172	<1%	1	<1%	0.19	<1%
MWSGS	14	<1%	210	<1%	1	<1%	0.5	<1%
MWSRS	23	<1%	125	<1%	1	<1%	0.1	<1%
NGWF	40	<1%	185	<1%				
NGWFS	1	<1%	19	<1%	1	<1%	0.45	<1%
NVC	96	<1%	1231	1%	8	<1%	0.93	<1%
NVCM	1	<1%	25	<1%	1	<1%	0.03	<1%
NVM	19	<1%	376	<1%	4	<1%	0.35	<1%
NVP	1	<1%	11	<1%	1	<1%	0.05	<1%
OXP	4	<1%	68	<1%	1	<1%	0.1	<1%
OXRC	16	<1%	223	<1%	4	<1%	0.65	<1%
OXRCM	2	<1%	30	<1%				
OXWM	7	<1%	625	<1%	4	<1%	0.44	<1%
PORD	2	<1%	11	<1%				
RED	1349	5%	5807	2%	59	2%	7.92	3%
RET	26	<1%	375	<1%	3	<1%	0.52	<1%

SGSW	80	<1%	949	<1%	17	1%	3.06	1%
SILT	33	<1%	276	<1%	1	<1%	0.5	<1%
STOR	405	1%	13969	6%	29	1%	2.14	1%
TN	3	<1%	4	<1%				
TR	2	<1%	3	<1%				
TSG	2	<1%	2	<1%				
UPOT	96	<1%	973	<1%	4	<1%	0.5	<1%
UWW	8	<1%	9	<1%				
VRW	239	1%	1961	1%	1	<1%	0.28	<1%
VRWM	4	<1%	176	<1%	1	<1%	0.2	<1%
Total	29359	-	245619	-	3349		232.84	-

Table 18.4: LTCP site - Roman pottery from phased deposits, quantification by weight (g)

Ware	**Late Iron Age/Early Roman**		**Early Roman**		**Late Roman**	
	Wt (g)	**% wt**	**Wt (g)**	**% wt**	**Wt (g)**	**% wt**
ABAET			64	<1%	28	<1%
BB1					86	1%
BSW	542	2%	4357	25%	675	11%
BUF	91	<1%	20	<1%	18	<1%
COLB	114	1%	82	<1%	13	<1%
CGSW					58	1%
COLCE			5	<1%		
EGSW					8	<1%
ESH	47	<1%	134	1%	8	<1%
GRF	8	<1%			132	2%
GROG	15424	71%	5204	30%	680	11%
GROGC	3726	17%	1627	9%		
GROGFL	22	<1%			105	2%
GROGRS	40	<1%	19	<1%		
GRS	608	3%	2823	16%	2401	39%
HAB	115	1%			70	1%
HAR	39	<1%	1627	9%	1280	21%
HAWO					1	<1%
HAX			94	1%	41	1%
MICW	109	1%				
MIC			86	<1%		
NGWF	137	1%	44	<1%		
NVC					196	3%
RED	14	<1%	247	1%	13	<1%
SGSW			95	1%		
STOR	740	3%	554	3%	289	5%
VRW			216	1%		
Total	21766		17298		6102	

Table 18.5: LTCP site - Roman pottery from phased deposits, quantification by estimated vessel equivalence (eve)

Vessel class	**Late Iron Age/early Roman**		**Early Roman**		**Late Roman**	
	EVE	**% EVE**	**EVE**	**% EVE**	**EVE**	**% EVE**
A	0.27	2%	1.4	9%		
B	0.25	2%	0.07	<1%	1.2	23%
C	0.19	2%	1.38	8%	0.1	2%
E					0.56	11%
G	11.21	91%	12.29	75%	3.36	63%
H	0.07	1%	1.09	7%		
J			0.2	1%	0.11	2%
K	0.35	3%				
Total	12.34		16.43		5.33	

Table 18.6: MTCP site - Roman pottery from phased deposits, quantification by weight (g)

Fabric	**Late Iron Age/ Early Roman**		**Early Roman**		**Mid Roman**		**Late Roman**	
	Wt	**% wt**	**Wt**	**% wt**	**Wt**	**% wt**	**Wt**	**% wt**
BSW	219	4%	2826	15%	572	15%	917	5%
BUF			16	<1%	35	1%	20	<1%
CGSW			376	2%	9	<1%	3	<1%
COLB			200	1%			38	<1%
COLC							19	<1%
COLCE			53	<1%				
EGSW							11	<1%
ESH	35	1%	50	<1%			54	<1%
GRF	210	4%	722	4%	34	1%	237	1%
GROG	4270	79%	5137	28%	935	24%	742	4%
GROGC	92	2%	84	<1%	30	1%	135	1%
GROGFL							61	<1%
GROGRF	132	2%						
GROGRS			3	<1%	378	10%	35	<1%
GRS	380	7%	2473	13%	602	15%	4663	23%
HAB							2443	12%
HAR			1908	10%	410	11%	4307	21%
HAWG							2	<1%
HAWO			8	<1%				
HAX			6	<1%	337	9%	3025	15%
HAXM							222	1%
LESTA			2	<1%				
LSH			6	<1%	3	<1%	979	5%
MICW	93	2%	119	1%	69	2%	12	<1%
MISC	1	<1%						
MWSGF			129	1%				
NVC					6	<1%	208	1%
NVCM							25	<1%
NVM							136	1%
OXP							68	<1%
OXRC							32	<1%
OXWM							10	<1%
RED			1461	8%	114	3%	1123	6%
RET			138	1%	1	<1%	93	<1%
SGSW			377	2%	13	<1%		

STOR			752	4%	352	9%	727	4%
UPOT	1	<1%						
UWW			1	<1%				
VRW			1570	9%			23	<1%
Total	5433		18417		3900		20370	

Table 18.7: MTCP site - Roman pottery from phased deposits, quantification by estimated vessel equivalence (eve)

Vessel Class	**Late Iron Age/ Early Roman**		**Early Roman**		**Mid Roman**		**Late Roman**	
	EVE	**% EVE**	**EVE**	**% EVE**	**EVE**	**% EVE**	**EVE**	**% EVE**
A	0.83	23%	3.15	17%				
B			1.05	6%	0.73	14%	8.38	30%
C			0.05	<1%	0.09	2%	0.48	2%
D							0.51	2%
E					0.08	2%	1.68	6%
F			1.36	7%				
G	2.12	60%	8.95	47%	2.19	42%	14.2	51%
H	0.59	17%	3.69	19%	1.15	22%	2.34	8%
J			0.69	4%			0.14	1%
K					1	19%	0.08	<1%
Total	3.54		18.94		5.24		27.81	

Table 18.8: M11 site - Late Iron Age pottery from phased deposits, quantification by estimated vessel equivalence (eve)

Fabric	**Vessel class**		**Total**
	Jar	**Beaker**	
GROG	5.16	0.29	5.45
GROGC	0.04		0.04
GROGFL		0.08	0.08
GROGRS	0.3	0.1	0.4
STOR	0.08		0.08
Total	5.58	0.47	6.05

Table 18.9: LBR site - Roman pottery from phased deposits, quantification by weight (g)

Fabric	**Early Roman**		**Mid Roman**		**Late Roman**	
	Wt	**% wt**	**Wt**	**% wt**	**Wt**	**% wt**
BSW	98	9%	426	8%		
BUF	1	<1%			55	17%
BUFM			66	1%		
CGSW	18	2%	130	2%		
COLB			10	<1%		
COLBM	174	17%				
COLC			2	<1%		
ESH	1	<1%				
GROG	124	12%	106	2%		
GROGC	164	16%				
GRS	198	19%	1768	34%	261	81%
HAR	48	5%	429	8%	8	2%
HAWO	3	<1%	7	<1%		
HAX	2	<1%	82	2%		
MWSGS			93	2%		
NVC			19	<1%		
OXWM			151	3%		

RED	10	1%	119	2%		
SGSW	7	1%				
STOR	198	19%	1846	35%		
Total	1046		5254		324	

Table 18.10: LBR - Roman pottery from phased deposits, quantification by estimated vessel equivalence (eve)

Vessel class	**Early Roman**		**Mid Roman**		**Late Roman**	
	EVE	**% EVE**	**EVE**	**% EVE**	**EVE**	**% EVE**
B	0.12	10%	0.77	17%	0.05	20%
D	0.12	10%	0.31	7%		
F	0.05	4%				
G	0.88	75%	3.43	76%	0.2	80%
Total	1.17		4.51		0.25	

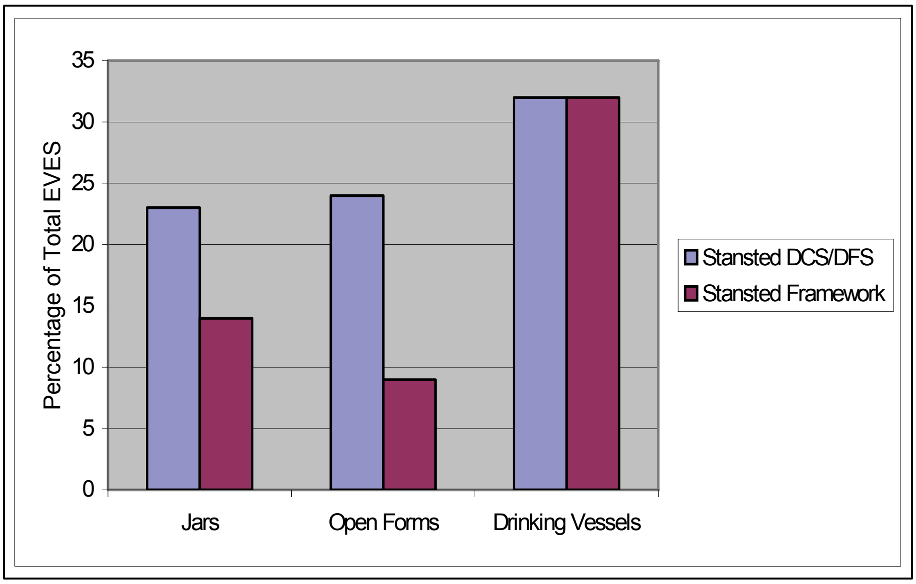


Figure 18.1: Proportions of different vessel classes

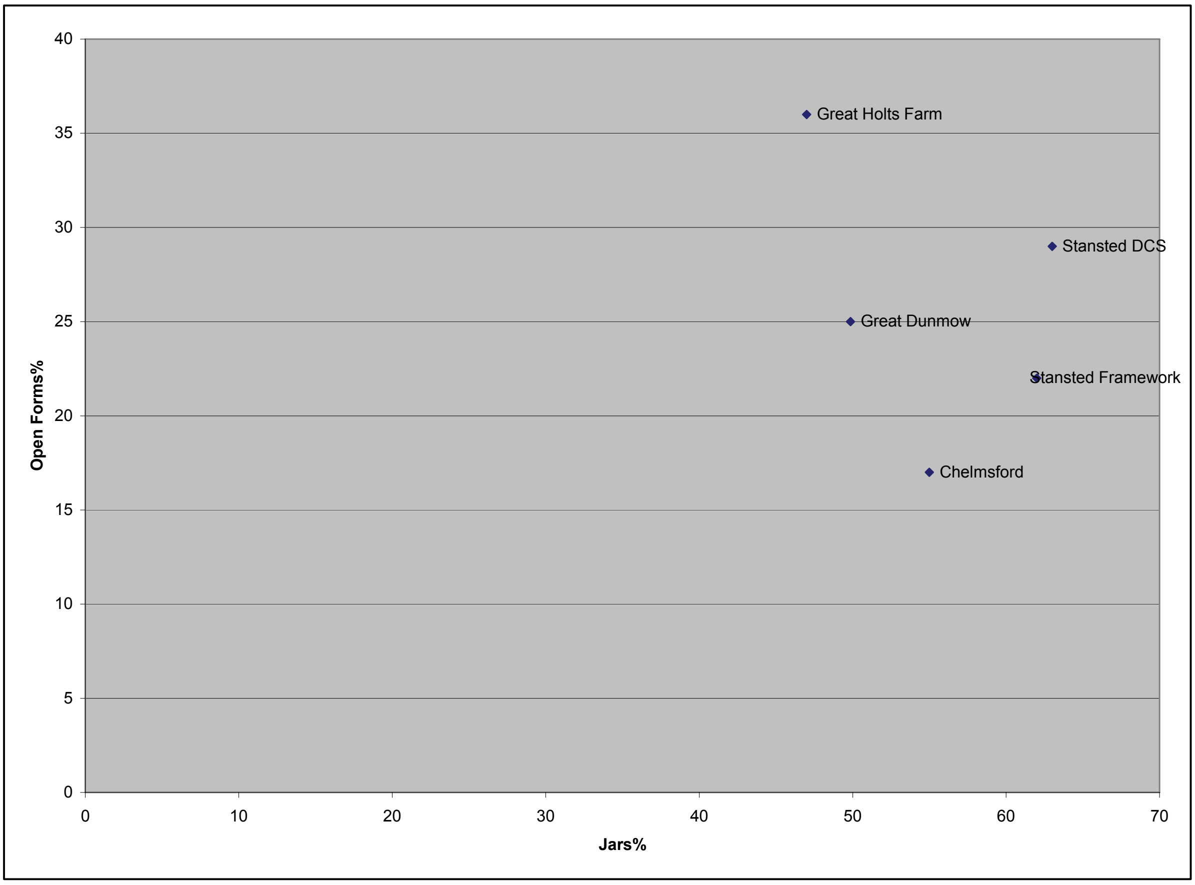


Figure 18.2: Proportion of jars and tablewares from a selection of Essex sites

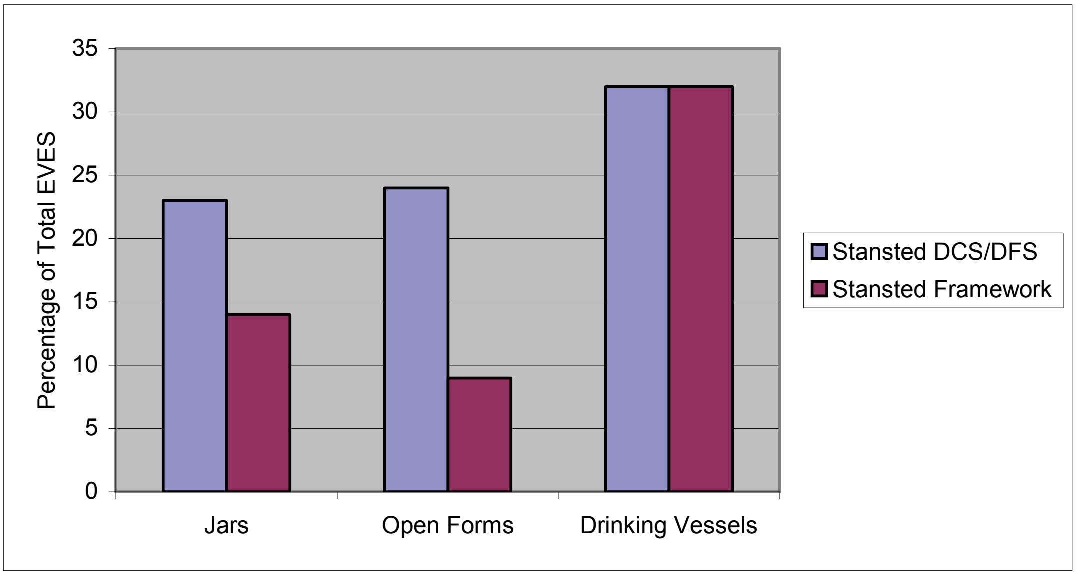


Figure 18.3: Funerary functional vessel class compared to Stansted DCS/DFS sites

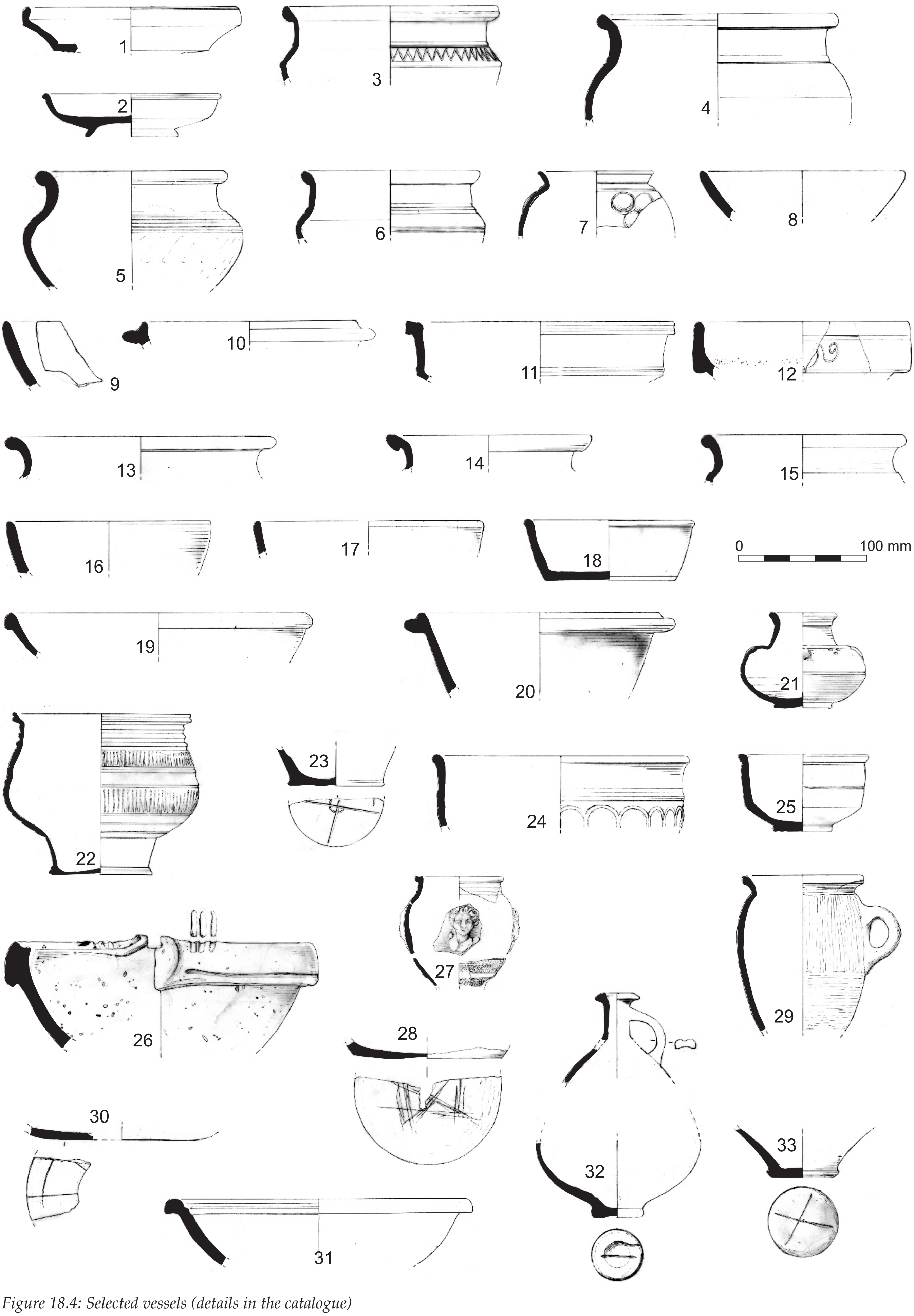


Figure 18.4: Selected vessels (details in the catalogue)

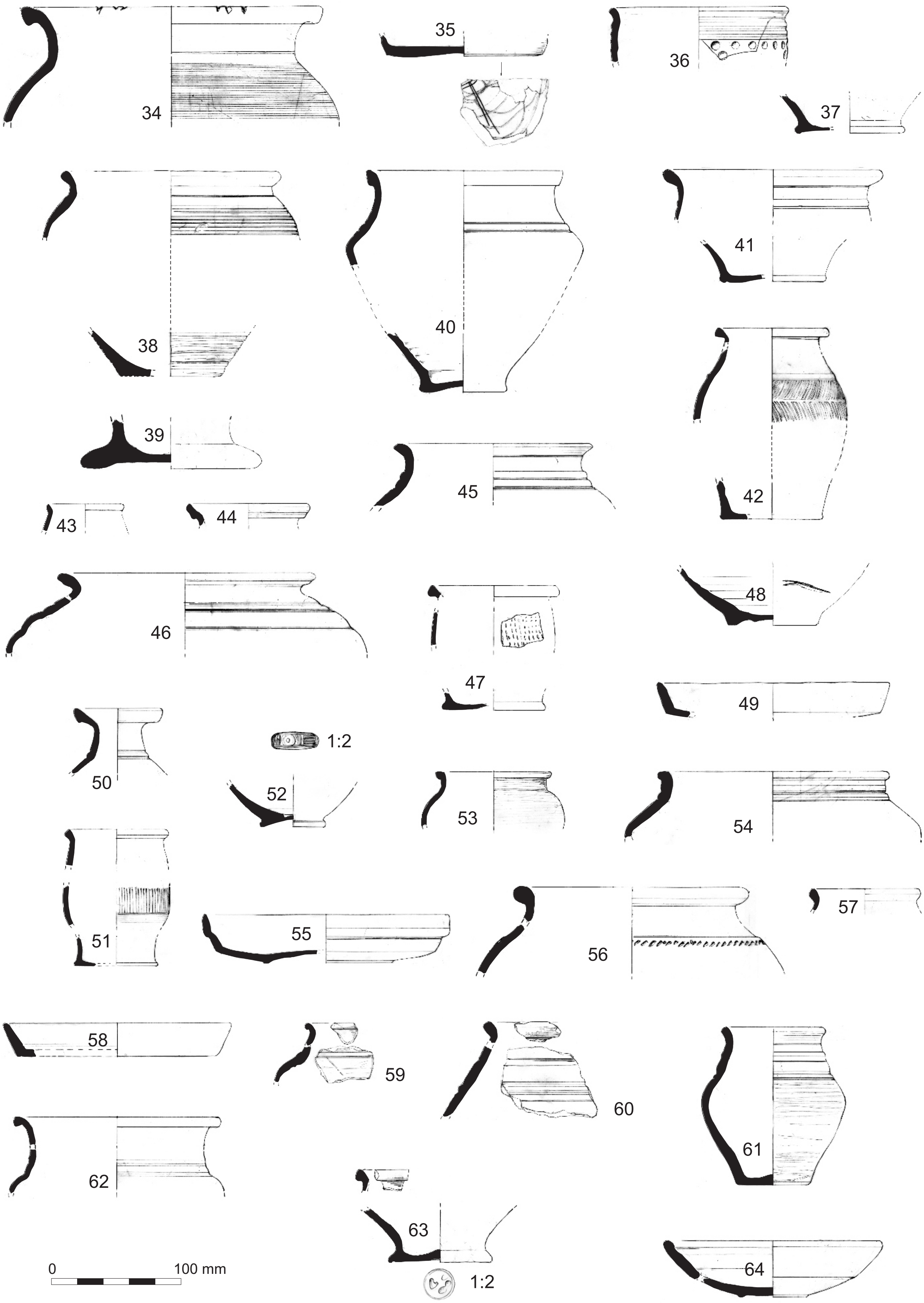


Figure 18.5: Selected vessels (details in the catalogue)

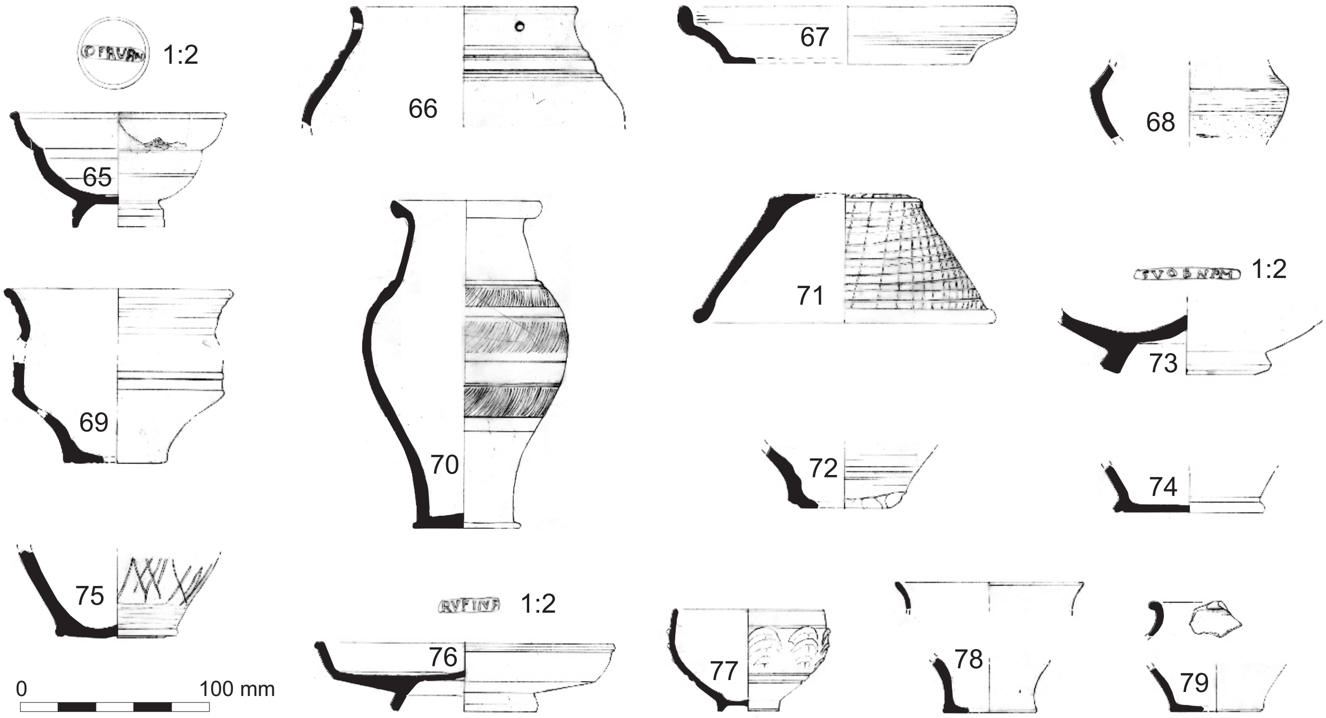
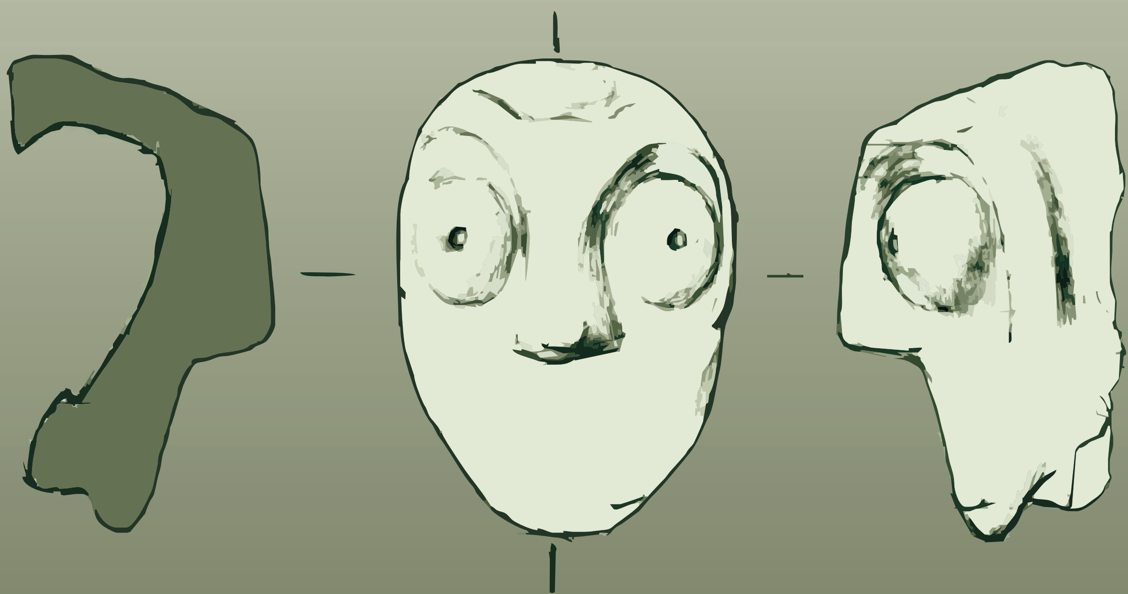


Figure 18.6: Selected vessels (details in the catalogue)

CHAPTER 19

Medieval and post-medieval pottery



by Lorraine Mepham

19 Medieval and post-medieval pottery

Lorraine Mepham

A total of 5193 sherds (58,024 g) of post-Roman pottery was recovered from three sites at Stansted airport, from all stages of fieldwork undertaken between 1999 and 2001. The breakdown of the total assemblage by site is given in Table 19.1. The three sites from which post-Roman pottery was recovered, and which are discussed here, are as follows:

- The MTCP site (site codes BAAMP99, BAAMP00): Late Saxon/early medieval settlement and contemporary landscape, and medieval windmill site
- The FLB site (BAAFL00): medieval settlement
- The LTCP site (BAACP99, BAACP00): medieval settlement and post-medieval hunting lodge.

Apart from a single medieval sherd from the M11 site (BAALR00), no other sites within the airport produced post-Roman pottery.

Methods

The pottery was recorded using the standard Wessex Archaeology pottery recording system (Morris 1994), focusing on analysis of fabric and form. Fabric types have been correlated with the regional fabric type series for post-Roman pottery in Essex (Cunningham 1985a; Cotter 2000). A type series was created for rim, base and handle forms, and this was linked where possible to vessel forms whose definition follows nationally recommended nomenclature (MPRG 1998), but also using the Essex type series for rim forms (Cunningham 1985a; Drury 1993). Details of decoration, surface treatment, manufacture and condition were also recorded. Quantification in all cases is by both number and weight of sherds; EVEs have not been considered appropriate for use with this assemblage as measurable rims are somewhat scarce.

Fabrics and Forms

One Late Saxon, 12 medieval and 16 post-medieval fabric types were identified, many of which are well known types within the Essex type series. One of the medieval fabrics (type 13: early medieval sandy ware) has been subdivided following more recent analyses of medieval assemblages from central Essex (most recently Walker 2004a), giving a total of 35 fabrics. Quantities by type are presented in Table 19.1, and the correlation of medieval vessel/rim form to fabric in Table 19.2.

Fabric 10: St Neots-type ware (2.1% of total by weight)

This fabric type has a wide distribution across the east and south Midlands, and is an occasional find in north-east Essex. It has not previously been identified from the airport, but is known from sites such as Stebbingford Farm, Felsted (Walker 1996), and Rivenhall (Drury 1993, 78). It is characterised by abundant, fine fossil shell inclusions such as occur in the Jurassic clays of Bedfordshire, Huntingdonshire and

Cambridgeshire, and has a broad date range of late 9th to 12th centuries, with a *floruit* in the 10th century.

Diagnostic sherds derive exclusively from wheelthrown jar forms with everted and thickened rims, some with slight lid seating (Fig 19.1, no. 1). Very similar jar forms were found at Rivenhall (Drury 1993, fig. 38.3-5), and at Colchester (Cotter 2000, fig. 11.1). All the sherds of St Neots-type ware came from the site at MTCP, where they have been used to identify a Late Saxon phase of settlement (ceramic phase 1: see below). At the same site these wares were later (cp2) supplemented by the locally made shelly and sandy/shelly wares (Fabric 12). The precise dating for the circulation of St Neots-type ware in Essex remains somewhat unclear. At Colchester, for example, all that can be said is that it appeared sometime in the 11th century, and was replaced in the 12th century by a sandier version (possibly 'developed St Neots ware') (Cotter 2000, 32-3). This late arrival might not be unexpected given the peripheral position of Colchester within the overall St Neots-type ware distribution area. In Oxfordshire, the earliest occurrence is in the early 10th century in urban centres, and it was in decline by the mid 11th century (Mellor 1994, 57) – the closer to the source area the earlier the *floruit*. The dating for Stansted is likely to be closer to that for Colchester.

Fabric 12: Shelly and sandy/shelly wares (3.8% of total)

The early medieval shelly and sandy/shelly wares (12A and 12C) have similar dating and vary only in the relative proportions of shell (crushed oyster) and sand inclusions. These wares have been conventionally dated as ?early 11th century to the later 12th century (Drury 1993, 78-80), although there is some suggestion that they continued in use into the early 13th century, occurring on such sites as King John's Hunting Lodge at Writtle, near Chelmsford (Rahtz 1969, 106).

Most of the diagnostic sherds are in the shelly variant (12A), and these consist exclusively of undeveloped jar rims (everted and thickened, a few with slight lid seating). The few jar rims in fabric 12C are similarly undeveloped, and there is one beaded bowl/dish rim. One sherd of fabric 12A is incised (scored) and one jar rim in fabric 12C is finger impressed.

Nearly all sherds of Fabric 12 came from the site at MTCP, where they characterise ceramic phase 2 in conjunction with St Neots-type ware (see below).

Fabric 13: Early medieval sandy ware (2.5% of total)

Early medieval ware forms a significant component of the Stansted assemblage. This coarse ware, described by Drury (1993, 80) is characterised by the presence of abundant coarse sand as a tempering agent; it is handmade and is reduced, but generally with red-brown surfaces. Drury gives it a date range of ?early 11th century to *c*1200, but more recent excavations at Stansted yielded early medieval ware in association with early to mid 13th century fine wares (Walker 2004a). While earlier variants of this ware are low-fired (in bonfires or clamps), later variants were fired in proper kiln structures, as at Middleborough in Colchester (Cotter 2000, 57-67), or at Frogs Hall, Takeley (Hardy 2007b).

Diagnostic sherds comprise rims deriving from 11 jars and three bowls/dishes, and one jug handle. Examples of both jar and bowl/dish rims include both undeveloped and developed rim forms, although the emphasis is on the former (one of which is finger-impressed). Five body sherds are decorated – two with applied thumbed strips, two scored, and one possibly rouletted. None of these are attributable to specific vessel form.

Sherds of fabric 13 came from the sites at MTCP and FLB in roughly equal quantities, appearing in ceramic phase 3 (see below).

Five distinctive subdivisions of this ware have been defined, following the analysis of the assemblages from earlier excavations at Stansted (Walker 2004a), and the more recent excavation of an early medieval kiln site near Stansted at Takeley (Mepham 2007). Interestingly, given the approximately equal quantities of Fabric 13 recovered from the MTCP and FLB sites, these variants show marked inter-site differences in their occurrence for which a purely chronological explanation seems unlikely.

Fabric 13st: Early medieval Stansted ware (3.6% of total)

This is a hard fabric tempered with abundant ill-sorted quartz, generally white, grey or colourless, with a size range of 0.3 to 1.5 mm.

This was the most common fabric found during the earlier excavations at the airport, and was also the most common type identified within the MTCP assemblage (although completely absent from the FLB site). At first thought to be a local product, on the basis of its abundance at Stansted, it now seems more likely that this fabric forms part of a widespread tradition of such wares across Essex, since visually identical fabrics have since been found elsewhere in the county (Walker 2004a, 407).

All of the identifiable vessel forms are jars, and all have undeveloped rims (two finger-impressed), ranging from simple everted to thickened or beaded (Fig. 19.1, no. 2).

Fabric 13i: Early medieval ware – inclusion free (0.6% of total)

This is a distinctive fabric, with a fine clay matrix lacking any added sand temper. Macroscopically visible inclusions include sparse to moderate grog (or clay pellet) and some carbonised material. Sherds tend to be thin-walled, with oxidised surfaces and/or margins and reduced core.

Of the seven diagnostic rim forms, six are from jars (Fig. 19.1, no. 3), mostly with undeveloped rims (two finger-impressed) although one squared rim (type H1) is present, and one from a shallow dish with convex profile and simple upright rim (Fig. 19.1, no. 4). All sherds came from the MTCP site.

Fabric 13r: Early medieval ware with rose-coloured quartz (<0.1% of total)

This variant was identified as a single body sherd only at the MTCP site. The fabric is tempered with rounded quartz sand (<0.5 mm), pink or red in colour.

Fabric 13f: Early medieval flinty ware (1.2% of total)

This variant is visually very similar to fabric 13, but with added sparse, angular flint (some calcined). Fairly common within the assemblage from earlier excavations at the airport, it has also been identified during recent excavations at Takeley (Oxford Wessex Archaeology 2004).

All of the identifiable vessel forms are jars, of which the majority (11 out of 14 examples) have the unusual squared rim (type H4) noted amongst the assemblage from earlier excavations at the airport (Walker 2004a, 408, fig. 270.79), and also observed at Takeley (Oxford Wessex Archaeology 2004). Nearly all the sherds of Fabric 13f came from the FLB.

Fabric 13k: Early medieval ware - ?Frogs Hall kiln products (0.4% of total)

A number of pottery kilns excavated in 2002 (by Oxford Wessex Archaeology and the Essex County Council Archaeological Field Unit) at Frogs Hall near Takeley were apparently producing a limited range of vessel forms (jars, spouted pitchers and dishes) in a transitional early medieval ware around the turn of the 12th century (Mepham 2007). The fabric of the kiln products is hard-fired, and contains a moderate amount of subangular to subrounded quartz grains, 1-2 mm in size; surface finish is for the most part fairly crude, leaving a 'pimply' surface. On fabric grounds alone, this ware is not particularly distinctive amongst the range of early medieval wares in the area. However, one distinctive characteristic of the kiln wares was the horizontal scoring observed on many of the vessels. This has enabled the tentative identification of a small number of scored sherds amongst the Mid Term assemblage as Frogs Hall products, as well as the rim from a tubular spouted pitcher (Fig. 19.1, no. 5) and the rim from a second probable pitcher (Fig. 19.1, no. 6). These wares have not so far been positively identified on other sites in the area.

Fabric 13t: Early medieval ware – transitional (0.6% of total)

This ware is transitional between early medieval ware and medieval coarse ware (see below), first recognised at Stansted and possibly an early product of the Hedingham kilns (Walker 2004a, 408). As a transitional ware, however, the visual distinction between sherds of fabric 13t and examples of fabrics 13 and 20 is not always clear. The tempering agent comprises grey, white and colourless sands, and the colouring is as early medieval ware.

The transitional nature of the fabric is reflected in the few rim forms present, two from jars (one undeveloped and one developed rim) and one flanged bowl rim. One body sherd has an applied, thumbed strip. All sherds identified came from the FLB site.

Fabric 20: Medieval coarseware (6.0% of total)

This ware encompasses all grey sandy coarse wares not assigned to specific types, such as Hedingham (see below), and as such could represent the products of several different sources. It is possible that some less obvious examples of Hedingham ware have been recorded here within this category. The ware has a broad date range of 12th to 14th century.

Jar forms are the most commonly represented; undeveloped rim forms are still present (7 examples) although the emphasis is on developed forms (26 examples). There are also three bowl/dish forms, one collared jug rim and a slashed jug handle. One body sherd is combed and three have thumbed, applied strips.

This fabric type was common amongst the FLB assemblage, but occurred only sparsely at the MTCP site. At the LTCP site a single (residual) sherd marks the earliest occurrence of post-Roman pottery amongst this assemblage.

Fabric 20D: Hedingham coarse ware (<0.1% of total)

This coarse ware was produced at kilns in the Sible Hedingham area in north Essex. It is moderately sandy and has a micaceous matrix, tempered with grey, white and colourless sands. The ware is generally reduced (grey) although buff and reddish examples are known. The date range is probably the same as the fine ware (see below), ie mid 12th to mid 14th century. Only a few sherds were identified at Stansted, all from the FLB site, with no diagnostic forms present.

Fabric 21: Sandy orange ware (0.7% of total)

Sandy orange ware (Fabric 21) is less common. This category, described by Cunningham (1982, 359), comprises all oxidised sandy wares not otherwise assigned to specific types, such as Harlow (see below). It has a broad date range of 13th to 16th century, and has been used here to characterise ceramic phase 4 (see below).

Diagnostic forms include two jars, one with curved rim (C1/D2), with stabbed and impressed cordon decoration (Fig. 19.1, no. 7), and one with bifid rim, one bowl, two jug rims and a jug handle. There is also a bunghole spout from a pitcher or jar. One body sherd has white slipped decoration, a technique more commonly seen at the airport sites on the oxidised Harlow wares (Fabric 21D).

Fabric 21C: Sgraffito ware (<0.1% of total)

This is a sandy orange ware with incised (sgraffito) decoration made through a thick cream slip. It is thought to have been made in Cambridgeshire, and dates to the later medieval period (14th to 15th century). Only seven sherds (all from a single context at the FLB site and probably from a single vessel) were identified (with four sherds from the previous excavations: Walker 2004a, 409).

Fabric 21D: Medieval Harlow ware (29.1% of total)

This was the most common fabric type from the FLB site (72.0% of the total from the site by weight). A variant of fabric 21, this is a micaceous orange ware containing abundant, well sorted quartz sand (<0.5mm), the grains reddish, grey or colourless, sometimes with sparse flecks of chalk. The source is considered to be at or near Harlow, with a possible kiln dump located at Canes Lane just outside the town (Meddens and Redknap 1992, 39). Its association with London-type wares in Old

Harlow (Walker 1991) suggests that production of this ware had started by the 13th century, and may well have continued throughout the medieval period, developing into the post-medieval Harlow industry (Walker 2004a, 409). Certainly the distinction between fabric 21D and the later redwares (fabric 40) within the late medieval assemblage from LTCP is not always clear.

Diagnostic sherds show an emphasis on jars with developed rims (42 examples), bowls with flanged rims (11 examples) and jugs (16 rims and 21 handles). There is also one pipkin handle, a bunghole, a lid, and an anthropomorphic head from an aquamanile (Fig. 19.1, no. 8). Many of the sherds from Stansted are glazed and/or decorated with white slip-painted motifs (none are reconstructable). Other decorative techniques include applied thumbed strips or cordons (nine sherds, including one below a jar rim), and scoring (two sherds). Cordoned jars were also identified amongst the assemblage from previous excavations at the airport (Walker 2004a, fig 273, 125). Two jar rims are finger-impressed (one of these is also stabbed below the rim) and two jug handles are slashed.

Fabric 22: Hedingham fine ware (<0.1% of total)

The Hedingham industry was based at Sible Hedingham. The pottery from the excavated kilns has never been fully published, but the fine ware is described by Drury (1993, 86-9) and Cotter (2000, 76). Only two body sherds were identified, both from the MTCP site and possibly from the same vessel.

Fabric 23: Medieval whitewares (<0.1% of total)

One whiteware body sherd from the FLB site was identified as a Surrey ware, possibly Tudor Green.

Fabric 27: Imported wares (<0.1% of total)

One small sherd from a Saintonge polychrome jug was found at the FLB site, a significant find given the relative scarcity of these wares (and indeed other medieval imports) outside the major ports.

Fabric 30: Beauvais slipware

A single small sherd from a Beauvais double sgraffito dish with a perforation through the rim came from LTCP. Sgraffito wares were made in large quantities in Beauvais throughout the 16th century. The double sgraffito type was first covered with a red slip (over a white-firing body) and then a white slip, the design being scored through the white slip to reveal the red slip beneath (Hurst *et al.* 1986, 108-10, pl. VII).

Fabric 36: London-type ware (0.2% of total)

A small quantity of London-type ware is present, comprising body sherds from white-slipped and glazed jugs, from both MTCP and FLB. None are closely diagnostic.

Fabric 40: Post-medieval red earthenware (43.9% of total)

In central Essex red earthenware first appeared in the late 15th century, developing out of the late medieval oxidised sandy industries (fabric 21), and continued in production and use throughout the post-medieval period. The fabric (essentially smooth, fine, orange-red and with inclusions not generally visible macroscopically) changes very little over this period, but some vessel forms and decorative treatments are more chronologically distinctive (Cunningham 1985a, 3, table 5). Redwares were produced in Harlow and Stock, to the south of Chelmsford (Cunningham 1985b), but there are a number of other known or potential production centres in the county which may also be represented here (Cotter 2000, 189-91, fig. 129).

During the transitional period of the later 15th and early 16th century the red earthenwares perpetuated many of the characteristics of the later medieval industry in terms of vessel forms, eg jars, jugs and bowls with sagging bases and sparse or no glaze, some with white slip painted decoration. These transitional wares were identified at the LTCP site in the earliest phases of the hunting lodge (cp6a), and include a small group of sherds with chalk flecks in the fabric, apparently from jars and bowls (Fig. 19.1, no. 9). Similar fabrics were observed during previous excavations at the airport (Walker 2004b, 500). Slip decoration disappeared during the 16th century, and later redwares are more frequently glazed.

Red earthenwares occurred in quantity only at the LTCP site (BAACP01), where they dominated the assemblage (88.1% of the total by weight, including black-glazed variants: see below). Forms seen in this assemblage are largely utilitarian, for use in the kitchen or dairy, and are well paralleled on other post-medieval sites in Essex (eg Cunningham 1985a; Cotter 2000). Most common are jars (probably multi-functional, and including larger versions designed for storage), bowls and dishes, and jugs. Some of the handled jars are likely to be chamberpots. More specialised cooking vessels are represented by pipkins and at least one dripping dish. There are several bungholes from large cisterns (bunghole jars), a form used primarily for brewing beer, but also for storing other liquids; they were manufactured principally in the later 15th and 16th centuries, are generally unglazed and are frequently slip painted (Cunningham 1985a, 4, 14, figs 6-7). Less common forms include two chafing dishes, a form typical of the 16th and 17th centuries in Essex, one of which has a thumbed bowl-base very similar to examples from Chelmsford and possibly made at Stock (Fig. 19.1, no. 10: Cunnningham 1985a, fig. 10.70; 1985b, fig. 50.28).

Tablewares are represented by a few smaller drinking vessels (cups and mugs), including one example of a pedestal cup with fluted base, probably of later 15th or 16th century date (see Cunningham 1985a, 15-15, form E3B). Also of interest are a couple of ‘frilled’ bases from mugs (or possibly small jugs) apparently imitating 16th century imported German (Raeren) stoneware forms (Fig. 19.1, no. 11).

Fabric 40bl: Black-glazed redware (3.6% of total)

This is a sub-division of fabric 40, comprising wares with a black (iron-reduced or manganese) glaze. Sources, as for the red earthenwares, include Harlow and Stock, but blackwares were also made in the Midlands, developing out of late medieval Cistercian wares. Production covered the 17th and early 18th centuries. Most of the forms present here seem to represent small, thin-walled drinking vessels (mugs and cups, possibly some tygs), with straight-sided, conical or convex profiles.

Fabric 40A: Metropolitan slipware (1.8% of total)

This is a type of red earthenware decorated with trailed white slip; in Essex the main production centre was at Harlow, but it was also made at Stock (Cunningham 1985b) and Loughton. It was in production by *c*1615 (Cotter 2000, 222), although it does not appear in London until the 1630s. Production continued throughout the 17th century, but was in decline by the end of the century in the face of competition from, amongst others, Staffordshire finewares. Forms seen at Stansted (all from the LTCP site) include dishes and closed forms (jars or jugs) and two chafing dish bases (Fig. 19.1, no. 12).

Fabric 42: Surrey/Hampshire whitewares (<0.1% of total)

A single jug handle in Border Ware was recovered from the LTCP site.

Fabric 43: Martincamp flasks (<0.1% of total)

A single sherd from a Martincamp flask came from the LTCP site. These vessels were imported from north-east France and are so commonly found in this country as to be regarded as a chronological 'type fossil' of the 16th and 17th centuries. This example is in a cream-coloured fabric and probably derives from a type I flask of the later 15th or early 16th century (Hurst *et al.* 1986, 102-4, fig 47, 142).

Fabric 45C: Raeren stoneware (0.2% of total)

The four sherds of Raeren stonewares recovered, all from the LTCP site, include one 'frilled' base from a small jug or mug, a type as ubiquitous on British sites in the first half of the 16th century as Martincamp flasks were in the 16th and 17th centuries, although they were still being made and used into the later 16th century (Hurst *et al.* 1986, 196, fig. 94.300-3).

Fabric 45D/E: Cologne/Frechen stoneware (0.3% of total)

Sherds of 16th and 17th century Cologne and Frechen stonewares have been grouped together here as distinction between the two types is not always clear cut. All examples came from the LTCP site. There are few diagnostic sherds, although all probably derive from drinking or serving vessels (mugs, jugs and bottles); there is one with an applied medallion. These vessels were imported into Britain in vast quantities in the 17th century after the expansion of the stoneware trade.

Fabric 45F: Westerwald stoneware (0.1% of total)

Westerwald stonewares were very widely traded in the 17th and 18th centuries. All four sherds recovered came from the LTCP site, none are particularly diagnostic but one has the purple (manganese) decoration introduced in 1665.

Fabric 45M: English stoneware (0.5% of total)

Stonewares were produced in this country from the later 17th century, first in London and later in the Midlands, Bristol and other centres. Six sherds were recovered, all from the LTCP site, of which one is from a narrow-mouthed jug or bottle and two are from cylindrical necked jugs. Two sherds are from cups or mugs - one a white-slipped and iron-dipped fineware and the second with an iron slip on the upper body. All these are types common in the later 17th and/or early 18th centuries as manufactured, for example, at John Dwight's factory in Fulham (Green 1999).

Fabric 46A: English tinglazed earthenware (0.1% of total)

Manufacture of tinglazed earthenware began in England in the late 16th century, and production increased in the 17th century with the establishment of several potteries along the south bank of the Thames in Lambeth and Southwark. The examples found here, all from the LTCP site, are all small, abraded sherds, including one plain white handle, probably from a chamberpot, and five sherds (single context) from a small polychrome drug jar.

Fabric 47: White salt-glazed stoneware (<0.1% of total)

A single small sherd of white salt-glazed stoneware may represent the latest well dated vessel associated with the hunting lodge at the LTCP site. The ware was produced from the 1720s to the 1770s.

Fabric 48: Industrial wares (unspecified) (0.1% of total)

A few sherds of modern refined whitewares were found at the LTCP site, probably representing recent agricultural activity on the site.

Fabric 48A: Chinese porcelain (<0.1% of total)

A single sherd of Chinese porcelain came from the LTCP site. This was imported from the late 17th and throughout the 18th century as high class tea drinking wares.

Fabric 50: Staffordshire-type slipware (0.6% of total)

Slipwares were made in Staffordshire from the mid 17th century and throughout the 18th century; similar wares were also made in Bristol at the same time. The examples seen here, all from the LTCP site, include trailed and feathered hollow wares (all appear to be from cups), common from the late 17th to early 18th century, and press-moulded flatwares with scalloped rims and trailed and feathered or joggled slip decoration, particularly common in the early 18th century, although production continued well into the later part of the century. The most complete vessel is a large, two-handled, necked cup with trailed and feathered decoration on the lower part of the body and trailed lettering around the rim (Fig. 19.1, no. 13).

Fabric 50A: Staffordshire manganese mottled ware (0.1% of total)

Five sherds of manganese mottled ware, probably from a drinking vessel, came from a single context at the LTCP site. This ware, and variations of it, was produced in Staffordshire, Bristol and Yorkshire, and it is broadly contemporary with the slipwares (fabric 50).

Pottery by Site

Introduction

Tables 19.3 – 19.5 present quantified breakdowns of the assemblages from the MTCP, FLB and LTCP sites by feature and by fabric type. In order to construct a broad chronological framework for the overall post-Roman assemblage, six ceramic phases have been defined:

cp1 (?10th/early 11th century): characterised by the presence of St Neots-type ware only. Vessel forms comprise jars with thickened and sometimes lid-seated rims. As discussed above, the dating for this phase, based on the regional dating for St Neots-type ware, is still imprecise and, in the absence of vertical stratigraphy, the stratigraphic relationship between cp1 and cp2 cannot be demonstrated.

cp2 (?early/mid 11th century): St Neots-type ware is augmented by shelly and sandy/shelly wares, in similarly undeveloped jar rim forms.

cp3 (?later 11th to late 12th century): early medieval sandy wares appear, primarily the Stansted-type variant (13st). Jar rims are still undeveloped, and there are a few bowls. Towards the end of the 12th century transitional wares appear, including possible Frogs Hall kiln products (13t and 13k).

cp4 (late 12th to 13th century): medieval sandy wares (20) appear from the late 12th century, supplemented from the 13th century by sandy orange wares (21), including medieval Harlow ware (21D). Jars have developed rim forms (curved/flanged or squared: types C1/D2, H1, H2).

cp5: (late 13th – 15th century): assemblage dominated by sandy orange wares in similar vessel forms, but including neckless jars with squared rims (type H3), a late 13th/14th century form. Occasional later medieval types, eg sgraffito ware (fabric 21C), dated 14th/15th century, appear, as well as a few sherds of red earthenwares (fabric 40), which appear in Essex from the later 15th century and then supersede the sandy orange wares.

cp6: (late 15th - early 18th century): dominated by coarse redwares (fabric 40), including locally made Metropolitan slipwares (fabric 40A) and black-glazed variants (fabric 40bl). The dominance of long-lived coarseware types means that many contexts attributed to this phase cannot be more precisely placed within the overall date range, but a threefold subdivision can be suggested based on the presence of the small quantities of more closely datable wares seen at LTCP:

cp6a: (late 15th/16th century): a phase marking the transition between late medieval sandy oxidised wares (fabrics 21 and 21D) and post-medieval red earthenwares (fabric 40). Late medieval vessel forms and decorative techniques (white slip painting) continue, and vessels tend to be unglazed or sparsely glazed. Other wares present in this phase include imported German (Raeren) stonewares, and a single sherd from a Beauvais double sgraffito dish.

cp6b: (16th/17th century): with a potential chronological overlap with cp6b, this sub-phase is characterised by the appearance of Cologne/Frechen stonewares (potentially from the early 16th century, although most if not all of the examples here are likely to be 17th century Frechen types), black-glazed redwares, Metropolitan slipware and tinglazed earthenware (all from the early 17th century).

cp6c: (late 17th/early 18th century): the latest phase of activity at the LTCP hunting lodge. German stonewares are superseded by English types (from London or the Midlands). Tinglazed wares continue, although the later wares are more likely to represent utilitarian rather than tablewares (drug jars and chamberpots). Metropolitan slipwares decline in popularity, replaced by the finer Staffordshire trailed and feathered wares. Potentially the latest ware represented is white salt-glazed stoneware, first produced in the 1720s.

The chronological variation in the three main site assemblages is shown in Figure 19.2.

The MTCP Site

The MTCP assemblage includes the only significant occurrence of the Late Saxon St Neots-type ware and the local early medieval shelly and sandy/shelly wares. Only a few feature groups have been assigned to cp1, and these produced only small quantities of sherds (see Table 19.3), of which the largest groups came from Late Saxon building 1 (22 sherds, all from western beam slot 302020), pit 305022 (19 sherds) and posthole 356095 (18 sherds). Pit 305022 yielded a small jar rim (thickened and everted), and the sherds from posthole 356095, all of which are in a very poor condition, possibly as a result of burning, appear to represent a single jar with thickened and lid-seated rim. In the case of Late Saxon building 1, the pottery appears to have been incorporated into the fill of the beamslot after the destruction of the building. The fact that sherds were entirely concentrated within the northern half of the western beamslot suggests that this may have been a result of redeposition from a nearby midden heap to the west of the building. Other features (posthole 310017, pits 318042, 322001 and 323012, ditch 344026) each produced no more than nine sherds, and their attribution to this ceramic phase is therefore more ambiguous. Features assigned to cp1 are concentrated in the southern part of the excavated area, around Late Saxon building 1, with some evidence for activity at this period to the north around early Medieval buildings 1 and 2 (although these are later in date).

The largest group of St Neots-type ware, however, came from a feature assigned to cp2 (pit 340008, where it was associated with local shelly wares (fabric 12A). This feature yielded a total of 148 sherds, including seven jar rims, thickened and/or lid-seated (the same forms occurred in both St Neots-type ware and the local shelly ware). Most of these sherds appear to result from the dumping of hearth material into the pit. Another group of St Neots-type ware and local sandy/shelly ware (71 sherds) came from early medieval pit 310136; this included eight jar rims, all lid-seated (Fig. 19.1, no. 1). This pit contained two major episodes of deliberate backfill in the upper part of the fill sequence – these sherds came from the lower of the two (310139), while the upper (310135) produced St Neots-type ware and shelly and sandy/shelly wares mixed with early medieval sandy wares (fabric 13 and variants). Pit 498020 can also be assigned to cp2 on the basis of a mix of St Neots-type ware and shelly ware (31 sherds).

Only one other feature group of any size could be assigned to cp2, and this came from tree-throw 310014 (56 sherds). In this instance many of the sherds were in noticeably poor condition, and it is likely that this group represents secondary refuse deposition, perhaps at a later date.

Apart from these two features, few features were assigned to cp2 (pit 304001, tree-throw 310014), and neither produced more than seven sherds, although 28 sherds of St Neots-type and local shelly wares were apparently residual within early medieval pit 310118.

The distribution of cp2 features shows some overlap with the cluster of cp1 features to the south (eg tree-throw 310014), but also seems to show a shift in focus to the north (the dump of hearth material in pit 340008, approximately 100 metres to the north of Late Saxon building 1, presumably derives from another building nearby), with a second focus further north again.

This second focus to the north becomes much more apparent in cp3, with large groups identified from pits 310129 and 310136 (upper fill), and smaller groups from nearby pits 310127, 310118 and 366001. These five groups consist primarily of the early medieval Stansted-type sandy ware variant (13st). Vessel forms represented, in Stansted-type ware and in the inclusion free variant (13i) comprise almost exclusively jar forms, with thickened and/or lid-seated rims, and there is one dish (Fig. 19.1, no. 4); a few rims are finger-impressed. Also present are a single dish in sandy/shelly ware, and a possible Frogs Hall type jar or pitcher rim with horizontal scoring on the exterior (Fig. 19.1, no. 6). There is at least one possible same-vessel link between pits in this group (310127 and 310129), and the very similar character of the deposits (with the possible exception of 366001, which has a lower proportion of Stansted-type ware) suggests that they may have formed part of a single dumping episode, or at least dumping within a very limited timespan.

One other smaller focus of activity can be discerned at this period, around early medieval buildings 1 and 2. There is really insufficient dating evidence to tie these structures firmly to cp3, although small numbers of sherds were recovered from postholes 926 and 354091 within early medieval building 1, and also from gully **919**, posthole **354069** and pit 357057.

The latest phase of activity on the MTCP site belongs to cp4, and is confined to the windmill structure (ditch recut 344060), which produced a small group of sherds (18) including Hedingham fineware and miscellaneous sandy orange wares, suggesting a date range for this feature in the 13th century. The original windmill ditch (354050) seems to be of more or less the same date on the basis of the pottery recovered, which included London-type ware and medieval Harlow ware. One small post-medieval redware sherd may be intrusive here.

To summarise the chronological sequence for the MTCP site, the earliest focus of activity, around Late Saxon building 1, can probably be dated to the 10th century. Later, perhaps during the early part of the 11th century, settlement may have shifted slightly to the north, and a second focus appeared further north again. Activity in the later 11th and 12th century was concentrated in this northern area and the southern focus seems to have been completely abandoned. Other structures (early medieval buildings 1 and 2) may also date to this period. The windmill appears to have been constructed sometime in the 13th century, but may have been relatively short-lived.

The FLB site

This site provided minimal evidence for activity prior to the 13th century, and the emphasis here is firmly on the later medieval period (13th to 15th century – see Table 19.4). Four features have been tentatively dated earlier – pit 405085 (cp2), pit 405087 (cp3) and pit 409014 (cp3), and gully 401009 (cp3), none of which produced more than seven sherds. Three of these features are outside the area of later activity, pits 405085 and 405087 located close together at the western end of the excavated area, and gully 401009 between these and the later features.

Features and contexts assigned to cp4 and cp5 are clustered within a relatively small area. Those assigned to cp4 are characterised by a predominance of sandy orange wares, consisting almost exclusively of medieval Harlow ware (fabric 21D). The largest groups came from pit 405023 (121 sherds altogether), cobbled surface 402021 (111 sherds) and pits 410010 (102 sherds) and 405064 (95 sherds), with smaller groups from layers 405066 (26 sherds) and 405069 below the cobbled surface (49 sherds), pit 407001 (43 sherds), pit 405083 (34 sherds), ditch 404001 (31 sherds) and gully 401005 (26 sherds). All other features yielded less than 20 sherds. Vessel forms from these context groups in Harlow ware comprise jars, mostly with developed rims (curved/flanged or squared: Essex types C1/D2, H1, H2), jugs with stabbed or slashed rod or strap handles, with a few bowls or dishes. Sherds are frequently glazed, and many are either white-slipped under the glaze, or have white slip-painted decoration. Two decorated body sherds appear to derive from a Rouen-style jug (ditch 404001). Two groups included sherds of London-type ware – three sherds from cobbled surface 402021 and two from pit 405023. None of these are closely diagnostic but confirm a general 13th century date. Also belonging to this ceramic phase are an anthropomorphic head from an aquamanile (Fig. 19.1, no. 8) and a pipkin handle, both from layer 405069.

Context groups assigned to cp5 are very similar in character, but include jars with squared, neckless rims (type H3), and the occasional redware sherd (fabric 40). Large groups include cobbled surface 403001 (247 sherds) and the overlying layer 401013 (629 sherds), sunken floor 406024 (136 sherds), pit 403058 (77 sherds), pit 403029 (49 sherds) and pit 401003 (37 sherds). One Surrey whiteware sherd, possibly Tudor Green, came from laye**r** 401013, as well as a sherd of Saintonge polychrome.

To summarise, settlement activity at the FLB site had a relatively restricted time span of no more than two centuries, beginning in the 13th century. Abandonment no later than the 15th century is indicated by the absence of any diagnostically later sherds, such as the early German stonewares (eg Raeren) which are ubiquitous on 16th century sites. The pottery assemblage appears to have been supplied primarily from the local Harlow-based industry, including both kitchenwares and glazed fineware jugs; the proportion of Harlow wares increases from 51% (by sherd count) in cp4 to 84% in cp5. The high proportion of Harlow ware can be compared to two other sites previously excavated at the airport (Long Border Road and The Wilderness: Walker 2004a), but its scarcity on other, apparently contemporaneous sites here has not been satisfactorily explained. Other coarseware types represented are also likely to be largely locally produced. Apart from a handful of sherds of London-type ware and a single sherd of Saintonge polychrome, no other fineware sources are represented.

The character of the assemblage is exclusively domestic, and remains the same in both ceramic phases. The presence of glazed finewares, including the aquamanile and the Saintonge polychrome, indicate some pretensions to status, although limited by the general scarcity of non-local finewares. Functional interpretations are difficult give the fairly restricted range of vessel forms – there is little here apart from jars (presumably multi-functional) and jugs. One specialised cooking form was identified (pipkin), and there is a single bunghole spout. The open forms could have had some function connected with dairying – where measurable, these are mostly over 300mm in diameter.

The LTCP site (Hunting Lodge)

At the LTCP site (BAACP01), pottery was recovered from features and contexts relating to the construction, occupation and subsequent demolition of a post-medieval hunting lodge, with a possible late medieval precursor. The overall date range appears to run from at least the 15th century (possibly slightly earlier) to the early/mid 18th century (Table 19.5). Sporadic occurrences of later sherds do not relate to the hunting lodge but to subsequent agricultural activity on the site.

Later medieval wares found at the LTCP site consist entirely of oxidised sandy Harlow ware (fabric 21D). Close visual similarities between this ware and the post-medieval redwares (fabric 40), and their occurrence in the same contexts, have meant that identification in some instances remains tentative, but tends to support the suggestion that the medieval Harlow industry continued into the post-medieval period. Certainly the vessel forms (jugs, bunghole vessels, handled jars) and decorative techniques (white slip painted motifs) seen here on the two types are directly comparable.

All sherds of Harlow ware occurred here together with post-medieval redwares; it is difficult in this case to determine whether they are therefore residual finds, or whether their co-occurrence with redwares marks a definite ‘transitional’ late medieval/early post-medieval ceramic phase, since the two types are likely to have had at least some chronological overlap in the later 15th century. The latter alternative seems the most likely, and this transitional ceramic phase has been defined here as cp6a.

The earliest ceramic groups that can be identified, then, probably date from the late 15th or 16th century. These can be characterised by the presence of some more closely dated ware types (Raeren type stoneware and redware copies of these vessels: Fig. 19.1, no. 11**;** Beauvais sgraffito ware), vessel forms (pedestal cups with fluted bases: Cunningham 1985, type E3B) and decorative techniques (white slip painting). The latter technique marks a continuation from the late medieval Harlow industry (see above), but had apparently disappeared by the end of the 16th century (*ibid.,* 64). Also dated to this period, although more tentatively, are some groups of unglazed redwares, including a small number of sherds with fine chalk inclusions (Fig. 19.1, no. 9) – a similar group was identified in one feature during earlier excavations at the airport (Walker 2004b, 500).

These early wares appear to be concentrated in midden 457014 and spread 467029, and the underlying cobbled surface 481003 (all in the 'yard' area in the north-west corner of the hunting lodge), pond 466001, midden 467008, and gullies 467025 and 467028. Apart from pond 466001, to the south-east of the hunting lodge, all these contexts are located in the north-western corner of the site, and presumably represent the principal area of refuse disposal during the earliest occupation of the hunting lodge. In the case of pond 466001, pottery appears to have been deposited within layers of backfill decommissioning the pond.

Ceramic groups which can be dated broadly to the 16th/17th century (cp6b) include the Metropolitan slipwares (fabric 40A), black-glazed redwares and Cologne/Frechen stonewares. Although Cologne wares could potentially date from the earlier 16th century, it is likely that most of the sherds here are Frechen types dating from the 17th century; identifiable vessel forms comprise medallion and *Bartmann* jugs or bottles. Other vessel forms characteristic of this period include chafing dishes in redwares and slipware, including one example with a thumbed bowl-base, possibly a Stock product (Fig. 19.1, no. 10; see Cunningham 1985a, fig. 10.70; 1985b, fig. 50.28), and probably a large proportion of the bunghole vessels; both these types are broadly dated as 16th/17th century. The only group of any size that can be assigned to this phase came from Phase 3 pit 459005 (possibly dug as a sump), at the north-east corner of the enclosure ditch surrounding the hunting lodge. However, in this instance these wares are almost certainly residual, as they derived from backfill layers relating to final use/disuse of the site; the feature also contained sherds of tinglazed earthenware and Staffordshire-type trailed slipware which are dated as later 17th or early 18th century.

The latest ceramic phase identified at the hunting lodge (cp6c) is characterised by the presence of tinglazed earthenwares (all of English origin), some later English (London or Midlands) stonewares, Staffordshire-type trailed and feathered slipwares and manganese mottled ware, Chinese porcelain and white salt-glazed stoneware. All of these are likely to date to the later 17th or early 18th century, although some continued in use later into the 18th century. Amongst these later wares is a necked cup in Staffordshire-type feathered slipware with trailed slip lettering around the rim (Fig. 19.1, no. 13). Perhaps the latest vessel is represented by a single small body sherd of white salt-glazed stoneware from Funnel 3 ditch 468003, a ware type produced from the 1720s to the 1770s. The presence of just a single sherd of this ware, and the absence of any of the later, factory-produced wares (or any other wares which can be

definitively dated later than the 1720s), suggests that the hunting lodge was abandoned at around this time, and certainly no later than *c*1750.
The range of pottery wares and vessel forms from the site is interesting and can be viewed, with the rest of the material assemblage from the site, as useful functional and economic evidence relating to the use and status of the range of buildings on the site. The assemblage is overwhelmingly dominated by coarse redwares, a group which includes trailed slipwares of the 'Metropolitan' tradition, made in the Harlow area; sources for the plain redwares are also likely to be fairly local. These redwares occur in a restricted range of forms - jars (multi-functional vessels, probably used for cooking and storage, amongst other things), pipkins and skillets, bowls and dishes (including larger forms probably used for dairying processes), jugs, bunghole jars or cisterns (for brewing and/or liquid storage) and chamberpots. The emphasis of this group of wares is in the quotidian activities of food storage and food preparation, with a level of self-sufficiency in terms of dairying and brewing. Alongside these kitchen wares, finer wares, for serving and display, are very sparsely represented. Vessels for the serving and consumption of drink (bottles, jugs, mugs and cups) are probably represented by the small quantities of stonewares (earlier German types, such as 16th century Raeren and 16th/17th century Cologne/Frechen, later replaced by English wares). Staffordshire-type trailed and feathered slipwares of later 17th or early 18th century type provided cups and press-moulded dishes, and tinglazed earthenwares could have been used both for tablewares and for more utilitarian forms such as drug jars and chamber pots. Other finewares are present in such small quantities that each might represent only a single vessel – Chinese porcelain, Beauvais slipware, Martincamp flask, white-slipped, iron-dipped English stoneware, and white salt-glazed stoneware.

The low proportion of finewares (and their apparent concentration in the latest phase of activity on the site, from late 17th to early 18th century) might be considered surprising on such a substantial and apparently high status site. A similar absence of high quality or 'luxury' goods has been noted amongst the rest of the material assemblage, including the glass and metalwork. Comparable sites of this type and date are rare, but a hunting lodge at least partly contemporaneous at Littlecote, Wiltshire, produced a much wider range of luxury items including pottery finewares, glassware, metal objects and interior fixtures and fittings (Wessex Archaeology 2002). Portable goods are likely to have been removed from the site before abandonment, but this would not explain the low incidence amongst the refuse deposited in middens and other contexts. Perhaps more likely is that the site was only intermittently occupied, and so the material assemblage represents 'caretaker' rather than upper class occupation.

<u>Catalogue of illustrated vessels</u>

MTCP

1. St Neots-type ware (fabric 10); lid-seated jar rim, diameter 260 mm. PRN (Pottery Record Number) 2041, context 310039, pit 310036.
2. Early medieval Stansted ware (fabric 13st) jar rim, diameter 240 mm. PRN 2035, context 310151

3. Early medieval ware - inclusion free (fabric 13i) jar rim. PRN 2081, context 310126, pit 310127.
4. Early medieval ware – inclusion free (fabric 13i) dish profile. PRN 2213, context 905, pit 926.
5. Early medieval ?Frogs Hall kiln ware (fabric 13k) spouted pitcher rim. PRN 2050, context 317022, ditch 317030.
6. Early medieval ?Frogs Hall kiln ware (fabric 13k) jar or pitcher rim, scored decoration, diameter 140mm. PRN 2104, context 300135, pit 300136.

FLB

7. Sandy orange ware (fabric 21) jar rim with stabbed and impressed cordon decoration, diameter *c.*350mm. PRNs 1865/1995, contexts 402020/409021, floor surface.
8. Medieval Harlow ware (fabric 21D) anthropomorphic head from aquamanile. PRN 1731, context 405069

LTCP

9. Post-medieval red earthenware (fabric 40) with fine chalk flecks; bowl rim. PRN 2431, context 466010, pond 466001.
10. Post-medieval red earthenware (fabric 40) chafing dish with thumbed bowl-base. PRN 2302, context 452012, ditch 452011.
11. Post-medieval red earthenware (fabric 40) Raeren copy frilled jug/mug base. PRN 2409, context 467001, gully 467028.
12. Metropolitan slipware (fabric 40A) chafing dish base with sgraffito decoration. PRN 2512, context 480054
13. Staffordshire-type slipware (fabric 50) necked, two-handled cup with trailed and feathered decoration on lower body, trailed lettering around rim ([WI]LLIAMT…NO…). PRN 2385, context 461027

Table 19.1: Breakdown of assemblage by fabric type and site

Fabric Code	Description	Date Range	BAAMP99/ BAAMP00	BAAFL00	BAACP01	TOTAL
10	St Neots ware	900 – 1100	246/1225			
12A	Early medieval shelly ware	1000 – 1200	113/473	3/9		367/1718
12C	Early medieval sandy/shelly ware	1000 – 1200	56/472	2/15		58/487
13	Early medieval sandy ware	1000 – 1200	100/755	88/709		188/1464
13f	Early medieval flint ware	1000 – 1200	3/39	81/641		84/680
13i	Early medieval sandy ware – inclusion free	1000 – 1200	35/356			34/347
13k	Early medieval sandy ware – Frogs Hall kiln products?	1175 – 1225	10/221			10/221
13r	Early medieval sandy ware with rose-coloured quartz	1000 – 1200	1/4			1/4
13st	Early medieval Stansted ware	1000 – 1200	308/2063			308/2063
13t	Early medieval ware – transitional	1000 – 1200		60/335		60/335
20	Medieval coarseware	1175 – 1400	9/70	420/3411	1/6	430/3487
20D	Hedingham coarseware	1150 – 1350		4/13		4/13
21	Sandy orange ware	1200 – 1600	17/101	30/321		47/422
21C	Sgraffito ware	1300 – 1450		7/37		7/37
21D	Medieval Harlow ware	1175 – 1500	126/573	1689/14,836	111/1454	1926/16,863
22	Hedingham fine ware	1175 – 1250	2/22			2/22
23	Medieval whiteware	1250 – 1450		1/10		1/10
27	Imported wares	1200 – 1400		1/2		1/2
30	Beauvais slipware	1500 – 1600			1/14	1/14
36	London-type ware	1150 – 1350	4/26	6/67		10/93
40	Post-medieval red earthenware	1500 – 1900	25/156	11/204	1288/25,104	1324/25,464
40A	Metropolitan slipware	1600 – 1700			46/1056	46/1056
40bl	Black glazed redware	1600 – 1750			194/2079	194/2079
42	Border Ware	1550 – 1770			1/19	1/19
43	Martincamp flasks	1480 – 1650			1/9	1/9
45C	Raeren stoneware	1500 – 1610			4/89	4/89
45D/E	Cologne/Frechen stoneware	1500 – 1700			16/188	16/188
45F	Westerwald stoneware	1590 – 1800			4/35	4/35
45M	English stoneware	1670+			6/283	6/283
46A	English tinglazed earthenware	1600 – 1800			12/39	12/39
47	White salt-glazed stoneware	1720 – 80			1/1	1/1
48	Industrial wares (unspecified)	1900+			3/48	3/48
48A	Chinese porcelain	1650 – 1900			1/5	1/5
50	Staffordshire-type slipwares	1680 – 1800			40/375	40/375
50A	Staffordshire-type mottled ware	1680 – 1750			5/54	5/54
	TOTALS		**1055/6556**	**2403/20,610**	**1735/30,858**	**5193/58,024**

Table 19.2: Fabric x form (medieval fabrics only)

Form	Essex type	Description	10	12	13	13f	13i	13k	13st	13t	20	21	21D	TOTAL
JAR	-	Jar rim: simple everted		2		1			7					**10**
	-	Thickened, everted	4	7	4		3		12					**30**
	-	Thickened, everted, with slight lid seating	12	3		1			1					**17**
	-	Beaded		1	2		2		5					**10**
	B2	Slightly developed everted			1	1				1	7		3	**13**
	B4	Developed, pointed, internally thickened						2					2	**4**
	C1/D2	Curved over flanged								1	2	1	31	**35**
	H1	Squared, flat-topped, short neck			2		1				18		15	**36**
	H2	Squared rim with sloping top, short neck			1									**1**
	H3	Squared, neckless									6		1	**7**
	H4	Small squared			1	11								**12**
	-	Bifid (lid seated)										1		**1**
DISH/ BOWL	=B4	Developed, pointed, internally thickened			1									**1**
	=C1/D2	Rounded, everted											1	**1**
	=H1	Flanged			1					1	2		11	**15**
	-	Internally expanded			1						1	1		**3**
	-	Beaded		1										**1**
	-	Simple upright					1							**1**
JUG	-	Jug rim, unspec						1				1	11	**13**
	-	Jug rim, collared									1	1	5	**7**
	-	Handles, all forms			1						1	1	21	**24**
		Spouted pitcher						1						**1**
OTHER	-	Aquamanile											1	**1**
	-	Bunghole vessel										1	1	**2**
	-	Lid											1	**1**
			16	**14**	**15**	**14**	**7**	**4**	**25**	**3**	**38**	**7**	**104**	**247**

Table 19.3: MTCP - pottery by feature (number of sherds / weight in grammes)

Feature	Description	cp	10	12	13	13i	13k	13st	13 other	21/21D	22	36	40	Total
302028	Late Sax bdg 1	1	22/54											22/54
304001	pit	2	6/5	1/1										7/6
305022	pit	1	19/67											19/67
310014	tree-throw	2	1/2	55/209										56/211
310017	posthole	1	1/1											1/1
310106	ditch	2		1/4										1/4
310118	pit	3	5/24	23/30	1/3	3/10		15/77	1/4					48/148
310127	pit	3	1/10	2/7	1/6	6/88		14/105						24/226
310129	pit	3		6/105	7/35	4/74	3/32	88/680	1/11					109/937
310136	pit	3	47/452	24/274	6/48	11/62	6/85	115/712						209/1633
317030	enclosure ditch	3			1/11		1/104							2/115
318042	pit	1	4/5											4/5
322001	pit/well	1	2/10											2/10
323012	pit	1	9/19											9/18
324039	ditch(Strip Field 1)	5											1/26	1/26
340008	pit	2	104/400	44/199										148/599
343157	ditch	5								1/6			18/82	19/88
344026	ditch	1	1/3											1/3
344060	ditch (windmill)	4			11/106					6/13	1/8			18/127
354050	ditch (windmill)	4								7/48		2/16	1/3	10/67
354069	post pad	3			2/6									2/6
354091	posthole (EM bdg 1)	3	5/11			2/33		4/21						11/65
356095	posthole	1	18/113											18/113
356101	pit	3			1/5									1/5
357057	pit	3		3/25		1/25		8/31	1/11					13/92
357069	pit	3		2/4	1/14	4/40		6/30						13/88
363020	ditch	4								1/10				1/10
366001	pit	3			19/166	2/7		24/186	1/17					46/376
906	posthole (EM bdg 1)	2		1/1										1/1

912	posthole	3			19/46									19/46
917	posthole (EM bdg 1)	1	2/22											2/22
919	gully	3		1/2				3/9						4/11
926	posthole (EM bdg 1)	3	1/1	2/33		2/17		12/61						17/112
490008	ditch	4								1/1				1/1
495004	ditch	4								3/51				3/51
494014	pit	2	5/28	1/2										6/30
497038	pit	1	24/20											24/20
498020	pit	2	9/41	22/96										31/137
500049	ditch (Strip Field 1)	1	181/421											181/421
500019	ditch	1	1/1											1/1
	TOTALS		468/1719	188/992	69/446	35/356	10/221	289/1912	4/43	17/79	1/8	2/16	20/101	1105/5949

Table 19.4: FLB – pottery by feature (number of sherds / weight in grammes)

Feature	Description	cp	12	13	13f	13t	20	20D	21	21D	23	27	36	40	Total
401003	pit	5				4/19	9/56	4/13		19/91				1/19	37/198
401005	gully	4					4/22			22/110					26/132
401009	gully	3				7/18									7/18
401013	over 403001	5		4/36			57/560			564/5019	1/10	1/2		2/21	629/5648
401018	pit	4		2/33		3/11	8/41			1/13					14/98
401019	ditch	4		1/13			1/7								2/20
401021	pit	4					6/76		6/59	2/13					14/148
401029	ditch	4		1/19											1/19
401032	ditch	4		1/17		12/64				6/39					19/120
402001	ditch	4		1/5						10/118					11/123
402006	tree-hrow	4								1/1					1/1
402014	gully	4								6/9					6/9
402016	ditch	4		4/70		1/53	3/9			6/25					14/157
402021	cobbled surface	4		4/50		1/6	19/166		5/85	79/946			3/6		111/1259
402022	pit	4					2/9			8/37					10/46
402024	pit	4			3/12		11/109		1/3	3/12					18/136
402028	ditch	4			1/52		7/39			1/23					9/114
403001	cobbled surface	5		11/56	1/22		32/119		8/64	194/995				1/1	247/1257
403021	pit	4			4/15		9/26		1/3	3/13					17/57
403029	pit	5			3/28		4/48			41/1086				1/74	49/1236
403031	pit	4								1/3					1/3
403041	pit	4			1/8		6/15			7/30					14/53
403058	pit	5		6/40	4/28		29/146			37/70				1/3	77/287
404001	ditch	4					1/26			30/202					31/228
405002	posthole	4		13/50											13/50
405004	posthole	4			4/30		1/59								5/89
405006	posthole	4			3/26		4/45								7/71
405008	posthole	4		1/5			2/17								3/22
405023	pit	4		9/105	9/86		29/288			72/755			2/57		121/1291

405049	ditch	5												2/24	2/24
405064	pit	4					8/38			87					95/867
405066	under 402021	4		1/17			7/83			18/264					26/364
405069	under 402021	4			2/27		8/71			39/525					49/623
405074	gully	4		1/7			2/4		1/3	1/1					5/15
405083	pit	4		6/20	4/14		16/101		3/10	5/6					34/151
405085	pit	2	2/8												2/8
405087	pit	3	2/15	2/2											4/17
406003	ditch	5		4/8	1/5		2/65							1/6	8/84
406004	ditch	4					1/23								1/23
406024	sunken floor	5		1/15			6/132		1/2	126/1559				2/56	136/1764
407001	pit	4	1/1	2/13	8/44		16/78			16/94					43/230
407009	ditch recut	4					4/75								4/75
409014	pit	3		1/4											1/4
409044	ditch	5					7/106								7/106
410010	pit	4		4/45	25/183	32/164	36/232		1/48	3/43			1/4		102/719
	TOTALS		5/24	80/630	73/580	60/335	357/2891	4/13	27/277	1408/12931	1/10	1/2	6/67	11/204	2033/17,964

Table 19.5: LTCP – pottery by feature (number of sherds / weight in grammes)

Feature	Description	Med.	40	42	43	45C	45D/E	45F	45M	46A	47	48	48A	50	TOTAL
447003	robber cut		52/1547						1/6					1/7	54/1560
447014	latrine		12/166				1/16		1/10						14/192
448004	Ph 1 encl.		1/6				6/63								7/70
449076	posthole		7/52												7/52
449078	depression		3/21												3/21
449083	pit		4/52												4/52
449107	Posthole (LM encl.)		1/18												1/18
449140	cobbles		1/11												1/11
450023	levelling over ditch 455018	1/17	11/216			1/7			2/190						15/430
450040	Posthole (LM lodge)		6/36												6/36
452011	ditch		1/526												1/526
453009	ditch (Funnel 3)		2/29												2/29
453024	construction cut		2/36												2/36
455008	?midden		10/51				1/13								11/64
455018	ditch		1/15												1/15
457014	surface/midden	30/643	41/560	1/19											72/1222
457015	cobbles	4/46	2/88												6/134
457016	ditch		5/49												5/49
457026	cobbles		2/72												2/72
457028	cobbles		2/50												2/50
458028	pit		42/1273			1/65									43/1338
458038	robber cut		1/14												1/14
458042	ditch		2/14												2/14
458047	posthole		1/48												1/48
459005	pit		153/2442				3/30			5/12		1/2		1/1	173/2487
459012	pit		6/201												6/201
459024	hearth		1/1												1/1
459026	hearth	49/189	18/269							3/5				2/2	72/465
459029	hearth	2/118	15/84					1/1							18/203

460019	?demolition		4/72												4/72
461014	robber cut		34/1209				4/58		2/77	1/8					41/1352
462005	pit		1/15												1/15
464035	pit		1/72												1/72
465023	cobbles		2/45												2/45
466001	pond	8/105	67/1370												75/1475
466020	ditch	6/56	105/1730										1/5		112/1791
467008	midden	1/14	142/1148			1/4									144/1166
467025	gully		26/273		1/9										27/282
467028	gully		34/517												34/517
467029	midden		23/232												23/232
467038	ditch		5/119												5/119
467057	ditch		12/219												12/219
468003	ditch		36/467							1/1	1/1			4/16	42/485
468015	pit		30/349												30/349
468021	posthole(LM lodge)		1/1												1/1
472004	cobbles	9/153	51/779												60/932
481009	cobbles	1/58	27/904												28/962
481029	well		9/182			1/13									10/195
	TOTALS	110/1382	1022/17,635	1/19	1/9	4/89	15/180	1/1	6/283	10/26	1/1	1/2	1/5	8/26	1185/19,691

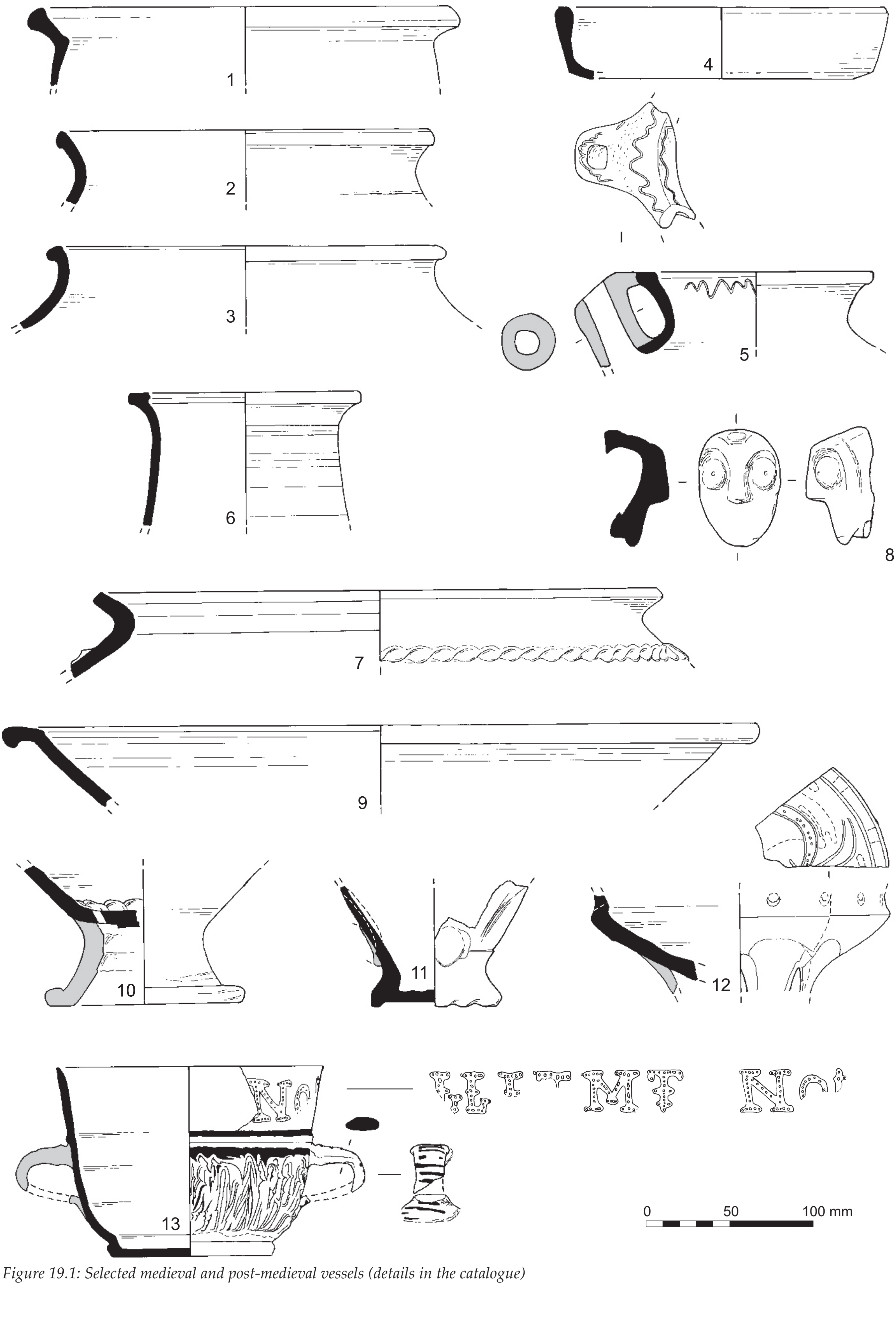


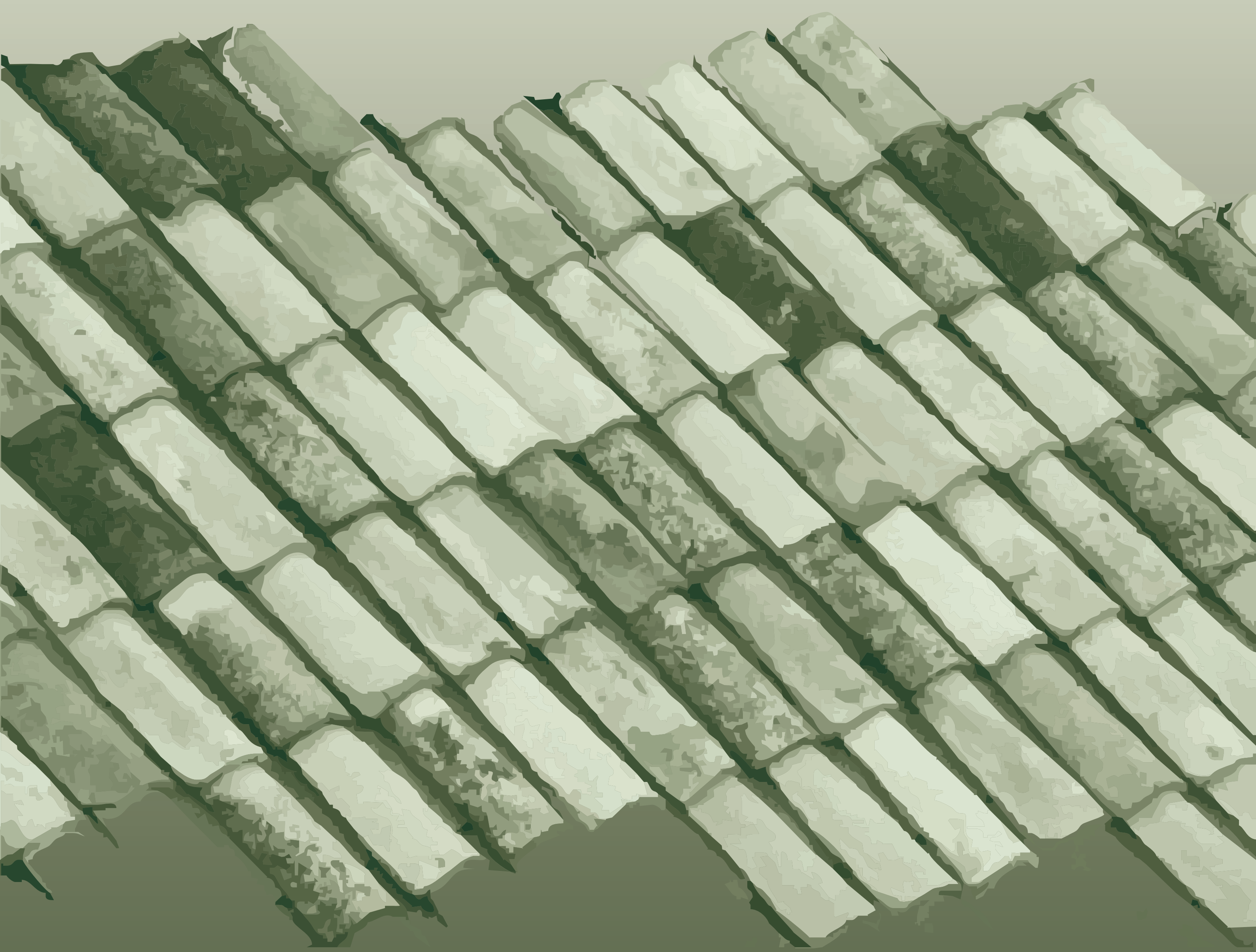
Figure 19.1: Selected medieval and post-medieval vessels (details in the catalogue)

SITE	**cp 1** **?C10/early C11**	**cp 2** **?early/mid C11**	**cp 3** **?late C11/12**	**cp 4** **late C12-C13**	**cp 5** **late C13-C15**	**cp6** **C16-early C18**
MTCP				*	*	
FLB		*	*			
LTCP						

Figure 19.2: Chronological breakdown of site assemblages
*(shading shows well represented cps; * indicates minimal presence)*

CHAPTER 20

Ceramic building material



by Grace Perpetua Jones

20 Ceramic Building Material

Grace Perpetua Jones

A total of 1,255 fragments of ceramic building material, weighing 155,408 g was recovered during evaluations and excavations at Stansted Airport. The material originated from five sites (Table 20.1): LTCP (BAACP99, BAACP00, BAACP01); MTCP (BAAMP99, BAAMP00); FLB (BAAFL00); M11 (BAALR00) and SG (BAAGS04). A proportion of the assemblage was discarded at the assessment stage, accounting for 27% of the overall count and 55% of the weight. The vast majority of this discarded material (99.1% by weight) originated from the LTCP site and is commented on below.

The remainder of the assemblage was recorded by context group, divided by fabric and form, counted and weighed. The thickness of each brick or tile was recorded, and any complete width or length measurements were taken. The presence of any surface markings such as signature marks, combing or animal prints was also noted. The material ranged in date from the Romano-British to the post-medieval and modern periods. The Roman fragments were mostly quite abraded, particularly those with silty fabrics, however the post-medieval and modern material was better preserved.

Fabrics

Twelve fabric types were identified amongst the assemblage retained for full analysis (921 fragments, 69,533 g). These are described further below. Five fabrics (types 4, 5, 7, 8 and 9) were Romano-British in date. Two of these were grog-tempered: fabric 4 is soapy in texture and contains a common amount (20-25%) of coarse grog fragments up to 4 mm in size; fabric 7 is much siltier, with finer grog temper. Fabric 8 is characterised by a clean-looking sandy matrix, whilst fabric 5 is distinctly silty in texture. Fabric 9 is more mixed, with inclusions of sand, iron, flint and chalk visible.

The medieval and post-medieval fabrics (types 1, 2, 3, 10 and 11) were differentiated according to the grain size of quartz present in the fabrics. All were hard fired; two fabric types could not be defined on the basis of the inclusions alone, without recourse to petrological analysis, and have therefore been characterised using firing traits. In the case of fabric 2 the inclusions were no longer visible due to a high firing temperature creating a nearly vitrified appearance. Fabric 10 was used for the manufacture of late post-medieval bricks, again fired to a very high temperature, creating a vesicular fabric. Fabric 1 demonstrated a fairly clean, sandy clay matrix with a sparse amount of argillaceous inclusions, fabric 3 was siltier with fine to medium-grained black iron oxides. Fabric 11 also contained fine-grained black iron inclusions; however larger red iron oxides, up to 10 mm in size, were also seen. Fabrics 6 and 12 represent modern pipe and brick fabrics and have not been recorded in detail.

Forms

A large range of brick and tile types were identified in the assemblage. The Roman types include *tegula; imbrex;* box flue-tile; plain, flat tile and brick. The *tegulae* were manufactured using four fabric types, and in a variety of sizes. The *tegulae* faces ranged in thickness from 15-35 mm, with a peak at 18 mm. The flanges measured from 36 mm to 58 mm, although most were within a range of 45-54 mm, comparable to the average depth of 50 mm recorded during Brodribb's study of Beauport Park (Brodribb 1987, 13). Cut-aways were visible on only three fragments, one of which also displayed a paw print and another a single signature ring. Two further tiles were also marked by single signature rings.

Imbrices and box flue-tiles were represented by 66 and 42 fragments respectively. Combing was present on many of the box-tile pieces, however the fragments were too small to enable any patterns of keying to be recognised. A wide range of tile thickness was recorded, from 11 mm to 30 mm, with the majority falling between 13 mm and 20 mm. The *imbrices* represented a slightly tighter range, 11 mm to 22 mm, with a peak between 12 mm and 16 mm. Fragments of plain tile (< 40 mm thickness) occur widely in this period, brick (>40 mm) is less common. The plain tiles range from 10 mm to 38 mm in thickness, with the greatest peak between 14 mm and 20 mm, and it is likely that most originate from *tegulae* or possibly *tubulus* rather than floor tiles. There appears to be no correlation between the tile type and fabric during the Roman period.

During the medieval and post-medieval period the roofing material includes peg tiles, hip tiles, a single nib tile and several fragments of curved tiles. Most of the peg tiles demonstrated one pre-firing perforation, usually circular in shape, although squared examples also occur. These holes ranged in diameter from 12 mm to 17 mm. The most complete example of a peg tile was 150 mm wide and 11 mm thick, with two 15 mm diameter perforations, 30 mm apart, 15 mm from the top edge, 40 mm and 45 mm from each side edge. The thickness of the peg tiles as a group ranged from 11 mm to 20 mm, peaking at 12 mm and 13 mm. Flat tiles displaying no distinguishing features were recorded as plain tiles, they were between 10 mm and 35 mm thick, however a peak again at 12 mm and 13 mm suggests that many of these fragments originate from peg tiles. The small quantities of hip and nib tiles are reported on below. The width of two bricks could be measured at 100 mm and 102 mm, the thickness of all medieval and post-medieval bricks varies from 41 mm to 60 mm.

LTCP

A rigorous sampling strategy was applied to the LTCP site as a result of the large quantities of ceramic building material encountered during the excavation of the post-medieval hunting lodge. This resulted in only a small proportion of the material being retained for quantification, totalling 476 fragments, 107,670 g, and recovered from 135 contexts. Of this material, 259 pieces (85,102 g) were recorded at the assessment stage and then discarded. Many of these were unstratified (mostly recovered from the topsoil), or were modern in date. The most diagnostic medieval and post-medieval pieces were retained for full analysis, as well as a quantity of Roman material.

The Roman material was recovered from 38 contexts across the site (90 fragments, 6125 g), with diagnostic pieces recorded from six contexts. *Tegula* fragments were recovered from contexts 129017 and 140024, both in late Roman ditches. A further piece was intrusive in Late Iron Age ring ditch 129062 (context 139043). Box-tile was identified in Late Iron Age/early Roman ditch 109215 (context 138012) in association with *imbrex* fragments, and also in context 114041, in Late Roman ditch 143007. The quantity of diagnostic material was low, however, most fragments were plain and flat.

The medieval and post-medieval assemblage was much better preserved, as might be expected as these were specifically selected for retention. It is dominated by roofing material, predominantly peg tiles, recovered from context 450023 (demolition rubble), context 913904 (ditch 913903), context 915403 (ditch 915402), context 915604 (ditch 915603) and cobbled droveway 915606. Single hip tiles were recovered from cobbled surface 458025, layer 460019 above a cobbled surface and context 459009 (pit 459005). The hip tiles were wedge-shaped with square or circular nail holes, 9-10 mm diameter. The clay had not been completely pushed through the perforation of the tile from layer 460019, and had not been subsequently knocked through with a nail. This would suggest that this tile was never actually used. The narrow end of two of the tiles had been finished in an arc shape, presumably to facilitate a close fit with the timbers. The edges of the tile from context 458025 were very smooth and were probably cut with a wire. The hip tiles were of a similar thickness to the peg tiles, 13-15 mm. Two curved tiles were present in contexts 459008 (fill of pit 459005) and 461001 (from robber cut 461014), the example from the latter was vitrified. The bricks were probably stock moulded, a single plinth brick was also recovered from context 466025 (ditch 466020). This brick was chamfered on one face, measured 195 mm in length, 53 mm in height, 101 mm in width across the base and 53 mm across the reduced upper area. The retained brick fragments were mostly vitrified, and ranged in thickness from 46 mm to 66 mm.

Few fragments of plain, flat tiles were recovered from the LTCP site. Those that were include a complete floor tile, measuring 160 mm x 160 mm x 35 mm, with mortar adhering to all four sides and the base. A second partial floor tile was also recovered, measuring 153 mm x 32 mm, traces of mortar were again present. Only one decorated floor tile was present in the assemblage, originating from post-medieval occupation layer 472004. This tile was stamped and slipped, and displayed a geometric pattern. No trace of the glaze survived.

MTCP

The MTCP site produced the largest assemblage of ceramic building material, recovered from 205 contexts. It was predominantly Roman in date (91% by count, 92% by weight) and provided evidence for roofing and cavity walling. The roofing material consists of 66 fragments of *tegula* and an almost equal number of *imbrex* pieces (63 fragments). Much of the plain, flat tile recovered from the site may have broken from *tegula* faces. Box flue-tile fragments numbered 37 and suggest the presence of a substantial building near to the site. Evidence for ceramic roofing material in the medieval period is limited to a single nib tile from context 354054, the fill of windmill ditch 354053. This tile is 16 mm thick, the nib projects from one side of the tile, and would have been used to attach the tile to the roof. A small number of bricks were recovered of Roman, medieval and post-medieval, and modern date.

FLB

The assemblage recorded from the FLB site was mostly undiagnostic, consisting predominantly of plain, flat tile fragments and miscellaneous pieces with only one surface remaining. The Roman material was represented by a single box-tile from layer 402019 (surface 402021) and a small number of plain fragments. The remainder of the assemblage was medieval and post-medieval in date, and included two flat fragments with remnants of a brown glaze on one side (from layers 401013 and 405082 – fills of pit 405083). They were relatively thin (15 mm and 16 mm respectively) and as such may have been used as wall tiles rather than floor tiles. Ten peg tile fragments were present, and it is likely that most of the pieces recorded as plain tiles did in fact originate from roof tiles.

The M11 and SG sites

The M11 site produced ceramic building material from seven contexts, with features ranging in date from the Bronze Age to the modern day. With the exception of a complete modern brick, the assemblage is small, abraded and undiagnostic, and represents only a background spread of material. The fragments in the prehistoric features are, of course, intrusive. The SG site also produced a very small, undiagnostic assemblage from seven contexts.

Discussion

The ceramic building material was predominantly recovered from the LTCP and MTCP sites. Fragments from 380 contexts were recovered, indicating the general spread of material across the sites. No large dumps or other concentrations of material were noted. The range of fabrics in all periods was fairly small, and was mostly distinguished by the grain size of the quartz inclusions. In the Romano-British and medieval / post-medieval periods both silty and sandy fabrics were used, indicating that the tiles recovered from Stansted were the products of more than one clay source and kiln.

The Romano-British ceramic building material recovered from the Stansted sites was concentrated on the MTCP site, with a lesser amount recovered from the LTCP, and only very small quantities recorded from the FLB and M11 sites. The presence of roofing material, in the form of both *tegula* and *imbrex* fragments, and evidence for cavity-walling, indicates the presence of a substantial masonry building in the vicinity of the sites, although the small quantities recovered suggests that it did not form part of the excavated settlements. This building would have been served by a hypocaust system and was roofed using flanged and curved tiles.

The medieval and post-medieval material was concentrated on the LTCP site, with very little recovered from the other sites. The presence of a large quantity of peg tiles indicates that the roof of the hunting lodge was tiled, three bonnet hip tiles removed from the site creates a more detailed picture of a hipped roof rather than a gabled roof. The early phase of the building was timber built, however by the final phase bricks were used in the construction. Bricks were also used to line a well located to the south of the structure, and to create foundations.

Fabric descriptions for the ceramic building material

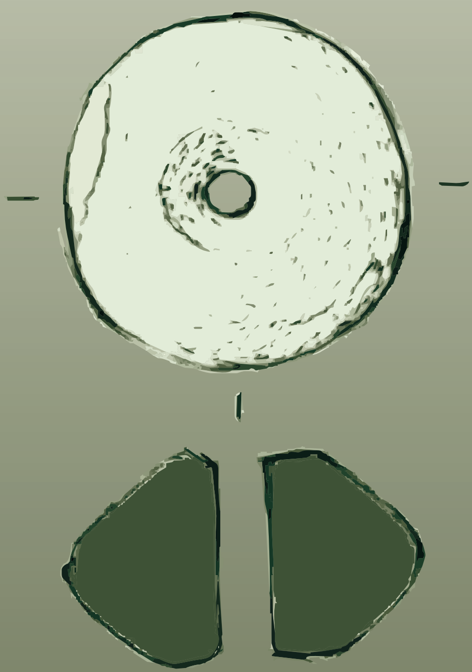
1. A hard, sandy fabric, reddish orange in colour, containing a moderate amount (10-15%) of angular, medium to coarse-grained quartz, well sorted; sparse (5-7%) hard, argillaceous inclusions of the same colour as the clay matrix, rounded, $\leq$2 mm, well sorted, were also present. This fabric has a broad date span from the medieval to the post-medieval period.
2. Hard fired, purplish grey colour. The clay has fused and the inclusions are not visible at X20 power using a binocular microscope. This level of firing was mostly seen in medieval and post-medieval contexts, however there was also a single example from a Roman context.
3. A hard, silty-textured fabric, pinkish orange in colour, containing a moderate to common amount (15-20%) of sub-angular, black iron oxides, mostly fine to medium-grained, and a sparse amount (5%) of angular red iron oxides, up to 2 mm in size, poorly sorted. The clay matrix contains an abundance of fine-grained quartz, barely visible at x20 power. The fabric represents the medieval and post-medieval periods.
4. A hard but soapy fabric containing a common amount (20-25%) of sub-angular to angular grog, $\leq$4 mm, poorly sorted, mostly unoxidised pieces. This fabric was utilised during the Roman period.
5. A hard, silty textured fabric of Romano-British date. The clay matrix appears to contain abundant very fine or fine sized quartz, but this is not clearly visible at x20 power, A sparse amount of fine-grained black iron oxides and occasional coarse-grained quartz, is also present.
6. Modern, speckled, iron-rich pipe fabric.
7. A hard, silty-textured, Romano-British fabric, containing a moderate amount (15%) of sub-angular to sub-rounded oxidised grog fragments, $\leq$2 mm, in a fine-grained sandy clay matrix with occasional rounded coarse to very coarse-sized grains.
8. A hard fabric of Romano-British date. The clay matrix is clean-looking and sandy, however the grains are not clearly visible at x20 power. The fabric may contain up to 25% sub-angular coarse-grained quartz, at least a proportion of which was probably deliberately added as temper.
9. A hard, silty fabric containing a moderate amount (10%) of medium to coarse-grained rounded, red iron oxides, and a rare to sparse amount (up to 5%) of angular flint and rounded chalk fragments. The clay matrix contains fine-grained quartz. The fabric is Romano-British.
10. Very hard, sandy fabric, dark reddish brown colour, almost vesicular indicating a very high firing temperature, contains a common amount (20-25%) of medium-grained quartz, sub-rounded, also contains a moderate amount (10-15%) of red iron oxides, up to 20 mm, poorly sorted, visible on the surfaces. Late post-medieval period.
11. A hard, sandy fabric, dark orange in colour, containing a common amount (25%) of medium-grained sub-rounded to sub-angular quartz, well sorted. A moderate amount (10%) of red iron oxides, up to 10 mm, are visible on the surface. The clay matrix contains a background of fine-grained black iron oxides. Late medieval in date.
12. Modern brick fabric.

Table 20.1: Quantification of ceramic building material recovered by site

Site	**Count of pieces**	**Weight of pieces (g)**	**Average piece weight (g)**
LTCP	476	107,670	226
FLB	84	2,751	33
M11	61	1,663	27
MTCP	618	43,222	70
SG	16	102	6
Total	**1255**	**155,408**	**124**

CHAPTER 21

Fired clay



by Grace Perpetua Jones

21 Fired clay

Grace Perpetua Jones

The fired clay assemblage from Stansted totalled 9,012 fragments, weighing 41,482 g. The material was recovered from seven sites - the LTCP; MTCP; M11; FLB; SG; LBR and the NP sites. The bulk of the fired clay was amorphous in character; however the presence of wattle impressions on a number of pieces suggests that much of this material represents structural material. A total of 210 fragments, 5,859 g, could be identified as fired clay objects (Table 21.1). The fired clay was recovered from contexts dating from the Neolithic to the present day. There is an emphasis on the Late Iron Age, Romano-British and medieval periods, and a decline from the Late Bronze Age to the Middle Iron Age, presumably relating to shifts in the settlement pattern during these periods. Selected objects are illustrated in Figure 21.1, nos 1-7.

Fabrics

The fired clay assemblage is dominated by fabric 1, a soft, silty fabric containing a common amount (20-25%) of sub-rounded to rounded chalk, up to 18 mm in size and poorly sorted, with occasional angular pieces of detrital flint of a similar size, coarse-grained quartz and very coarse red iron oxides. This fabric is usually buff to orange in colour. In several cases the chalk has leached from the fabric, and for the purposes of analysis has been classified as fabric 3, however it is likely that both represent the same fabric. It has been used as daub and in the manufacture of loomweights.

A clean, sandy fabric of reddish orange colour had also been used for daub (fabric 2). It is soft and silty in texture, and contains a common amount (25%) of angular, coarse-grained quartz, with occasional pieces of sub-rounded quartz of ≤3 mm, poorly sorted. Fabric 4 was represented by one cylindrical loomweight. It was characterised by a silty clay matrix with occasional coarse-sized quartz and angular, detrital flint, ≤20 mm, and rare sub-rounded chalk inclusions, up to 12 mm.

Two fabric types were identified that had been used in the manufacture of clay slabs, and one for a brick-like object. Fabric 5 is silty and micaceous, fabric 6 contained a common to very common amount (25-30%) of sub-angular argillaceous inclusions, probably grog. They were moderately sorted, measuring up to 5 mm, although most were 1 mm. The clay matrix was also silty and micaceous. Context 356015 produced 43 fragments of extremely friable slab/brick (fabric 7). The fabric contained a very common amount (30%) of sub-rounded to sub-angular chalk inclusions, up to 3mm, moderately sorted.

Fabrics 8 and 9 were representative of salt production. The former is a fine, slightly silty fabric, with a very common to abundant amount (>30%) of linear vesicles, the remains of organic temper. It had been used in the manufacture of salt containers. Fabric 9 also possessed a silty clay matrix, however only a sparse amount of organic temper had been added to the fabric. Rare pieces of detrital flint had also become incorporated. There is no evidence it had been used to make containers, but demonstrated evidence of being associated with salt production (see below). Fabric 10 was silty in texture, with occasional rounded, coarse-sized quartz grains visible on the surface of the single object found in this fabric (bead in context 107013). Fabric 11 has been assigned to the spindle-whorl in context 136130. It contained a sparse amount of organic temper in a sandy clay matrix, and is similar to the Iron Age pottery fabrics.

Objects of fired clay

Loomweights

Clay loomweight fragments were recovered from eight contexts during excavation on the MTCP site. Seven of these contexts represented the fills of Middle Bronze Age waterhole 309075, the eighth was located in Middle Bronze Age pit 312031, located approximately 63 m to the north-east of the waterhole. The loomweight assemblage was quite fragmentary and no complete examples were identified. A maximum of eleven clay loomweights were recovered from the waterhole, and one from pit 312031 (Table 21.1). Many of the fragments shared the same fabric type (fabric 1), however an attempt to refit the fragments from the different contexts within the waterhole was unsuccessful.

The fragments all originated from cylindrical loomweights. These objects were between 70 mm and 100 mm in diameter, usually at the upper end of this range, and the height of loomweights in contexts 309112 and 309119 was measured at 80 mm and 83mm respectively. Reconstruction of fragments in context 309113 indicate that the height of this particular loomweight was a minimum of 90 mm. The central perforation was visible on only one example (context 309119), and indicated that the distance from the outer edge of the perforation and the outer edge of the weight varied from 42 mm to 48 mm (Fig. 21.1, no.1).

Spindlewhorl

A single spindlewhorl was recovered from the LTCP site, in Mid/Late Iron Age pit 136129 (Fig. 21.1, no. 2). It was biconical in cross-section, with the maximum diameter (30 mm) located across the middle of the whorl. It is 17 mm in height and has been centrally perforated by a 4 mm hole. The top and bottom of the object has been flattened. The spindlewhorl is small, and weighs only 14 g. This form of spindlewhorl is paralleled at Springfield Lyons (Major 1987, 11, fig 10.3) and North Ring, Mucking (Barrett 1988, 37, fig 38.2).

Briquetage

Salt consumption

A small quantity of salt container material (briquetage) was recovered from Late Iron Age and Roman features at Stansted sites (Table 21.1). The briquetage is characterised by the highly distinctive pink, lavender, grey and white colouring of clay containers that have been used to evaporate seawater brine, which contains 3% salt in solution (Morris 2001, 41, after Peacock 1984). Crosby (2001, 112) noted that amongst the briquetage assemblage from the early Roman saltern in Morton Fen, Lincolnshire, ‘salt colours are apparent only on containers’. These containers were ‘shallow, slab-built sub-rectangular vessels’, trough-like in form (Crosby 2001, 112). The single, fragmentary rim recovered from context 147013 (intervention 147010, Late Iron Age/early Romano-British ditch 102130) was flat-topped and appeared to represent a trough-like vessel (Fig. 21.1, no. 4). The remaining four briquetage sherds in this context were flat, 13 mm thick, and also probably originate from a trough-like vessel. In almost all of the briquetage sherds, these ‘salt colours’ were far stronger on one side of the fragment than the other. One surface usually remained orange in colour, presumably indicating the outer surface which was not in constant contact with the salt water. The rim fragment demonstrated the deepest level of discolouration.

The fabric of the salt containers contained at least 30% organic temper. Crosby argues that the ‘almost exclusive use of organic-tempered fabrics was probably a deliberate choice by the salt-makers to take advantage of the joint properties of lightness and thermal shock resistance created by the presence of organic voids’ (Crosby 2001, 111).

Evidence for salt production in Essex dates from the Late Bronze Age, with a further phase of development taking place in the Iron Age, attested at sites such as the Ardale School site C and Little Waltham (Barford 1990, 81-2). The Red Hills salterns produced salt during the Late Iron Age and early Romano-British periods (Fawn *et al.* 1990, 42).

Associated material

Three contexts produced material which appeared to represent objects used in the salt production process, but which were unlikely to be containers. Fragments from contexts 319200 (intervention 319198, Late Romano-British ditch 344200) and 110075 (early Romano-British ditch 110077) had no surfaces, and were highly variable in colour: greyish black in the core of the fragment, and a yellowish brown to orange colour towards the outside. Areas of pink suggest some relationship with the briquetage, however the form of the fragments could not be ascertained, and the sparse amount of organic temper (fabric 19) also indicates a different use to the containers.

Two fragments from context 320097 (intervention 320093, Late Iron Age/Romano-British ditch 306045) created a flat slab with two surfaces, 17-19 mm thick. Although this object did not display any of the salt colours, it did contain a high proportion of organic temper and as such is entirely different to the clay slabs defined below. The core was greyish black in colour and both surfaces were brownish orange. Faint channels from finger wiping could be seen on one surface.

Clay slabs

Flat slabs of clay, with two surfaces, were recorded from three of the Stansted sites. This type of object was recovered from five contexts on the LTCP site. Intervention 129039 (ditch 109215) and intervention 129100 (gully 129160), dated to the Late Iron Age and Late Iron Age/early Romano-British periods respectively, produced fragments of similar appearance, with a silty, micaceous fabric (fabric 5). Both were fully oxidised, a buff to light greyish brown colour, 30-35 mm in thickness. This fabric had also been used to construct a slab recovered from the topsoil (context 101005, Fig. 21.1, no. 5). The slab was 43 mm thick and demonstrated upper and lower surfaces, as well as two finished edges, joined at an angle of approximately 135°. The core of the object was completely unoxidised and black in colour, the surfaces were a light greyish brown colour. The slab was not dissimilar to a lumpy slab recovered from Middle Iron Age pit 109011. This object was the least evenly formed of the clay slabs, and was also the thickest at 90 mm. The core was again completely unoxidised, and the external surfaces only lightly oxidised. Two finished edges were visible, joined at a rounded corner. Three fragments from a subsoil spread (context 110126) joined to create the edge of a slab which survived to a length of 185 mm and was 28-29 mm thick. It was also composed of the silty, micaceous fabric 5. Intervention 129074 (Late Iron Age/early Roman ring gully 129088) produced fragments of a grog-tempered slab (fabric 6), however only one surface was present.

A grog-tempered (fabric 6) slab was also recovered from intervention 435021 (Late Iron Age/early Roman ditch 433033) on the M11 site (Fig. 21.1, no. 6). The largest fragment measured 130 mm x 140 mm and was 30 mm thick. Three fingertip impressions were visible at the edge of the fragment. A 30 mm thick slab in silty, micaceous fabric 5 was also recovered from this site, in intervention 439047 (Late Iron Age ditch 433054). Both upper and lower surface were present, plus one finished edge.

Extremely friable fragments from some form of brick or slab were found at the base of an undated pit, feature 356013. The pit also contained metalworking debris and it is possible these clay objects were used to line the pit. During excavation it was noted that some had been embedded into the natural. The highly abraded nature of the fragments had caused most to crumble, and none demonstrated two surfaces. Those surfaces that had survived appeared to have been carefully flattened, and may have been given some form of slurry treatment as they are almost light-reflective.

Perforated clay slabs are seen on Late Bronze Age sites in Essex and have been reported on at Springfield Lyons (Major 1987, 11) and North Ring, Mucking (Barrett 1988, 39), however no perforations were visible on the Stansted clay slabs.

Bead

A single bead was recovered from the LTCP site, from context 107013 – intervention 107016, Late Iron Age ditch 113048 (Fig. 21.1, no. 3). It was 22.2 mm in diameter, had rounded, convex sides and had been flattened on the top and the bottom. The centre had been perforated with a 4 mm diameter hole. The form of this object would suggest it may have been used as a spindlewhorl, however it is only 8 g in weight and it is therefore unlikely it would have served such a function. A study of West Norwegian spindlewhorls from the Sogn Folkemuseum recorded a weight range of 10 g to 50 g, with most between 20-35 g (Øye 1988, 37).

Ball

Context 347109 (intervention 347108, Late Iron Age ditch 344347) produced a spherical ball of fired clay, 90 mm in diameter (Fig. 21.1, no. 7). The ball had been irregularly formed, with flattened areas visible on the surface. It had been made from the chalk-gritted fabric 1, and fired to a buff / yellowish brown colour on the exterior, however most of the interior remained unoxidised. The function of this ball, if any, is unknown.

Structural material

The bulk of the fired clay recovered from the Stansted sites can be described as amorphous in character, consisting of small and abraded fragments, in poorly fired fabrics. The function of many of these small fragments cannot be ascertained, and any dating must rely on associated material. The presence of featureless fired clay across the sites is quantified in Table 21.2. Wattle impressions on a number of fragments suggest that many derive from structural material such as daub. The most commonly occurring daub fabric was fabric 1, containing rounded chalk inclusions, which was also used for the loomweights and clay ball.

Distribution

The assemblage was recovered from a large number of contexts across the sites (658 contexts), may of which contained very small quantities of material. The largest group of material came from the MTCP site, yet of the 335 contexts that produced fired clay, 303 contained less than 100g. A similar situation is seen at all of the other sites, with 198 contexts at the LTCP site producing less than 100 g, 54 contexts at the M11 site and 36 at the FLB, SG, LBR and the NP sites produced very small quantities of material, with less than 50 g of fired clay per context, with the exception of context 494015 (BAASG03). This context was located in pit 494014, containing daub, late Saxon pottery and charcoal.

Of particular interest is the small quantities of fired clay recovered from Neolithic tree-throw 429002 (1 g) and Neolithic pit 502 (6 g), suggesting the earliest use of the landscape.

MTCP

The largest group of material was recovered from hearth 354081, located within an early medieval building. The 2.4 kg of fired clay, predominantly daub fragments, may result from the destruction of the building. Late Saxon pit 315051 produced 527 g of daub, a further 1.2 kg was recovered from nearby Late Saxon pit 305011. Late Romano-British pit 319140 contained 1.3 kg of daub and featureless fragments. This feature was thought to have an industrial use. This material may have derived from the destruction of the rectangular buildings, alternatively it may relate to nearby oven/kiln features, such as late Roman kiln 338022 (contexts 338010 and 338015), from which 2 kg of material was recorded. Late Roman ditch 306175, located to the south of the kiln, produced 438 g. Early medieval pit 310129 contained 645 g, adjacent early medieval pit 310136 produced 461 g. Other interventions from which reasonable quantities of material were recovered include Middle Bronze Age waterhole 309075 (1.1 kg); Late Bronze Age pit 334059 (336g); Late Iron Age ditch 344073 - intervention 361006 (430 g); late Roman-British pits 334013 (480 g) and 356077 (245 g), an early Roman posthole, 319298 (266 g); early medieval pit 310118 (250 g) and Late Saxon pit 317001 (208 g). Large quantities were also recovered from unphased tree-throw 357067 (1.7 kg).

LTCP

Only four contexts excavated at the LTCP site produced over 150 g of fired clay. These include early Romano-British ditch 102134 (192 g); Late Iron Age/early Romano-British pit 136012 (538 g); a deposit that had formed in the top of early Romano-British ditch 109214 (618 g), and unphased hearth 147027 (721 g).

FLB

The largest groups of fired clay from the FLB site were recovered from a medieval oven/kiln, feature 405015 (1.7 kg, contexts 405011, 405014, 405022). Medieval ditch 407009, located to the south-west of this feature, produced 376 g. Fired clay was also identified in unphased tree-throw 409035 (160 g).

M11

Assemblages of more than 150 g of fired clay recorded from the M11 were concentrated around adjacent pits 423154 (1 kg) and 423113 (672 g), Middle Bronze Age waterhole 426015 (520 g) and late Iron Age ditch 430052 (178 g).

Discussion

The low percentage of identifiable objects from Stansted is surprising for a site displaying substantial settlement evidence during the Middle to Late Bronze Age, Late Iron Age to Romano-British and medieval periods. The bulk of the assemblage represents structural fragments, found widely across the sites, in contexts dating from the Neolithic to the medieval period. Nonetheless, the assemblage also provides evidence for textile production during the Middle Bronze Age at the MTCP site and, to a lesser extent, during the Iron Age at the LTCP site. During the Late Iron Age and Romano-British periods salt was being brought to the site, perhaps from the Red Hills. The presence of material that may be associated with production suggests the possibility that part of the process may have been carried out on, or near to, the site.

The clay slabs, recovered from Late Iron Age and Roman features at the LTCP and M11 sites, are similar in form to fragments of pre-Roman ‘bricks’ associated with ‘ovens’ in Prae Wood (Wheeler and Wheeler 1936) which are likely to derive from ‘slab-like’ pedestals used in pottery kilns (Swan 1984, 61). Swan has termed them ‘Belgic bricks’ (*ibid*). Unperforated clay plates may also have been used during pottery production as oven-floors or as spacers in the kiln, however the function of small fragments can be difficult to interpret (Swan 1984, 64). No perforated clay slabs were recovered from the Bronze Age contexts.

Table 21.1: The fired clay objects

Context	Cut	Feature	Object type	Fabric	No of pieces	Weight (g)
LTCP (BAACP00)						
101005	Topsoil		Clay slab	5	3	882
109015	109011	MIA pit 109011	Clay slab	5	10	396
110126	Subsoil		Clay slab	5	3	208
129038	129039	LIA ditch 109215	Clay slab	5	4	208
129073	129074	LIA/ERB ring gully 129088	Clay slab	6	23	95
129099	129100	LIA/ERB gully 129160	Clay slab	5	4	186
103006	103003	LIA ditch 113060	Briquetage	8	1	6
129030	129039	LIA ditch 109215	Briquetage	8	11	26
147013	147010	LIA/ERB ditch 102130	Briquetage	8	5	69
150025	150024	ERB ditch 102074	Briquetage	8	1	5
110077	110075	ERB ditch 110077	Fragment associated with salt production	9	1	13
107013	107016	LIA ditch 113048	Bead	10	1	8
136130	136129	M/LIA pit 136129	Spindle whorl	11	1	14
MTCP (BAAMP00)						
309084	309075	MBA waterhole 309075	Cylindrical loomweight	3	10	116
309084	309075	MBA waterhole 309075	Cylindrical loomweight	1	3	74
309087	309075	MBA waterhole 309075	Cylindrical loomweight	1	1	91
309108	309075	MBA waterhole 309075	Cylindrical loomweight	3	6	76
309111	309075	MBA waterhole 309075	Cylindrical loomweight	1	10	91
309111	309075	MBA waterhole 309075	Cylindrical loomweight	1	6	175
309112	309075	MBA waterhole 309075	Cylindrical loomweight	3	2	210
309113	309075	MBA waterhole 309075	Cylindrical loomweight	1	19	182
309113	309075	MBA waterhole 309075	Cylindrical loomweight	4	2	292
309117	309075	MBA waterhole 309075	Cylindrical loomweight	1	7	91
309119	309075	MBA waterhole 309075	Cylindrical loomweight	1	6	279
312027	312031	MBA pit 344312	Cylindrical loomweight	1	1	89
356015	356013	Undated pit 356013	Clay slab/brick	7	43	436
319320	319319	LRB ditch 344170	Briquetage	8	2	12
330281	330275	LIA/ERB ditch 344078	Briquetage	8	1	1
319200	319198	LRB ring ditch 344200	Fragment associated with salt production	9	3	48
320097	320093	LIA/ERB ditch 306045	Slab associated with salt production	8	2	141
347109	347108	LIA ditch 344347	Clay ball	1	4	622
M11 (BAALR00)						
435023	435021	LIA/ERB ditch 433033	Clay slab	6	7	524
439050	439047	LIA ditch 433054	Clay slab	5	1	192
439057	439056	LIA/ERB ditch 439061	Briquetage	8	6	27
Total quantification of fired clay objects					**210**	**5885**

Table 21.2: Quantification of featureless fired clay fragments

Site name	No of contexts in which fired clay is present	Count of fragments	Weight of fragments (g)
FLB	43	557	3305
LBR	3	5	13
LTCP	208	1959	5333
M11	61	343	4264
MTCP	335	5894	22257
SG	6	40	393
NP	2	4	32
Totals	**658**	**8802**	**35597**

Table 21.3: Percentage of featureless fired clay present by period

Mesolithic/Neolithic landscape	<0.1
Neolithic landscape	<0.1
Bronze Age landscape	14.4
Late Bronze Age/Early Iron Age landscape	3.1
Iron Age landscape	9.7
Late Iron Age/early Roman landscape	4.4
Roman landscape	26
Saxo-Norman landscape	0.9
Medieval landscape	31.4
Post-medieval landscape	0.2
Modern features	<0.1
Unphased features	9.8

Catalogue of illustrated objects (Fig. 21.1)

1. Loomweight, fabric 1, context 309119, waterhole 309075, MTCP (BAAMP00)
2. Spindlewhorl, fabric 11, context 136130, pit 136129, LTCP (BAACP00)
3. Bead, fabric 10, context 107013, ditch 107016, LTCP (BAACP00)
4. Briquetage rim, fabric 8, context 147013, ditch 147010, LTCP (BAACP00)
5. Clay slab, fabric 5, context 101005, topsoil of field C, LTCP (BAACP00)
6. Clay slab, fabric 6, context 435023, ditch 435021, M11 (BAALR00)
7. Clay ball, fabric 1, context 347109, ditch 347108, MTCP (BAAMP00)

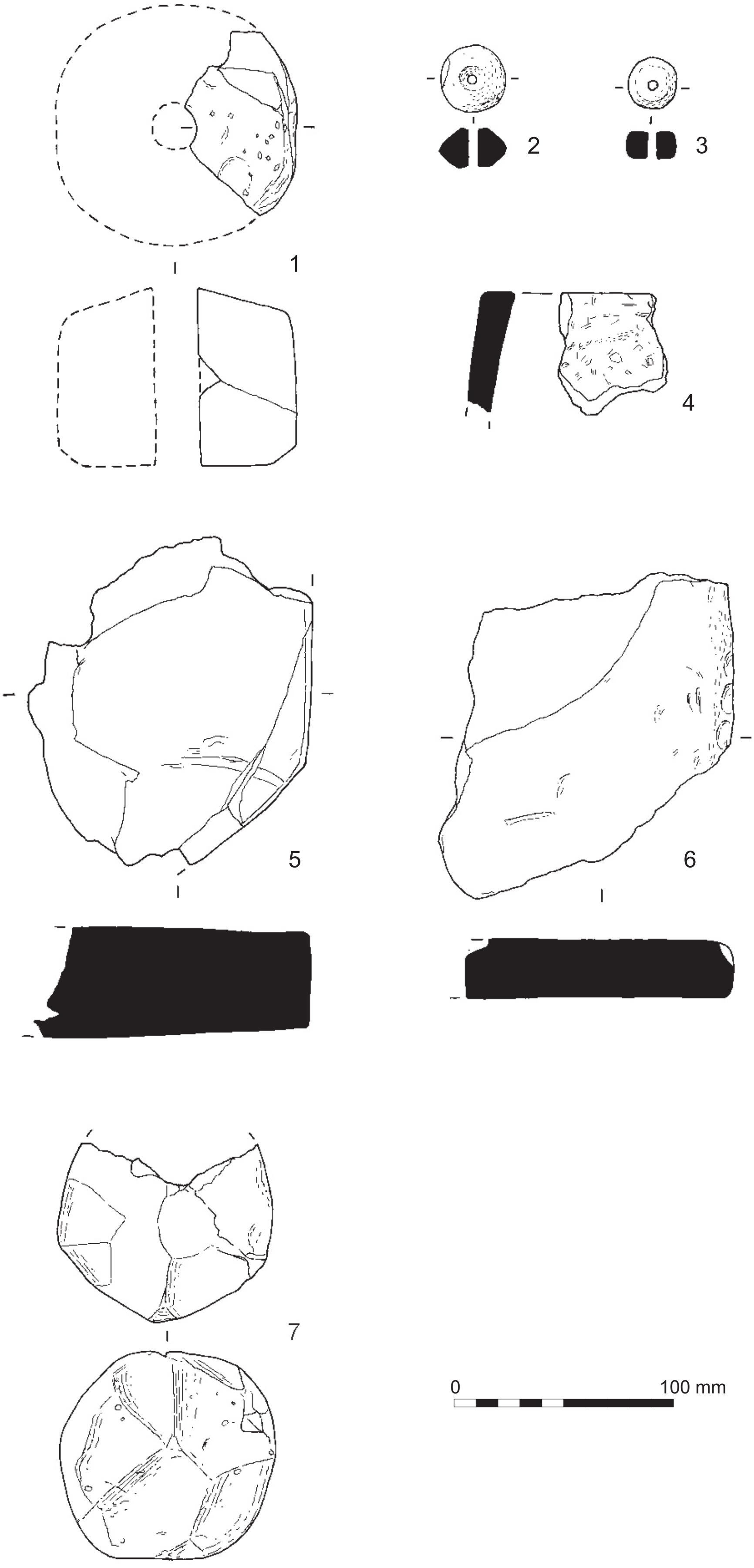
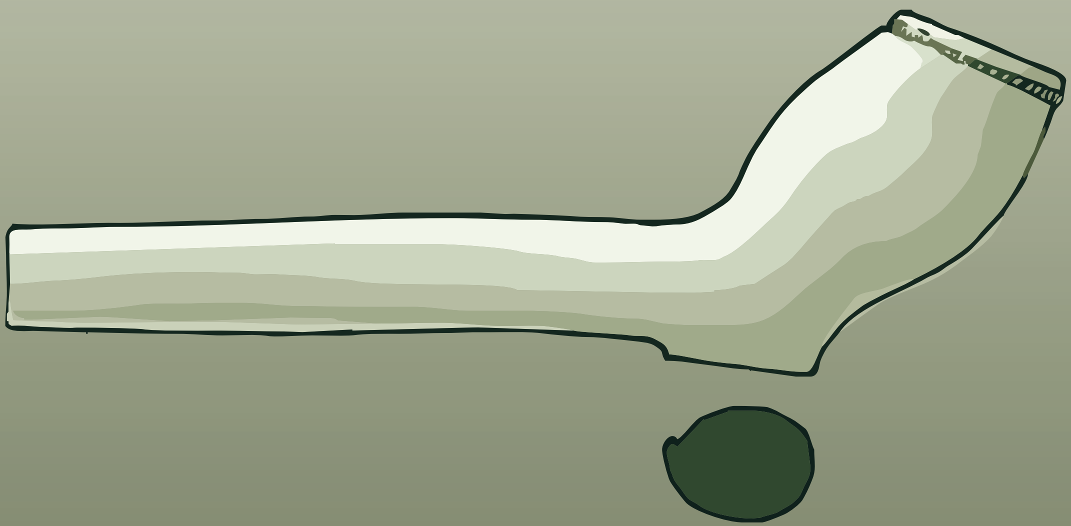


Figure 21.1: Selected fired clay objects (details in the catalogue)

CHAPTER 22

Clay tobacco pipes



by D A Higgins

22 Clay Tobacco Pipes

D A Higgins

This report deals with the clay tobacco pipes recovered by Framework Archaeology during excavations on three sites at Stansted Airport in Essex; the FLB (BAAFL00); the MTCP (BAAMP00) and the LTCP (BAACP01) sites. These three groups of pipes were examined and a detailed catalogue of the material prepared so as to provide a proper record of the pipes recovered as well as accurate dating evidence for the excavations as a whole. The pipe fragments have been individually examined and recorded (Table 22.1) in accordance with the draft clay tobacco pipe recording system, which has been developed at the University of Liverpool (Higgins and Davey 1994).

Bowl forms have been recorded with reference to the London typology established by Atkinson and Oswald (1969) although the dating has been modified according to the actual form and attributes of the individual fragments. In addition to the context number a unique reference letter (A, B, C, etc) has been added to provide a means of identifying individual pieces where there is more than one bowl fragment within a given context. These start from A within each context group. An assessment of the likely date of the stem fragments has also been provided. The stem dates should, however, be used with caution since they are much more general and less reliable than the dates that can be determined from bowl fragments or marked pieces.

A total of 55 fragments of clay tobacco pipe was recovered, comprising 14 bowl fragments, 40 stem fragments and 1 mouthpiece. The assemblages from the three sites are discussed first followed by a general discussion of the pipes as a whole.

FLB site (BAAFL00)

The FLB site produced a single fragment of pipe stem (405048, Fill of post-medieval ditch 405049), which dates from the late 17th or early 18th century (*c*1660-1720). This stem is not marked or decorated.

MTCP site (BAAMP00)

The MTCP site also produced a single fragment of pipe stem (354062 – upper fill of intervention 354060, medieval ditch 344060), in this instance dating from the mid-18th to mid 19th century (*c*1750-1850). This stem fragment comes from a long-stemmed pipe and is not marked or decorated.

LTCP site (BAACP01)

Almost all of the excavated fragments (14 bowl, 38 stem and 1 mouthpiece) were recovered from the long-stay car park site. Overall these fragments have been dated to *c*1610-1780 but this includes some broad dates for the 17th-century style stems and the better evidence provided by the bowl fragments give a more limited range of *c*1640-1780, with an emphasis on material of late 17th to early 18th century date.

Several of the fragments recovered were quite large and one or two joins were also found, suggesting that these finds had not been much disturbed since their initial deposition. There do not appear to be any marked differences between the date of the fragments or the range of forms represented in each group and it would appear that this material represents a general domestic assemblage that was discarded during this period.

The Pipes

Although quite a number of papers have been written on pipes from Essex, the majority of these relate to places such as Colchester or Maldon towards the east coast of the county and there has not been a recent review of material from the county as a whole. Despite its small size, this group provides a useful indication of the styles of pipes that were current in the east of the county from around 1640-1780.

In broad terms, the pipe forms represented are all either London forms or quite closely derived from styles that were current in the capital. The mid 17th century forms present are heel types (Fig. 22.1, nos 1-2), which are typical of this period with their neat, barrel-shaped bowls. Towards the end of the 17th century rather straighter-sided forms appear (Fig. 22.1, no. 4), followed by a typical range of transitional styles (Fig. 22.1, nos 5-6). Around 1700 a more upright form appears (Fig. 22.1, no. 7), which goes on to become the standard form for much of the 18th century (Fig. 22.1, nos 8-9). The only rather less usual form is a fragmentary spur bowl (Fig. 22.1, no. 10). Spur bowls of this type were much more common in central southern England and, although they occur in small numbers in London, they become increasingly rare amongst groups from the north-east of London and, in particular, from East Anglia.

A transitional heel fragment of *c*1680-1710 (Fig. 22.1, no. 6) shows one point of interest with regard to the manufacturing techniques employed. This piece has the remains of two stem bores visible in the broken section. During the moulding process a wire with a thickened end to aid its passage through the clay was used. A similar wire, but with a more pointed end, was re-inserted into the partially dry pipe to support the stem during the trimming process. If this wire did not exactly follow the bore created during moulding, then a second hole could be formed. The presence of this second hole confirms that the two wire process has been employed since at least the end of the 17th century.

So far as can be determined from this small group, the Stansted pipes are generally neat and well finished but with a plain surface. Only one of the fragments appears to have been burnished, and this fragment also has part of a stamped mark on the heel (Fig. 22.1, no. 3). This piece most probably dates from *c*1660-80 and represents a good quality product. The maker cannot be identified since only the very edge of a circular stamp with a plain border and part of a decorative motif below the main device survives. The only other two marked pieces from the site both date from the 18th century and have moulded initials on the sides of the heel. The first is chipped, but appears to have the Christian name initial A and the surname C, G or S (Fig. 22.1, no. 8). No combination of these initials is matched by any currently known maker from the area. The other mark reads WW (Fig. 22.1, no. 9) and this can probably be attributed to William Walker of Ware in Hertfordshire, who is recorded working from

1745-58 (Oswald 1975, 174). This piece also has a relief bowl cross inside the bowl, orientated as an upright '+' (Fig. 22.1, no. 9). None of the fragments is decorated.

Summary

Although a small group, all the closely datable pipe fragments recovered date from *c*1640-1780 and suggest a specific period during which post-medieval material was being deposited at this site. The group is one of the first to have been studied from the western part of the county and shows that London styles of bowl form and mark were being employed. The pipes are all plain and there is only one burnished fragment, which also had a stamped mark. Two 18th century moulded marks are also present, one of which can be attributed to a local maker at Ware.

Catalogue of illustrated finds (Fig. 22.1)

1. Bowl fragment of *c*1640-1660 with a stem bore of 7/64" and a fully milled rim. The bowl joins a stem to give 50 mm of stem surviving overall, with an odd manufacturing kink where the stem joins the bowl. Degraded surface so impossible to tell whether it was burnished originally. BAACP01 458024
2. Bowl fragment of *c*1640-1660. The rim is three-quarters milled but the stem bore unmeasureable. Good bowl form, neatly finished. BAACP01 462015
3. Bowl fragment of *c*1660-1680 with a stem bore of 7/64". Tiny proportion of surviving heel with part of a circular stamped mark. The mark had a plain border and there is part of a decorative motif at the bottom, both of which are in relief. This pipe has been finished with a good burnish and it is of a better quality than any of the others from the site. BAACP01 480071
4. Bowl fragment of *c*1660-1690 with a stem bore of 8/64". BAACP01 459029
5. Bowl fragment of *c*1680-1710 with a stem bore of 6/64". BAACP01 461027 (B)
6. Bowl fragment of *c*1680-1710 with a stem bore of 5/64". There are the remains of two separate stem bore holes showing that both moulding and trimming wires were being used in the manufacture of this pipe. BAACP01 461027 (A)
7. Bowl fragment of *c*1690-1740 with a stem bore of 4/64". BAACP01 461027 (C)
8. Bowl fragment of *c*1700-1770 with a stem bore of 4/64" and relief-moulded maker's initials. The Christian name initial is probably A and the surname C, G or S. None of these combinations is matched by any known local maker. BAACP01 468004 (A)
9. Bowl fragment of *c*1720-1780 with a relatively thin stem with a stem bore of 4/64". The heel is marked with the large relief-moulded initials WW, probably for William Walker of Ware, Hertfordshire, recorded working 1745-58 (Oswald 1975, 174). BAACP01 447011
10. Bowl fragment of *c*1700-1760 with a stem bore of 6/64". Tall spur bowl fragment with just one tiny section of rim still surviving. Unusual bowl form for this area. BAACP01 468004 (B)

Table 22.1: Summary of the clay pipes

Site	Code	Ref	B	S	M	Date	64	Bur	X	M4	Rim	TT	TF	CN	Surname	Other	P	T	M	Dec	Dr	Comments
BAACP01	447011		1			1720-1780	4	0	+	-	-			W	W		HS	R	M		9	Heel fragment with a relatively thin stem and bore. The heel is marked with large initials WW, possibly for William Walker of Ware, Hertfordshire, recorded working 1745-58 (Oswald 1975, 174).
BAACP01	455008			1		1660-1770	6	0														
BAACP01	458024		1	1		1640-1660	7	0	0	4	B										1	Bowl and joining stem to give 50mm of stem surviving. Degraded surface.
BAACP01	458085			1		1610-1710	6	0														
BAACP01	459007				1	1610-1740	6	0				C	0									
BAACP01	459027			1		1640-1760	6	0														
BAACP01	459028			1		1610-1710	6	0														71mm survives in fresh looking condition.
BAACP01	459029		1			1660-1690	8	0	0	/	B										4	
BAACP01	461001			1		1660-1750	-	0														Stem sliver without any surviving bore.
BAACP01	461001			4		1630-1710	7	0														
BAACP01	461001			4		1660-1750	6	0														
BAACP01	461027	A	1			1680-1710	5	0	0	-	-										6	Heel fragment only. There are the remains of two separate stem bore holes showing that both moulding and trimming wires were being used.
BAACP01	461027	B	1			1680-1710	6	0	0	/	B										5	
BAACP01	461027	C	1			1690-1740	4	0	0	-	C										7	
BAACP01	461027			1		1660-1770	5	0														
BAACP01	461027			2		1610-1720	6	0														
BAACP01	461027			2		1640-1720	6	0														Two joining fragments, probably freshly broken, making up 148mm overall.
BAACP01	462015		1			1640-1660	-	0	0	3	B										2	Good bowl form, neatly finished.
BAACP01	468004	A	1			1700-1770	4	0	0	-	-			A?	C, G or S						8	Damaged heel fragment with moulded initials. The Christian name initial is probably A and the surname C, G or S. None of these combinations is matched by any known local maker.
BAACP01	468004	B	1			1700-1760	6	0	0	-	C?										10	Tall spur bowl fragment with just one tiny section of rim still surviving. Unusual form for this area.
BAACP01	468004			1		1640-1710	7	0														
BAACP01	468004			1		1680-1770	6	0														

BAACP01	468004		3	1680-1770	5	0											
BAACP01	468004		4	1680-1780	4	0											
BAACP01	472004	1		1700-1770	-	-	-	-	-								Plain C18th bowl fragment with degraded surface.
BAACP01	472004		1	1640-1710	6	0											
BAACP01	472004		2	1640-1710	7	0											Two joining fragments (79mm overall), freshly broken.
BAACP01	472004		1	1660-1750	6	-											Degraded surface.
BAACP01	480068	1		1700-1770	5	0	0	-	-								Plain heel fragment from a London Type 25 bowl (Atkinson & Oswald, 1969).
BAACP01	480071	1		1660-1680	7	G	-	-	-	-	-	-	H	R	S	3	Tiny proportion of surviving heel with part of a circular stamped mark. The mark had a plain border and there is part of a decorative motif at the bottom. Nicely burnished stem suggesting a good quality product.
BAACP01	480071		1	1610-1710	7	0											
BAACP01	480072		1	1620-1720	6	0											55mm surviving.
BAACP01	480083	1		1700-1760	6	-	-	-	-								Stem just opening into a plain C18th bowl.
BAACP01	480083		1	1650-1740	6	0											
BAACP01	480083		1	1680-1780	5	0											62mm surviving.
BAACP01	480083		1	1610-1740	6	?											Rather degraded surface, but possibly burnished originally.
BAACP01	480112	1		1680-1710	6	0	0	-	-								Plain heel fragment (only) from a London Type 22 form (Atkinson & Oswald, 1969).
BAACP01	547017		1	1660-1720	5	0											80mm survives in fresh looking condition.
BAAFL00	405048		1	1660-1720	6	-											Thick stem of late C17th to early C18th type - surface abraded.
BAAMP00	354062		1	1750-1850	4	0											Fragment from a long-stemmed pipe.

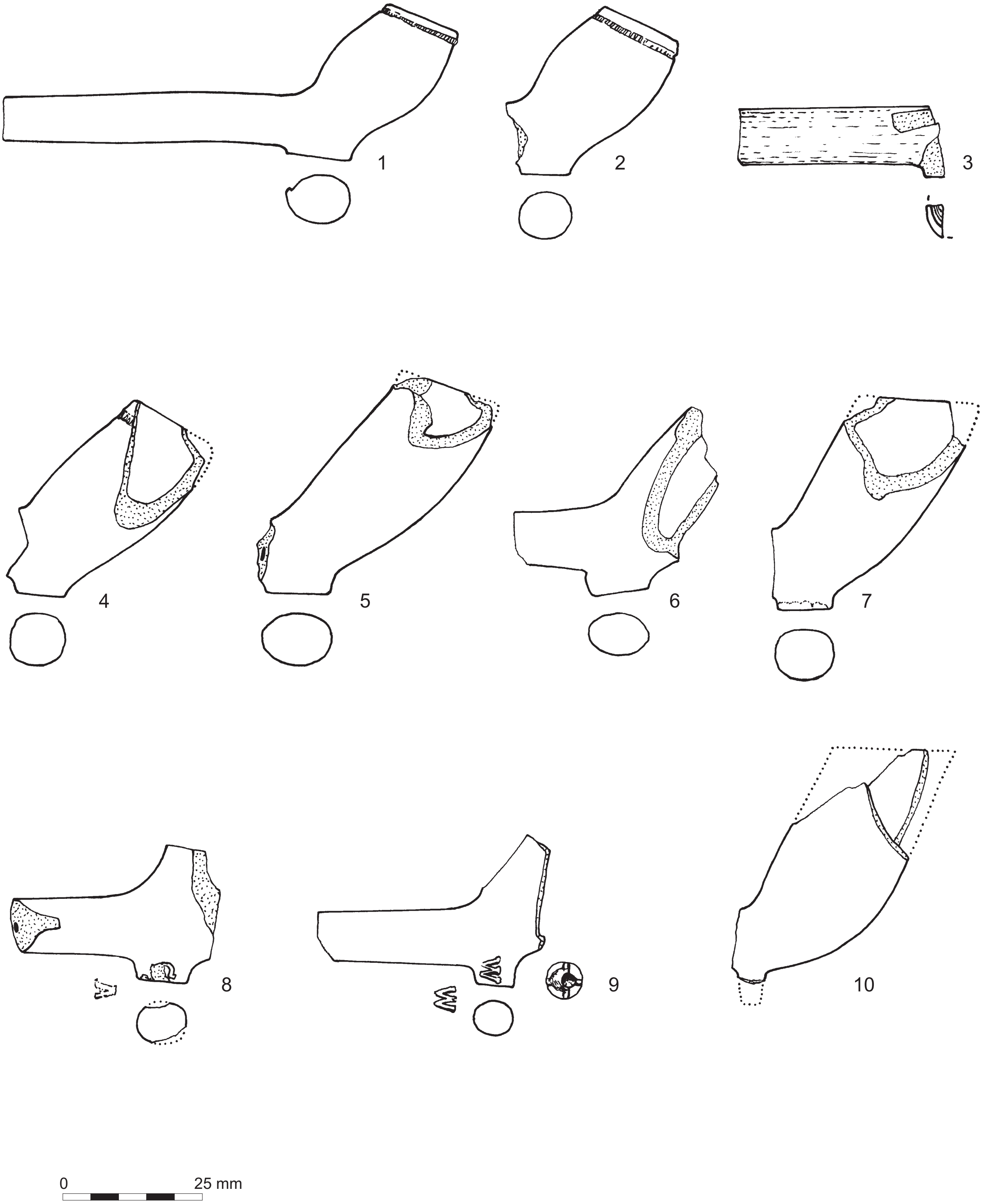


Figure 22.1: Selected clay tobacco pipes (details in the catalogue)

CHAPTER 23

Glass

by Lorraine Mepham

23 Glass

Lorraine Mepham

Glass was recovered from three sites at Stansted Airport: the LTCP, MTCP, and FLB sites. The majority of the assemblage comprises fragments of vessel glass, although window glass, objects and waste material are also represented in small quantities. The date range of the assemblage is Romano-British to post-medieval. Table 23.1 summarises glass totals by site, Table 23.2 gives a breakdown of the assemblage by date, and a complete archive catalogue is included here as Table 23.3. The largest assemblages came from the LTCP and MTCP sites, with just a small quantity (all post-medieval/modern vessel glass) from the FLB site.

Romano-British glass

A small quantity has been identified as Romano-British in date; this includes vessel glass, objects (beads) and glass waste. Fragments came from both the LTCP and MTCP sites.

All ten beads came from a single deposit (context 335022, intervention 335021, late Romano-British ring gully 306077) on MTCP (five of them retrieved from a sieved soil sample). This group comprises four very small, translucent yellow-green beads of irregular annular form, four small translucent blue beads of similar form, and two small translucent blue beads of barrel-shaped form.

Of the 16 vessel fragments, ten are completely undiagnostic; these are in colourless or very pale blue or green glass, and all derive from thin-walled vessels. The remaining six fragments are more diagnostic. One is a thick, folded rim from a cylindrical or prismatic bottle (MTCP, 328258, intervention 328257, 2nd-3rd-century ditch 344159), one of the most common vessel forms, and current during the 1st and 2nd centuries AD. A second rim is from a funnel-mouthed vessel, either a jug or flask (MTCP, 335007, late Romano-British gully 335003). A third rim (MTCP, 6606, late Romano-British hollow way 6616) is from a straight-sided vessel with a slightly everted, cracked-off rim, possibly a beaker (eg Price and Cottam 1998, fig 22, dated later 1st century AD). A thin-walled body fragment with applied vertical ribs in colourless glass, from an uncertain vessel form, came from a post-medieval latrine pit on the LTCP (447012, cut 447014). A thick-walled base (MTCP, 6319, intervention 6318, 2nd-3rd-century ditch 306147) probably derives from a bowl (eg Price and Cottam 1998, fig 25 or fig 38). The sixth fragment has trailed decoration, but is otherwise of uncertain vessel form (LTCP, 115021, late Romano-British pit 115020).

The single piece of glass waste was recovered from a Romano-British cremation burial (MTCP, 349147, early Romano-British cremation burial 349139); this is a small blob of pale blue/green glass, which could represent a pyre good of some description.

Overall the assemblage indicates a certain level of affluence and/or access to luxury goods amongst the inhabitants of the sites.

Post-medieval glass

The remaining glass is of post-medieval or modern date, of which the majority came from the hunting lodge uncovered on the LTCP site (BAACP01) (111 fragments). This group includes both vessel and window glass. The window glass is all of similar type: thin-walled fragments in a very pale greenish glass, mostly suffering a moderate degree of oxidisation and consequent lamination. On the few fragments where quarry shape is apparent, it is of diamond shape (eg 480999 from the finds retrieval grid and 461035, cut 461038), but there are no came shadows visible. Condition and form suggest that these fragments are of early post-medieval date.

The vessel glass consists largely of green wine bottles. These are very fragmentary and include much undiagnostic material, but examples of both ‘onion’ and ‘mallet’ forms are distinguishable amongst this group (461001, post-medieval robber cut 461014), but not cylindrical forms, indicating a maximum potential date range of *c*1680-1760. These fragments came from several contexts across the site, of which the largest group (21 fragments) had been dumped in a robber trench (468004, intervention 468003, robber trench 481016).

Other miscellaneous body fragments in greenish glass, often heavily oxidised, appear to derive from thinner-walled vessels than the bottles, possibly flasks of some form (450014 - intervention 450012, post-medieval ditch 453009 – 462010 – post-medieval ditch 462009 - and 461016 – post-medieval robber trench 461043).

Also recovered from this site were three fragments of fine drinking vessels of 16th or 17th century date, a small phial of 17th or early 18th century type (459027, post-medieval hearth 459026), and another thin-walled vessel, possibly a second phial (461035, post-medieval construction cut 461038).

Two drinking vessel fragments came from the ploughsoil. One is a plain foot in colourless glass from a goblet of unknown form (Obj. No. 1337), with a probable date range of 16th to 17th century. The second fragment is also in colourless glass, but with applied *vetro a fili* spiral trails marvered into the surface (Obj. No. 1336); this probably derives from a squat beaker. This beaker type has a date range spanning the 17th century, and was produced in the Low Countries, Venice and probably England; examples with coloured trails are dated as earlier 17th century (Willmott 2002, type 3.6). The type, of relatively small size, is thought to have been used for wine and spirits; it is not a form commonly found in England (*ibid.*, 43, fig 20).

The rim of a cylindrical beaker in pale greenish glass, with mould-blown wrythen decoration (Willmott 2002, type 1.3, fig 7), was found unstratified (Obj. No. 1326). This is a common form, distributed widely across England (*ibid.*, fig 4); the wrythen-decorated type has a date range of mid to late 17th century, and examples were made at English glass-making centres such as Rosedale and Hutton (Crossley and Aberg 1972, fig 61, 25; fig 64, 73) as well as on the continent. Larger than the squat beakers, cylindrical beakers are thought to have been used primarily for drinking beer.

The relatively low quantities of glass are perhaps surprising given the substantial nature of the buildings on the site, and their presumed high status (as a hunting lodge) within the post-medieval landscape. However, the comparatively low levels of other artefact types were also noted, as was the scarcity of ‘luxury’ items such as fineware pottery, echoed here in the rare occurrence of fineware glass drinking vessels.

Table 23.1: A summary of the glass by site

Glass Type	**LTCP**		**MTCP**		**FLB**		**TOTAL**	
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Vessel	82	1744	20	198	10	155	112	2097
Window	43	63					43	63
Object			10	2			10	2
Waste			1	4			1	4
TOTAL	**125**	**1807**	**31**	**204**	**10**	**155**	**166**	**2166**

Table 23.2: Glass by date

Glass Type	**Romano-British**		**Post-Med/Modern**	
	No.	Wt.	No.	Wt.
Bead	10	2		
Vessel	16	71	96	2026
Window Glass			43	63
Waste	1	4		
TOTAL	**27**	**77**	**139**	**2089**

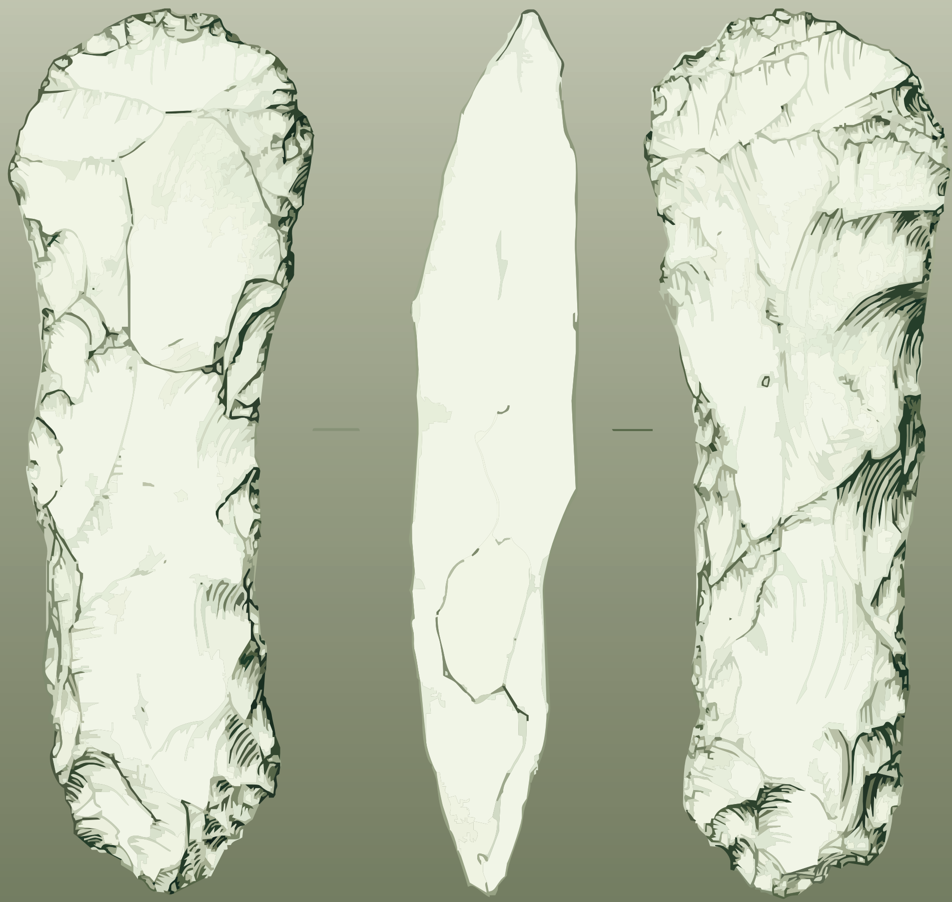
Table 23.3 Catalogue of all glass by context

Site Code	Context	SG No.	Interpretation	SG Deposit Date	Type	No.	Wt. (g)	Spot Date	Description
BAACP01	0	1	Primary Fill		Vessel	1	1	PM	Drinking vessel: rim from cylindrical beaker with wrythen mould-blown decoration; pale greenish glass (Willmott type 1.3)
BAAMP99	503	1	Primary Fill		Vessel	1	22	PM	Green bottle
BAAMP99	2312	344247	Secondary Fill	Romano-British	Vessel	1	11	PM	Phial neck
BAAMP99	6319	306148	Secondary Fill	Romano-British	Vessel	1	1	Romano-British	Small, thin-walled frag vessel glass. V. pale green, bubbly
BAAMP99	6319	306148	Secondary Fill	Romano-British	Vessel	1	14	Romano-British	Thick-walled frag from base of bowl (Price & Cottam fig. 25 or fig. 38).. V pale green, bubbly
BAAMP99	6606	6606	Deliberate Backfill	LRB	Vessel	1	14	Romano-British	Thick-walled frag; straight-sided with rim cracked-off; ?beaker (Price & Cottam fig. 22). Pale green, bubbly.
BAAMP99	8713	8713	Secondary Fill	PM	Vessel	1	86	MO	Bottle/jar
BAACP00	115021	115021	Secondary Fill	LRB	Vessel	1	1	Romano-British	Vessel: pale blue, trailed decoration
BAACP00	136167	136167	Layer	U	Vessel	1	8	PM	Green bottle
BAACP00	138027	109208	Secondary Fill	ERB	Vessel	1	1	Romano-British	Minute fragment of vessel glass - Romano-British? Very pale blue
BAACP00	141003	109238	Secondary Fill	LIA/ERB	Vessel	1	1	Romano-British	Minute fragment of vessel glass - Romano-British?
BAAMP00	301001	301001	Topsoil	U	Vessel	1	3	Romano-British	Vessel; optic-blown ribbed dec; possibly hexagonal bottle (Price & Cottam fig. 95)
BAAMP00	328258	344163	Secondary Fill	LIA/ERB	Vessel	1	22	Romano-British	Rim from cylindrical/prismatic bottle, blue/green
BAAMP00	328258	344163	Secondary Fill	LIA/ERB	Vessel	4	1	Romano-British	Small, thin-walled frags, pale green
BAAMP00	328268	344169	Secondary Fill	LRB	Vessel	1	2	Romano-British	Almost clear
BAAMP00	333052	333052	Deliberate Backfill	LRB	Vessel	1	1	Romano-British	Almost clear
BAAMP00	335007	335007	Secondary Fill	Romano-British	Vessel	1	8	Romano-British	Rim from jug or flask with funnel mouth (eg Price & Cottam fig. 72 or 84)
BAAMP00	335022	306079	Secondary Fill	Romano-British	Bead	6	1	Romano-British	Two small blue glass beads
BAAMP00	335022	306079	Secondary Fill	Romano-British	Vessel	2	1	MO	Tiny frags of vessel glass, clear, looks modern
BAAMP00	335022	306079	Secondary Fill	Romano-British	Bead	4	1	Romano-British	Three small translucent yellow-green beads
BAAMP00	349147	349147	Cremation Burial	Romano-British	Waste	1	4		Blob of glass waste
BAAMP00	359020	344047	Ditch	Romano-British	Vessel	1	2	Romano-British	Almost clear
BAAFL00	406009	406009	Layer	PM	Vessel	1	1	PM	Green bottle
BAAFL00	406010	406010	Layer	PM	Vessel	1	2	PM	Green bottle
BAAFL00	406010	406010	Layer	PM	Vessel	1	43	PM	Green bottle
BAAFL00	409007	409007	Secondary Fill	U	Vessel	6	46	MO	Clear bottle/jar
BAAFL00	409024	409024	Secondary Fill	U	Vessel	1	63	MO	Brown bottle
BAACP01	447004	447004	Deliberate Backfill	PM (disuse)	Window	9	9	PM	
BAACP01	447011	447011	Deliberate Backfill	PM(III)	Vessel	1	12	PM	Green bottle (neck)
BAACP01	447011	447011	Deliberate Backfill	PM(III)	Window	1	1	PM	?Window (small frag)
BAACP01	447012	447012	Deliberate Backfill	PM(II)	Vessel	1	3	Romano-British	Fine vessel, applied vertical ribbed decoration; clear glass, good quality
BAACP01	449015	1	Primary Fill		Vessel	1	2	PM	Thin-walled
BAACP01	449063	449063	Layer	MO	Vessel	1	5	MO	Brown bottle
BAACP01	450014	453011	Secondary Fill	PM(II)	Vessel	1	3	PM	Greenish; heavily oxidised (flask?)
BAACP01	458020	458020	Secondary Fill	PM(disuse)	Vessel	1	60	PM	Green bottle: onion or mallet?

BAACP01	458024	458024	Ploughsoil	MO	Vessel	1	2	PM	Beaker base; marvered white trails (vetro a fili) 9Willmott type 3.6)
BAACP01	458024	458024	Ploughsoil	MO	Vessel	1	2	PM	Drinking vessel: wine goblet footring, colourless
BAACP01	459006	459006	Deliberate Backfill	PM(disuse)	Window	2	2	PM	slightly oxidised
BAACP01	459008	459008	Deliberate Backfill	PM (IV)	Vessel	2	3	PM	Green bottle
BAACP01	459022	459022	Deliberate Backfill	PM (disuse)	Vessel	1	4	PM	Green bottle
BAACP01	459024	459024	Hearth	PM (IV)	Vessel	1	2	PM	Green bottle; string neck
BAACP01	459027	459027	Deliberate Backfill	PM (IV)	Vessel	4	2	PM	Thin-walled ?phial (tubular neck); very pale greenish; Obj. No. 1370
BAACP01	459029	459029	Occupation Layer	PM (III)	Vessel	1	1	PM	Bottle/jar - tiny frag; pale greenish
BAACP01	461001	461001	Deliberate Backfill	PM (disuse)	Window	3	17	MO	
BAACP01	461001	461001	Deliberate Backfill	PM (disuse)	Vessel	4	106	MO	Bottle/jar; clear
BAACP01	461001	461001	Deliberate Backfill	PM (disuse)	Vessel	2	22	MO	Brown bottle
BAACP01	461001	461001	Deliberate Backfill	PM (disuse)	Vessel	1	23	PM	Green bottle (base); onion/mallet form
BAACP01	461015	461015	Deliberate Backfill	PM (IV)	Vessel	1	12	PM	Green bottle
BAACP01	461016	461016	Secondary Fill	PM (disuse)	Vessel	1	2	PM	Greenish; thin-walled, oxidised (flask?)
BAACP01	461027	461027	Deliberate Backfill	PM (IV)	Vessel	7	726	PM	Green bottle; 2 bases (onion)
BAACP01	461035	461035	Secondary Fill	PM (IV)	Vessel	1	1	PM	Thin-walled ?drinking vessel; Obj. No. 1400
BAACP01	461035	461035	Secondary Fill	PM (IV)	Window	24	24	PM	Diamond-shaped quarries; oxidised; Obj. No. 1399
BAACP01	462009	462009	Ditch	PM (I)	Vessel	9	49	PM	Greenish, thin-walled, heavily oxidised (flask?): Obj. No. 1397
BAACP01	468004	468004	Deliberate Backfill	PM (disuse)	Vessel	21	530	PM	Green bottle; max. 2 bases and bodies (?mallet)
BAACP01	468004	468004	Deliberate Backfill	PM (disuse)	Vessel	3	12	PM	Green bottle
BAACP01	480048	480999	Retrieval Grid	PM	Window	1	1	PM	
BAACP01	480048	480999	Retrieval Grid	PM	Vessel	2	11	PM	Green bottle
BAACP01	480083	480999	Retrieval Grid	PM	Window	2	7	PM	Diamond-shaped quarries
BAACP01	480083	480999	Retrieval Grid	PM	Vessel	5	94	PM	Green bottle (neck/body); onion/mallet form
BAACP01	480092	480999	Retrieval Grid	PM	Window	1	2	PM	
BAACP01	480092	480999	Retrieval Grid	PM	Vessel	1	3	PM	Green bottle (neck)
BAACP01	480100	480999	Retrieval Grid	PM	Vessel	3	41	PM	Green bottle (base); onion/mallet form
BAACP99	991801	991801	Topsoil	MO	Vessel	1	3	PM	Bottle/phial
BAACP99	992101	992101	Topsoil	MO	Vessel	2	10	PM	Clear ?cup (handle stump)

CHAPTER 24

Flint



by Kate Cramp

24 Flint

Kate Cramp

An assemblage of 12,235 struck flints and 9,805 pieces (90.835 kg) of burnt unworked flint was recovered during several phases of archaeological investigation at Stansted Airport between the years of 1999 and 2003 (Tables 24.1-24.2).

The material represents, in varying quantities, a long period of human activity from the lower Palaeolithic to the later Bronze Age. A summary of the struck flint assemblage is given in Table 24.3.

Quantification

The evaluation and excavation undertaken in the area of the MTCP site (BAAMP99 and BAAMP00) were the most prolific in terms of the number of struck flints produced. This site yielded a total of 7,004 pieces providing nearly 60% of the struck assemblage (Table 24.1). The majority of burnt unworked flint, a total of 5,397 pieces weighing 55.678 kg, also came from this area (Table 24.2).

Considerable quantities of flintwork were recovered from the LTCP site, which yielded a total of 2,698 struck flints and a further 2,682 pieces of burnt unworked flint (18.008 kg) following a programme of fieldwalking and three phases of excavation. Assemblages of reasonable size were also recovered from the M11 excavations (BAALR00) and from the SG excavation (BAASG03). Excavations at the FLB (BAAFL00), LBR (BAALB00), Standby Runway (BAASR00) and NP (BAANP00) sites all produced assemblages of modest size. A further 60 struck flints were recovered from unstratified contexts.

Methodology

All of the struck flints within the assemblage were individually examined and recorded. Each flint was given a unique object number and assigned to a basic category according to broad debitage, core or tool type. Further classification was made using more detailed technological and typological criteria. Unretouched flakes and blades, for example, were sub-divided according to their position in the reduction sequence: primary (75%-100% dorsal cortex), secondary (1-74%) or tertiary (0%). Cores/core fragments were further described by platform and removal type (eg blade or flake), while retouched tools were described using a combination of functional (eg scraper) and typological categories (eg microlith).

Dating was attempted throughout the analysis and concerned both individual pieces and groups of flints. In order to examine depositional and post-depositional processes, the condition was noted for each artefact along with evidence of burning and breakage. Other types of surface alteration, such as cortication and iron-staining, were also recorded consistently. Bulk records were used for burnt unworked flint, which was quantified by piece and by weight. Additional information, such as the degree of calcination, was also noted where relevant.

The results of this non-selective assessment informed the selection of certain groups for further analysis (Table 24.4). These twenty-five flint assemblages were consequently subjected to detailed technological, metrical and refitting analyses. A sample of 200 flints from the waterhole (feature 309075) and another 200 from the barrow (feature 324078) on the MTCP site (BAAMP00) were also examined for microscopic traces of use-wear.

The technological analysis involved recording butt type (after Tixier *et al*. 1980, fig 47), termination type (Cotterell and Kamminga 1987) and hammer-mode (eg Onhuma and Bergman 1982). The classification of flake type used Harding (1990) with slight modification. The presence or absence of platform edge abrasion was also recorded. Metrical analysis was performed on all complete pieces, and required taking the maximum length, breadth and width measurements of a specimen to the closest millimetre (after Saville 1980). Details about the raw material type, including colour and possible source, were recorded where they could be discerned.

Attempts to find refitting or conjoining flints were made throughout the analysis. The refitting exercise involved laying out all the flintwork from each feature and grouping the material according to visual similarity in raw material type. The large quantity of material from the barrow and waterhole meant that a sample was used, which inevitably reduced the prospect of finding refitting material. In some cases, the heavy cortication of the flints meant that it was necessary to rely on cortex alone as a means of distinguishing related groups. Attempts to find knapping refits and conjoins were made both within and, where there was good reason to, between assemblages.

Low-power use-wear analysis was performed on a randomly selected sample of flints from the barrow and from the waterhole on the MTCP site (BAAMP00). This analysis was based on research conducted by Tringham et al. (1974), Cotterell and Kamminga (1979), Odell (1981), Odell and Odell-Vereecken (1980), Mallouf (1982), Akoshima (1987) and Brown (1989). A total of 400 flints (200 from each feature) were examined for use-wear using a binocular microscope at x 20 magnification. Where a used edge was encountered, the pattern of damage was classified according to material density (soft, medium or hard) and action type (scraping, cutting/whittling or boring). The data was added to the existing database.

Raw material

Local gravel flint nodules appear to have been the most heavily exploited source of raw material for the production of the flintwork. These nodules are characterised by an abraded, stained cortex and an interior that ranges in colour through browns, greys and iron-stained oranges. Thermal fractures and cherty inclusions occur frequently, and probably affected the flaking quality of the flint. Many of the partially worked nodules and pieces of unclassifiable waste in the assemblage consist of discarded pieces of gravel flint that were apparently abandoned after initial assessment showed them to be affected by incipient fracture lines. These nodules would have been readily available from local river gravels and, despite their inherent flaking difficulties, seem to have been regularly exploited out of convenience.

A less important but significant source of flint seems to have been the boulder clay deposits that cover large parts of the site. These nodules usually possess a thin, fresh, cream-coloured cortex encasing a dark brown or black interior. The rare occurrence of thermal fractures and impurities would suggest that it was knapped more successfully than the gravel flint. A very large, unworked nodule (965 g) of probable boulder clay origin was recovered from pit 498020 on the SG site.

The presence of numerous pieces with a particularly thick, clean, chalky cortex implies that some of the nodules were recovered from chalk deposits. Mined flint may have come from mines known in Sussex, such as Angmering and Cissbury, or perhaps further afield from Grimes Graves in Norfolk (Kemble 2001, 49-50). It is probable that closer, shallower deposits were more regularly exploited, however.

The polished flint axes from a Middle Bronze Age waterhole 309075 (MTCP) and from fieldwalking transect 221387 (LTCP fieldwalking) almost certainly represent the use of mined chalk flint sources. A further five flakes from the deliberate reduction of such objects were also recovered. These came from the topsoil (MTCP) and from intervention 491019 Early Romano-British ditch 507032 (SG); two refitting examples were recovered from feature 420068 (M11). The fifth flake could be indirectly refitted to the axe from the waterhole. Most of these pieces are of a fine-grained, homogeneous, light- or mid-grey flint. The examples from the waterhole were probably originally black in colour, but have lightened through the process of cortication. The polished implements are likely to have reached the site in a finished or almost finished state although, as the presence of knapping refits indicates, they continued to provide tool potential through their re-use as cores.

Chert and bullhead flint were only minimally used alongside these main flint groups. Of the 2286 flints (excluding chips) selected for more detailed analysis, only seven were identified as chert; five of these came from Early Neolithic pit 344278 and, although no refits were found, they almost certainly derive from the same core. The use of bullhead flint, which occurs at the base of the Reading beds (Dewey and Bromehead, 1915; Shepherd 1972, 114), is represented by two pieces of unclassifiable waste and five chips. Without exception, these were recovered from Middle Bronze Age tree-throw 425005 (M11). The concentration of these pieces in one feature implies that the flakes derive from a single knapping event and were deposited simultaneously, particularly since bullhead flint does not appear to have been widely used across the rest of the site.

Condition

The condition of the flintwork varies by context but is generally good and sometimes exceptional. Numerous large assemblages in fresh condition were recovered from the area, including those from the Early Neolithic tree-throws on the M11 evaluation and excavation and from the Middle Bronze Age waterhole 309075 on the MTCP excavation. The flintwork from the barrow on the MTCP is in a remarkably fresh condition, with most pieces retaining a keen edge and intact fissures. As might be expected, redeposited flints from topsoil and ploughsoil deposits tend to be heavily rolled and show extensive edge-damage. Examples include the *tranchet* axes from BAACP99 (LTCP phase I) and BAACP00 (LTCP phase II).

The degree of cortication is variable, with some flints corticated to an opaque white and others entirely unaffected. All intermediate stages are represented, with many pieces displaying an incipient, mottled cortication. Although a broad correlation was noted, the degree of cortication was not relied upon as a chronological indicator without additional corroboration. Further details of condition are given in relation to the individual assemblages discussed below.

Palaeolithic

Evidence for human activity in the Palaeolithic period is limited to two handaxes (Fig. 24.1, nos 1-2) and a small collection of less chronologically distinctive pieces. These flints occurred as residual finds in later deposits and, in some cases, there is evidence for their re-use in the Neolithic and Bronze Age. The meagre quantity of Palaeolithic flintwork does not support extensive human activity in the area at this time, nor does it allow much elaboration on the character of this activity.

LTCP (BAACP00)

The sickle blade from context 116023 (tree-throw 116024) was probably used as such in the Neolithic period, but may in fact represent a salvaged Upper Palaeolithic long blade (Fig. 24.2, no. 3). Further discussion of this piece can be found in the Neolithic section (below).

MTCP excavation (BAAMP00)

A small but significant group including two handaxes (Fig. 24.1, nos 1 and 2) and a possible scraper were recovered from the MTCP site. All three pieces came from the reworked subsoil (deposit 301001), either adjacent to or within the fill of a palaeochannel. The artefacts are in reasonably fresh condition, showing slight rolling and a distinctive deep ocherous staining.

The handaxes probably date broadly to the British Middle Acheulian, between OIS 11-7, (D. A. Roe, pers. comm.). The smaller of the two is of ovate type (Fig. 24.1, no. 1). The tip has been damaged and broken, both recently and in antiquity, which obscures a possible *tranchet* removal. The larger handaxe is of pyriform type (Fig. 24.1, no. 2). A *tranchet* removal has been taken across the tip of one face, producing an almost cleaver-like edge. The longer working edge is located opposite an area of cortex, which may have been deliberately retained in order to provide an effective grip for prehension. The flint on which the handaxe is made is similar in appearance to bullhead flint, although the distinctive orange banding is not located immediately below the cortex but occurs in localised patches at some depth.

The possible scraper consists of a thick, disc-shaped thermal fragment with the same distinctive iron-staining seen on the handaxes. The retouch is irregular and undercut in places, more reminiscent of natural damage than the deliberate, systematic modification of a blank. If genuine, the scraper is an atypical example of Lower Palaeolithic technology, as scrapers manufactured on thermal blanks occur only rarely in this period (D. A. Roe, pers. comm.).

M11 evaluation and excavation (BAALR00)

The unclassifiable tool from context 440009 (intervention 440010, ditch 440017) may represent a re-worked Palaeolithic tool. This piece consists of a recently broken artefact, perhaps part of a biface, with a similar ocherous staining to that of the handaxes from the MTCP. Later retouch to one edge truncates the earlier iron-staining, indicating its re-use.

Mesolithic

The Mesolithic assemblage from the excavations at Stansted is limited to a thin scatter of diagnostic pieces (microliths, burins and *tranchet* axes), most of which occurred as topsoil finds or in later features. While the assemblage may contain an additional Mesolithic element that cannot easily be isolated, it seems reasonable to conclude from the small quantity of diagnostic flints that activity in this period was not particularly prolonged or intensive.

Fieldwalking on LTCP site (BAACP99)

Possible Mesolithic pieces include one piercer and one rejuvenation tablet, both of which were recovered from transect 220001. A number of the blades and blade cores in the assemblage may also be Mesolithic in origin. Examples include the blades and bladelike flakes from transects 220001, 220527, 221025, 221412 and 221427 and the blade cores from transects 220001 and 221426 (see also Early Neolithic section below).

LTCP phase I (BAACP99)

Two Mesolithic *tranchet* axes were recovered from the topsoil (context 995001) during excavation. The larger of the two specimens (117 mm x 37 mm x 21 mm) is slightly curved in profile, giving the impression that it would have been hafted as an adze (Fig. 24.2, no. 4). The flint contains coarse, cherty inclusions. The smaller axe (82 mm x 34 mm x 22 mm) retains a naturally concave cortical edge; this may have been designed for hafting purposes (Fig. 24.2, no. 5). Both pieces are rolled and damaged, as would be expected of flint from a ploughsoil context.

LTCP phase II (BAACP00)

The Mesolithic assemblage from this site consists of a thin scatter of chronologically diagnostic pieces, most of which occurred in the topsoil and are generally in a poor, rolled condition indicative of successive redeposition.

The badly damaged broad-blade microlith, which was recovered from the topsoil (context 101005), probably dates to the earlier part of the Mesolithic (Fig. 24.2, no. 6). The microlith has been abruptly retouched along the right-hand edge and can be compared to Jacobi's type 1a (Jacobi 1978, 16, fig. 6). A complete Mesolithic *tranchet* axe was recovered from the topsoil (context 101003) (Fig. 24.2, no. 5). The axe is made of a poor quality, frost-shattered flint and has been re-sharpened with a *tranchet* blow in the course of use. A late Iron Age/Early Romano-British ring gully 129088 (intervention 129054) in the north-west of the site contained a Mesolithic burin. The blade cores from the topsoil (context 101005), late Iron Age gully 102109 (context 140041, intervention 140040) and layer (919101) may also date to the Mesolithic or earlier Neolithic.

MTCP Excavation (BAAMP00)

As is the case elsewhere, the Mesolithic assemblage from this site is small and residual. Diagnostic pieces show a fairly widespread distribution. The frequent association between redeposited Mesolithic flints and Middle Bronze Age features may be significant.

Several datable tools were recorded, including three burins. These came from Middle Bronze Age barrow ditch 324078 (context 320136, intervention 320131), an isolated Middle Bronze Age pit (context 316075, pit 316074) and a late Romano-British ditch 306117 (context 309178, intervention 309177). Some of the blade cores may be Mesolithic in date, although given the evidence for Early Neolithic activity on site, it is possible that they belong to a slightly later industry. Examples include the pieces from barrow 324078 (context 320113, intervention 320150), Middle Bronze Age pits 316118 (context 316113) and 322014 (context 322017) and an unphased tree-throw 349116 (context 349117).

A proportion of the debitage (eg the three crested blades from barrow 324078 (intervention 309238), tree-throw 316150 and ploughsoil (layer 324023) may also date to the Mesolithic; these pieces are less easily isolated from the Early Neolithic assemblage, however.

M11 evaluation and excavation (BAALR00)

A Mesolithic burin was recovered from the fill of Middle Iron Age ditch 440036 (context 441001, intervention 441005) (Fig. 24.2, no. 7). The burin was associated with a small assemblage of flintwork in poor condition and of mainly later Bronze Age date, suggesting that it forms a residual component within a later, disturbed deposit. A second burin came from deposit (423027) within post-medieval posthole 423028.

A further 36 flints, largely consisting of blades and bladelike pieces, were spot-dated more broadly to the Mesolithic/Neolithic period on their general technological appearance. The majority probably relates to the extensive evidence of Early Neolithic activity at the site, although it is possible that a number of Mesolithic pieces are included but cannot be distinguished.

SG Excavation (BAASG03)

The Mesolithic period is again represented by a small number of residual flints. Late Saxon ditch 497043 (context 497004, intervention 497003) produced a broad blade microlith (Fig. 24.2, no. 8), which can be compared to Jacobi's 3 c type and probably dates to the early Mesolithic (Jacobi 1978, 16, fig. 6). The microlith is missing its tip and is lightly rolled with moderate damage to its edges.

Deposit (497041) within late Saxon pit 497038 produced an end scraper made on a robust tertiary blade (Fig. 24.2, no. 9). The blade exhibits neat, abrupt, invasive retouch to the plunging distal end. The flint is heavily corticated with a mottled, post-depositional iron-stain overlying the cortication. The scraper probably dates to the Mesolithic although it could be earlier. There is some evidence to suggest that it was deliberately placed in the pit as part of a formal deposit.

Several blades, bladelets and bladelike flakes were also recovered from the site that may be Mesolithic or perhaps earlier Neolithic in date. These include single finds from late Saxon pit 498020 (context 498019), late Saxon ditches 503014 (context 5030020, intervention 503001), 497043 (context 497004, intervention 497003), and 497046 (context 497018, intervention 497017), Early Neolithic tree-throw 496001 (context 496003) and topsoil layer (494001). Most are soft-hammer struck and exhibit platform edge abrasion; several possess dorsal blade scars.

LBR evaluation and excavation (BAALB00)

This small assemblage includes a multi-platform blade core (34 g) from 2nd–3rd-century ditch 205018 (context 203007, intervention 203005), which may be Mesolithic or earlier Neolithic in date.

Early Neolithic

Excavation and Fieldwalking on the LTCP site (BAACP99)

Chronologically diagnostic types include a fragment of a partially polished axe (56 g) from transect (221387) (Fig. 24.2, no. 10). The axe is manufactured from a fine-grained chalk flint, probably from a non-local flint source, and has been re-worked as a core to yield several flakes. A number of the bladelet cores may also be earlier Neolithic, or Mesolithic, in date. Examples include the single platform bladelet core from transect 221426 and the multi-platform bladelet core from transect 220001. Both are small, weighing 26 g and 20 g respectively. It is highly likely that a certain quantity of the blade debitage also belongs to an Early Neolithic industry; this is more difficult to isolate in the absence of coherent, *in situ* assemblages.

Pit 995106

An assemblage of 54 flints, including 33 chips, was recovered from deposit (995107) within Early Neolithic pit 995106. The assemblage is composed entirely of unretouched pieces, mainly flakes, which are mostly in poor condition and likely to be residual. Several pieces are rolled and glossed. The quantity of chips present in the assemblage suggests that some knapping microdebitage is present, although a proportion may have been generated by modern damage. No diagnostic pieces were recovered from the pit, and the variable condition of the flintwork implies a redeposited assemblage of mixed date. There is no evidence to suggest that the flintwork belongs with the large assemblage of Early Neolithic pottery from the same feature.

LTCP phase II (BAACP00)

No large Neolithic assemblages were recovered from the area of the LTCP site and very few chronologically diagnostic types were identified. One exception is the possible Neolithic sickle blade from the surface of tree-throw 116024 (context 116023) (Fig. 24.2, no. 3). This artefact consists of a curved secondary blade with retouch along both edges of the thicker, distal end; this may have been performed in order to facilitate the binding of the blade to the haft. Confirmation that the sickle was hafted is provided by a broad arc of polish along the right-hand edge, which was probably caused by the attrition of an ill-fitting haft against the blade. Both edges of the sickle exhibit heavy use-wear, which is particularly pronounced on the concave edge. The size of the blade (170 mm x 43 mm) and its dense white cortication might suggest the re-use of an Upper Palaeolithic long blade. No further flints were recovered from the tree-throw.

M11 evaluation and excavation (BAALR00)

Earlier Neolithic activity in the area of the M11 site is most clearly represented by the flint assemblages from a group of three tree-throws (434035, 434038 and 434068) and one ditch terminus (420068). These features are tightly clustered within an area of approximately 25 m^2 on the north-eastern edge of the site. The assemblages are almost identical in their technology and composition and almost certainly belonged to the same group of inhabitants. The assemblage from pit 434029 may also be contemporary, as it lies less than six metres to the north-west of the main group. No further work was performed on this assemblage, however, as chips provide 65 of the 73 struck flints recovered from its two fills.

The material from tree-throw 440004, which is located 160 m to the south-east of the main group, can also be tentatively dated to the Early Neolithic. There is little evidence to suggest that this material was related to the activity in the north-east of the site, however. A smaller assemblage of probable Early Neolithic date was also recovered from tree-throw 429002, which lies approximately 20 m to the south of tree-throw 440004.

The terminus of Iron Age ditch 440036 (context 435032, intervention 435030) produced a small, finely-flaked knife or arrowhead with missing tip (Fig. 24.3, no. 11). An earlier Neolithic date is most likely for this piece.

<u>Pit 420068</u>
The 34 worked flints from the single fill (420069) of pit 420068 form a coherent earlier Neolithic assemblage, consisting entirely of unretouched flake material (Table 24.5). The flints are in a fresh, heavily corticated condition with slight iron-staining in places. Four pieces (27 g) of burnt unworked flint were also recovered.

The assemblage contains approximately equal numbers of blades and flakes, many of which bear dorsal blade scars. Where it can be determined, most of the flakes have been struck using a soft-hammer percussor and a small number (eight pieces) exhibit platform edge abrasion. The general technological appearance of the debitage allows the assemblage to be confidently assigned to the Early Neolithic; this date is confirmed by the presence of a conjoining blade from a polished implement.

Most of the removals are non-cortical (14 pieces), although several side-trimming (six pieces) and distal-trimming flakes (four pieces) are present. A single preparatory flake was recorded. While retouched tools are entirely absent from the assemblage, a total of eight flints (nearly 30%, excluding chips) display macroscopically visible use-wear. A further seven flints are burnt and 13 broken.

Beyond the conjoining polished blade, no further refits were found. Evidence that material from the same core was deposited together is provided by a small group of four flints with a distinctive cortex underlain by a thin grey band; it is highly probable that these pieces originate from the same nodule. The general paucity of cores and chips, however, indicates that certain stages of the reduction sequence are absent. It is therefore unlikely that the assemblage represents a dump of knapping waste, as seen in ditches elsewhere. Instead, the flintwork probably represents a selection of useful flakes that were in circulation for a short time and eventually discarded in the ditch. With the possible exception of the blade from a polished implement, there is no evidence to suggest that the material formed part of a 'special' deposit in the ditch terminus.

<u>Tree-throw 434033</u>

The single deposit (434034) within tree-throw 434033 contained an assemblage of 30 Early Neolithic struck flints in fresh condition (Table 24.6). The majority are corticated to an opaque white colour and, as in the assemblage from ditch terminus 420068, several are slightly yellowed from iron-staining. A further nine pieces (39 g) of burnt unworked flint were also recovered.

The assemblage is largely composed of unretouched flakes (13 pieces) with a generous representation of blades and bladelike flakes (nine pieces). The latter tend to be thin, slender removals with parallel lateral edges. Both flakes and blades commonly possess dorsal blade scars. The evidence suggests a careful, blade-inclined reduction strategy, which involved the regular use of soft-hammer percussion and platform edge abrasion. As no diagnostic pieces are present, the dating of the flintwork has been based on these technological and morphological characteristics.

No retouched tools were recovered from the tree-throw. Instead, unmodified edges were selected for use, with macroscopic use-wear noted in three instances. This figure would undoubtedly increase given a microscopic analysis. Although a knapping refit was identified between two blades, the small number of chips recovered and the absence of cores suggest that the material was not deposited in the context of knapping activity. A small number of flints are burnt (five pieces) and, in most cases, to an advanced stage of calcination. The combination of utilised and burnt pieces with little or no retouch is emerging as a recurrent theme of the Early Neolithic assemblages from Stansted.

In terms of its condition, composition and technological character, the assemblage bears strong similarities to the flintwork recovered from pit 420068 (see above), from tree-throw 434038 and, in particular, from tree-throw 434035 (see below). It is highly likely that the deposits are broadly contemporaneous, a suggestion made all the more plausible by their close proximity.

Tree-throw 434035

Two deposits within tree-throw 434035 produced a combined assemblage of 61 struck flints (Table 24.7), the majority of which came from the upper fill (59 pieces). The flintwork is in a fresh, heavily corticated condition. Several pieces have accrued a light iron-staining, comparable to that noted on a number of the flints from pit 420068 and tree-throw 434033 (see above). The assemblage also contained 11 pieces (170 g) of burnt unworked flint, which again came mainly from the upper fill.

The material from the tree-throw forms a coherent, Early Neolithic assemblage which, technologically, is almost indistinguishable from the assemblage from tree-throw 434033. Although flakes predominate (31 pieces), blades and bladelike flakes are well represented by a total of 14 flints. The reduction strategy is one of careful preparation and removal. Numerous pieces exhibit platform edge abrasion (15 pieces) and, where it can be determined, most have been struck using soft-hammer percussion (21 pieces); only seven hard-hammer flakes were identified. Linear platforms (nine pieces) and punctiform platforms (eight pieces) occur relatively frequently and are more widely associated with blade-based technologies. The presence of three rejuvenation flakes, including one tablet and one crested blade, shows a preoccupation with platform preparation and maintenance.

The retouched component consists of one edge-retouched flake and one unclassifiable tool, which together provide around 3.5 % of the assemblage (excluding chips). The unclassifiable tool consists of a large, irregular nodule of gravel flint (399 g) with numerous hard-hammer flake removals taken from two adjacent platforms, producing an almost keeled edge. Areas of heavy bashing and crushing to the worked edge suggests that the object was intended as a crude chopping implement. It is possible that the nodule was initially worked as a flake core and then re-used, although the removals exhibit little standardisation in terms of size and shape.

The presence of one multi-platform flake core (23 g), one partially worked nodule (85 g) and five chips suggests a limited knapping element; no knapping refits or closely-related flint groups were identified, however. Attempts to find refits with the flint from tree-throw 434033 were also unsuccessful. A total of seven flints are burnt and 29 are broken; use-wear was recorded on nine pieces. Again, as in other Early Neolithic assemblages from the site, there is the association of burnt and utilised pieces within an assemblage containing very few tools.

Tree-throw 434038

A total of 62 struck flints and six pieces (74 g) of burnt unworked flint were recovered from a single deposit (434039) within tree-throw 434038 (Table 24.8). The material forms a coherent, Early Neolithic assemblage which is technologically similar to the assemblages from tree-throws 434033 and 434035 (see above) but contains larger pieces and is marked by significantly less breakage (seven pieces). As in the other tree-throw assemblages, most of the flints are densely corticated and frequently bear a light yellow iron-staining.

The assemblage contains flakes and blades/bladelike flakes in equal quantities. Most of these are non-cortical or trimming flakes; no preparatory flakes were noted. The results of the technological analysis indicate a predominantly soft-hammer percussion mode (14 pieces compared to three hard-hammer pieces) involving the routine use of platform edge abrasion (11 pieces). Several of the flints appear to have been struck from the same core but none could be directly refitted.

With the exception of one partially worked nodule (25 g), no formal cores were identified. The retouched component is characteristically restricted in number, comprising two piercing tools (Fig. 24.3, no. 12). The assemblage also contains two angular pieces of unclassifiable waste with areas of battering to their surface; these may have shattered from a hammerstone. Macroscopic use-wear is present on eleven flints, including both piercers, and a further three flints have been burnt. The technology and the composition of the assemblage bear a striking resemblance to those of the other Early Neolithic assemblages from the M11 site. This not only implies the broad contemporaneity of the deposits, but also suggests that similar processes led to the selection, combination and deposition of the flints in the tree-throws.

Tree-throw 440004

The single fill of tree-throw 440004 produced an assemblage of 27 uncorticated struck flints in very fresh condition (Table 24.9). The flintwork probably dates to the earlier Neolithic, although no chronologically diagnostic types were recovered to confirm this.

The assemblage is composed entirely of unretouched debitage, including 17 flakes. Blades, bladelets and bladelike flakes are represented by ten pieces. The flakes tend to be thin and regularly-shaped with fine dorsal scars; a number of the blades exhibit bladelike dorsal flake scars. Nine pieces possess platform edge abrasion. The hammer mode appears mixed, with flakes of both hard- and soft-hammer production represented. Non-cortical flakes and trimming flakes are present in approximately equal quantities; no preparatory flakes were recovered. Two flints are burnt and eight are broken; eight pieces show signs of use-wear.

Most of the flints in the assemblage seem to have come from the reduction of two cores. At least nine related pieces, including one pair of refitting flakes, were distinguished by their fine-grained, brown-black interior and thin, buff-coloured cortex. A second group of five related pieces was also noted; no refits were found within this smaller collection. The low number of refits along with the absence of cores, preparatory flakes and chips suggests that much of the knapping waste was deposited elsewhere; the assemblage probably represents a selection of the more useful elements.

Although there are similarities between them, the assemblage differs slightly in character and appearance from Early Neolithic flintwork discussed above. The greater use of hard-hammer percussion and the total absence of cortication are the most visible of these differences. Tree-throw 440004 lies 160 m to the south-east of the group of features 420068, 434035 and 434038 discussed above. These flint assemblages share a marked technological affinity, and it is therefore suggested the flintwork from tree-throw 440004 is not closely related to the Early Neolithic activity going on in the northern area of the site.

Tree-throw 429002

An assemblage of 19 struck flints and one piece of burnt unworked flint (6 g) was recovered from a single deposit (429001) within tree-throw 429002. Most flints are in a fresh or minimally damaged condition. The degree of cortication varies, from uncorticated to moderately corticated. The material probably dates broadly to the Neolithic, and possibly to the earlier Neolithic. The limited size of the assemblage and the absence of diagnostic tool types have precluded a more precise date.

Flakes constitute the largest category, represented by a total of 12 pieces. Two blades with dorsal blade scars, one bladelet and one retouched blade are also present. Several exhibit platform edge abrasion. A partially worked nodule weighing 50 g was also recovered. The proximity of pit 440004, which lies c. 20 m to the north, may be of chronological significance as it produced a flint assemblage that is similar in appearance to that from tree-throw 429002.

SG Excavation (BAASG03)

Evidence of earlier Neolithic activity from the SG excavation is provided by the stray find of a leaf-shaped arrowhead from the topsoil (492012) (Fig. 24.3, no. 13). Invasive but non-covering retouch has been applied to most of the edge and the bulb has been thinned. The arrowhead has suffered extensive modern damage to its edges, including the loss of its tip.

Other possible Early Neolithic assemblages include the flintwork from a pair of large tree-throws (505015 and 494029) in the central area of the site and a smaller tree-throw (501010) in the northern area. A substantial assemblage was also recovered from ditch 507032.

Tree-throw 505015

A total of 17 struck flints were recovered from three deposits (505016, 505017 and 505018) within tree-throw 505015. The flints are in a fresh condition with a blue-white, mottled cortication (Table 24.10). A single fragment (2 g) of burnt unworked flint was also recovered from a layer of burning within the feature (505018).

Technologically, the flintwork almost certainly belongs to a Neolithic industry; the bladelike propensity of the debitage allows the dating to be tentatively refined to the earlier Neolithic. An analysis of bulb morphology reflects a predominantly soft-hammer reduction strategy; two of the flakes have abraded platform edges. Most stages of the core reduction process are represented: preparatory flakes, trimming flakes, non-cortical flakes and rejuvenation flakes. The cores themselves, however, are absent and chips only minimally represented.

A single edge-retouched flake was recovered from context 505017 and several unretouched flakes appear to have been utilised. None of the flints are burnt, which makes this otherwise fairly typical assemblage stand out against the pattern of other Early Neolithic assemblages from Stansted.

Tree-throw 494029

A small assemblage of six struck flints in fresh condition were recovered from tree-throw 494029, which lies less than a metre from tree-throw 505015. Two retouched flakes and a few utilised edges were noted and most pieces are burnt. The presence of several flakes with platform edge abrasion, some of which may have been soft-hammer struck, suggests a broadly Neolithic date for the material. The assemblage is almost certainly contemporary with the material from tree-throw 505015, which produced much the same material.

Ditch 507032

A total of 30 struck flints were recovered from three deposits within Early Romano-British ditch 507032 (Table 24.11). A large quantity of burnt unworked flint was also retrieved from the feature, a total of 101 pieces weighing 1,278 g. This material was deposited fairly equally between contexts 491021 and 507024, while context 507001 produced a single fragment weighing 11 g.

The material seems to comprise two chronologically distinct groups, which can be divided on the basis of condition and technology. The later group consists of thick, angular trimming flakes. Without exception, these flints are uncorticated and are heavily rolled and damaged. This component probably represents redeposited later prehistoric flintwork, perhaps dating from end of the Bronze Age.

The second, technologically earlier, group consists of fresh material with a mottled blue-white cortication. These pieces include one flake from a polished axe, three blades and numerous carefully struck flakes, four of which have been burnt. It is likely that the debitage is contemporary with the polished flake. A broad Neolithic date is therefore proposed for the group, although the bladelike propensity of the debitage could support a date in the earlier Neolithic.

Tree-throw 501010

An assemblage of 87 struck flints, including 38 chips, was recovered from three deposits within tree-throw 501010 (Table 24.12). The flintwork is in a fresh, moderately corticated condition and is probably of Early Neolithic date.

The assemblage is dominated by unretouched debitage, including a large number of flakes (37 pieces) and smaller quantities of blades/bladelike flakes (eight pieces). The knapping strategy is characteristically Early Neolithic in approach, with evidence for blade production, careful core preparation, and a mixed but predominantly soft-hammer percussion mode. A total of 13 flakes exhibit platform edge abrasion and 13 have probably been removed with a soft percussor; seven flakes display the well-defined bulbs associated with the use of direct hard-hammer percussion. Non-cortical removals (19 pieces) occur in similar numbers to trimming flakes (23 pieces), although wholly cortical flakes are in a minority (five pieces). Many pieces, including both flakes and blades, bear the dorsal scars from previous blade removals.

In common with many of the other Early Neolithic assemblages from Stansted, the retouched component is restricted to one piece (an edge-retouched blade) although several unretouched edges have been utilised. Two of the flints are burnt. The assemblage also includes an echinoid fossil (context 501013), which may have been deliberately placed in the tree-throw.

The tree-throw contains good evidence of knapping activity. The collection of 38 fresh chips, most of which were recovered from the lower fill, suggests that knapping was performed near or perhaps directly into the feature. The full range of knapping waste is not present, however. Cores are conspicuously absent and very few preparatory flakes represent the initial decortication stage. Instead, it seems that only selected elements of the original knapping scatter ended up in the tree-throw.

The presence of three sequences of refitting flakes confirms that some of the material comes from the same core. Several additional flakes with a similar cortex may originate from the same nodule but could not be directly refitted. A conjoin was also found between two secondary flake fragments from context 501011. In two cases, the refits were made between deposits, indicating that material from the same core was widely distributed throughout the fills of the tree-throw. This would suggest that accumulation of flintwork in the feature was a fairly slow and piecemeal process; a more discrete cluster of refits might be expected if the deposition of the flintwork was a single event.

MTCP Evaluation and Excavation (BAAMP99 and BAAMP00)

The evaluation and excavation revealed fairly limited evidence of earlier Neolithic activity in the area. By far the largest assemblage came from an isolated pit in the north of the site; this feature produced over 300 struck flints (including nearly 120 chips) following the evaluation and excavation. Small collections of flintwork were recovered from tree-throw 353028, tree-throw 354095 and pit 323037. Tree-throw 411 produced a minor concentration of three flints that can tentatively be attributed to the Neolithic but without much confidence. The remaining evidence consists of residual flints, which are found thinly scattered across the site in later features. Diagnostic pieces include one leaf-shaped arrowhead (Fig. 24.3, no. 14) and one flake from a polished implement from the topsoil (context 301001), and an incomplete polished axe with indirectly refitting flake (Fig. 24.3, no. 28) from the Middle Bronze Age waterhole (feature 309075).

Pit 344278 (interventions 502 and 353011)

A total of 311 struck flints and 25 pieces (133 g) of burnt unworked flint were recovered from pit feature 344278 (Table 24.13). Most of the flints were recovered when the pit was half-sectioned during the evaluation in 1999 (225 pieces); a further 86 flints were recovered following full excavation in 2000. The majority is in a very fresh condition and most pieces are heavily corticated, often to an opaque white. The flintwork can be dated to the Early Neolithic on technological and typological grounds.

The assemblage is dominated by chips (117 pieces) and unretouched flakes (98 pieces). Blades, bladelets and bladelike flakes also make a sizeable contribution to the total (67 pieces). Typical examples are large, broad and regular in form with platform edge abrasion and dorsal blade scars. Blade material accounts for nearly 40% of the assemblage (excluding chips), a figure that falls securely within the range predicted for Mesolithic and Early Neolithic assemblages (Ford 1987, 79).

The technological and metrical data reflect a controlled, blade-oriented industry involving careful core preparation and reduction. Soft-hammer percussion seems to have been used almost exclusively, with 72 pieces classified as soft-hammer removals compared to five probable hard-hammer flakes. In 71 instances, the platform edge was abraded prior to flake removal. Plain platforms are most frequently represented (53 pieces), although platforms of linear type (28 pieces) and punctiform type (12 pieces) are also common and often coincide with an abraded platform edge.

As a group, trimming flakes are slightly outnumbered by non-cortical removals (87 pieces compared to 152 pieces). Two platform edge rejuvenation flakes were also recovered, reflecting a desire to maintain core productivity through the periodic adjustment of the flaking angle. The apparent under-representation of primary flakes (12 pieces) suggests that decortication waste was generally deposited elsewhere and may indicate the off-site preparation of nodules, perhaps performed at the source.

The presence of 117 chips and two partially worked nodules indicate that some knapping waste was deposited in the pit. A total of eight refitting sequences, each comprising between two and five flakes, were identified following the refitting analysis. These refits were found both within and between the pit deposits. Several groups of the same flint type are present, but many pieces from the reduction sequence are clearly missing. No formal cores were identified, which is a recurrent feature of the Early Neolithic flint assemblages from Stansted.

Another persistent feature is the relatively low number of retouched tools. The assemblage from pit 344278 is no exception, containing 11 pieces which provide nearly 6% of the total assemblage (excluding chips). These include five edge-retouched flakes/blades, four serrated flakes, one end scraper (Fig. 24.3, no. 15) and one arrowhead fragment. The latter consists of the tip of unclassifiable, bifacially retouched arrowhead. Given its association, it is most likely to originate from a leaf-shaped type. The serrated pieces, one of which is made on a plunging bladelike blank (Fig. 24.3, no. 16), are consistent with an earlier Neolithic industry. A very high proportion of assemblage exhibits macroscopic use-wear, which occurs on the margins of unretouched flakes as well as on the working edges of the retouched pieces. Evidence of burning was recorded on 27 flints, mostly flakes and blades but including three retouched pieces. One of the serrated flakes has been burnt.

Tree-throw 353028

The single fill of tree-throw 353028 contained seven heavily corticated struck flints in fresh condition. The assemblage forms a technologically coherent group and probably dates to the Neolithic. A single fragment (4 g) of burnt unworked flint was also recovered.

The flintwork comprises four flakes, two blades and one bladelet. The small size of the assemblage and the absence of diagnostic tool forms do not allow the material to be confidently dated. The flintwork is, however, similar in character to that recovered from pit 344278 (see above), located some 50 m to the north. It is not impossible that the two assemblages are broadly contemporary.

<u>Tree-throw 354095</u>

Deposit 354096 within tree-throw 354095 produced a technologically coherent assemblage of 27 struck flints in a fresh, heavily corticated condition. Two pieces of burnt unworked flint (36 g) were also recovered. The flintwork probably dates to the earlier Neolithic and may be contemporary with the flintwork from tree-throw 353028 lying c. 35 m to the west.

The assemblage consists of 18 flakes, four blades, one bladelet and one core on a flake (20 g). No retouched artefacts are present, although there is a high incidence of utilised edges (eight pieces). A single flake is burnt and eight are broken.

<u>Pit 323037</u>

A small assemblage of ten struck flints and five pieces of burnt unworked flint (13 g) were recovered from a single deposit within pit 323037. The flintwork is in a fresh, heavily corticated condition and may be Neolithic in date.

The assemblage contains six flakes, three blades and one notched flake. One of the blades has been struck from an opposed platform blade core. The use of soft-hammer percussion is well represented and several pieces exhibit platform edge abrasion. A total of three flints are burnt and five are broken. Use-wear was noted on four pieces.

<u>Late Neolithic</u>

Fieldwalking on LTCP site (BAACP99)

The incomplete end-and-side scraper from transect 221043 is probably of a later Neolithic or Early Bronze Age date. The scraper exhibits careful retouch to the distal and left-hand edges. The break may be the result of a hafting snap. A number of the more carefully struck flakes and cores may also be later Neolithic in date.

LTCP phase I (BAACP99)

Little demonstrably later Neolithic flintwork was recovered from the site, with the possible exception of the assemblage from pit 991409.

<u>Pit 991409</u>

The single fill (991410) of pit 991409 contained a total of six flints in reasonably fresh condition. The assemblage includes two utilised side scrapers, both of which are small and finely retouched. The assemblage may date to the Late Neolithic or Early Bronze Age, although the limited number of flints and absence of diagnostic pieces means that this date is uncertain. There is also the possibility that the flintwork has been redeposited, as two sherds of Late Bronze Age pottery came from the same feature.

LTCP phase II (BAACP00)

No datable tool types indicate later Neolithic activity at the site, although some of the less chronologically distinctive pieces (eg the serrated blade from topsoil layer 916201) may date broadly to the Neolithic.

MTCP Excavation (BAAMP00)

The later Neolithic assemblage from the site consists of several discrete concentrations set against a low-density scatter and appears to represent general, mixed activity. Of particular note is the *in situ* scatter of later Neolithic flintwork from layer 324033. A number of isolated residual finds, such as the serrated flake from the topsoil (context 301001), may belong to the same industry.

<u>Scatter 324033</u>

A total of 62 flints were recovered from deposit 324033 (Table 24.14), an *in situ* Neolithic flint scatter sealed below the subsoil. The majority of flints are in a fresh, heavily corticated condition. The general technological appearance of the flintwork and the presence of a *petit tranchet* arrowhead (Fig. 24.3, no.17) together support a probable date in the mid or later Neolithic.

A total of 40 flakes and seven blades/bladelike flakes were recovered from the scatter. The majority of flakes are small and regularly-shaped. Non-cortical removals are well represented (34 pieces) compared to trimming flakes (22 pieces) and wholly cortical removals (2 pieces). Platform edge abrasion was recorded on 11 pieces. Most flakes have been hard-hammer struck (36 pieces) although the occasional soft-hammer flake is also present (five pieces).

The assemblage contains one multi-platform flake core (34 g) and one incomplete flake core. Further evidence of knapping activity is provided by three sequences of refitting flakes, each consisting of between two and four flints, and one conjoining tertiary flake that has broken down a *siret* fracture (ie as it was struck from the core). Numerous additional flakes belonging to the same sequence were also noted but could not be refitted. These pieces were isolated on account of a distinctive, grey-green cortex. Only two chips were retrieved, which may reflect sampling strategies rather than the true absence of microdebitage.

A total of four retouched tools were recovered from the scatter, including one edge-retouched flake, one spurred flake and one notched flake. The *petit tranchet* arrowhead (Fig. 24.3, no. 17) has been made transversely on a tertiary flake with direct, abrupt retouch along the distal edge; the striking platform and bulb have been removed using inverse retouch. Several instances of Late Neolithic *petit tranchets* are known (Green 1980, 113), and as such the presence of this piece is in accordance with the later Neolithic date suggested by the debitage.

Macroscopic use-wear was recorded on 13 pieces. A single flake is burnt and 22 flints are broken. Most of the observed breakage is ancient and was probably incurred during knapping or use, although subsequent trampling of the scatter might also result in widespread breakage. The fresh condition of the flints, however, suggests that they were not exposed to significant trampling and disturbance following deposition.

The presence of retouched and utilised pieces implies an activity area rather than a knapping scatter; this is also borne out by the absence of chips and the paucity of other typical waste products, such as cores and preparatory flakes. The range of tools – from piercers to arrowheads – further suggests that a wide variety of activities were being performed. The presence of refits might indicate that the deposition of the flintwork was a short-term event rather than an accretion of several phases of activity over a longer period.

M11 evaluation and excavation (BAALR00)

While numerous large assemblages of Early Neolithic flintwork were recovered from the site, evidence for activity in the later Neolithic is limited to one pit assemblage and a few scattered stray finds, including one chisel arrowhead from topsoil layer (424001).

<u>Pit 434009</u>

A total of 119 heavily corticated struck flints were recovered from a single deposit (434010) within pit 434009 (Table 24.15). The flintwork forms a fresh, technologically coherent assemblage probably dating to the later Neolithic or earlier Bronze Age.

The assemblage consists largely of unretouched flakes and chips. A single retouched tool, a piercer, was recovered from the pit. The material represents a hard-hammer, flake-based industry. Platform edge abrasion was used occasionally (10 pieces) but does not appear to have been a particularly important part of the reduction strategy.

The composition of the assemblage suggests an *in situ* dump of knapping waste. Chips are extremely numerous (61 pieces) and many are of the same flint type; this is confirmed by two refitting pairs of chips. That elements this small can be refitted might indicate that knapping was performed directly into or very close to the feature. Several additional refits between flakes were also identified, including one conjoining flake that had broken down a *siret* fracture. A further ten flakes probably derive from the same nodule but could not be directly refitted.

Compared to non-cortical flakes (17 pieces), trimming flakes of all types are well-represented (28 pieces) and preparatory flakes are unusually numerous (11 pieces). A refit between two preparatory flakes was found, indicating that flint nodules were probably being decorticated in the immediate area. The final by-product of the reduction sequence is also represented, by one incomplete multi-platform flake core (101 g).

A knapping refit between one burnt and one unburnt flake adds another dimension to the assemblage, particularly as the burnt flake had also been utilised. There is no evidence for *in situ* burning in the pit. This might suggest that some of the flintwork was removed from the knapping scatter, utilised, burnt, and then replaced. Nine further flints have also been burnt, including the core, demonstrating that some of the flints had a wider circulation than others.

Early Bronze Age

The flint assemblage from Stansted provides very little convincing evidence of Early Bronze Age activity; this hiatus is also reflected by the pottery assemblage. One of the few diagnostic pieces came from LTCP (BAACP00). Here, the single fill (913805) of pit 913804 contained a burnt and broken barbed and tanged arrowhead along with a small collection of flakes. The pit has been dated to the Late Bronze Age on the pottery evidence; it is possible that the arrowhead was garnered from elsewhere and deliberated placed in the fill at this time.

A second barbed and tanged arrowhead (Fig. 24.3, no. 18) was recovered from deposit (459027), within a post-medieval hearth 459026 on the LTCP site (BAACP01). The arrowhead exhibits fine bifacial retouch. The tang and left-hand barb have broken following deposition and there is some further modern damage to the tip. The arrowhead can be most closely compared to Sutton type b (j) (Green 1980, 122, fig. 45).

The third barbed and tanged arrowhead (Fig. 24.3, no. 19) was associated with Middle Bronze Age pottery in pit 2604 on the MTCP evaluation (BAAMP99). While barbed and tanged arrowheads are known to have persisted beyond the Early Bronze Age (Green 1980, 137-8), this piece may represent a curated piece that was deliberately deposited in the Middle Bronze Age.

Middle and Later Bronze Age

Fieldwalking on LTCP site (BAACP99)

The majority of the struck flint assemblage from fieldwalking probably dates to the middle or later Bronze Age and represents a flake-based, hard-hammer dominated industry. The flakes are generally thick and angular in form, with large, plain platforms that rarely exhibit platform edge abrasion. The flake cores, which range in weight from 39 g to 188 g, show a similarly expedient technology. Most have been reduced using direct hard-hammer percussion and there is little evidence of platform preparation or rejuvenation. Examples were recovered from transects 220001, 220419, 220857, 220879 and 221274.

LTCP phase I (BAACP99)

Given the absence of diagnostic artefacts, it has only been possible to ascribe a broad Neolithic or Bronze Age date to the largely redeposited spread of material from the excavation. Pit 995257 contained a small assemblage of probable Late Bronze Age date. The flintwork from pit 991407, hearth 995086 and pit 995270 may belong to the same period, but in each case the assemblage is small and may be of mixed date.

Pit 995257

An assemblage of 31 struck flints was recovered from two deposits (995255 and 995256) within pit 995257. A single piece of burnt unworked flint (49 g) came from deposit 995255. The flintwork is in reasonable condition although most pieces exhibit limited edge damage. The degree of cortication varies from light to heavy; a total of nine pieces are uncorticated.

The assemblage consists entirely of unretouched debitage, mainly chips (14 pieces) and flakes (nine pieces). The number of chips recovered from the pit may be indicative of knapping activity in the general area, although other typical by-products, such as preparatory flakes and cores, are either under-represented or entirely absent. Several pieces of Unclassifiable waste were recovered, however. A total of nine flints are broken; none are burnt. Macroscopically detectable use-wear was recorded on one piece. The flintwork reflects an expedient, *ad hoc* knapping strategy characteristic of a later Bronze Age industry, and therefore probably contemporary with the small quantity of Late Bronze Age pottery recovered from the pit.

Pit 991407

A small assemblage of eight flints, including a single blade, was recovered from a single deposit (991408) within pit 991407. Three flakes within the collection possess a distinctive creamy cortex and probably derive from the same core although they do not refit. No retouched artefacts were recovered. A single flake exhibits use-wear. Two are broken; none are burnt. Given the absence of diagnostic pieces, it is only possible to date the material broadly to the Neolithic or Bronze Age.

Hearth 995086

Four deposits (995101, 995102, 995115 and 995116) within hearth feature 995086 produced an assemblage of 14 flints. The majority, a total of eight pieces, was contained within context 995101. Most of the flintwork is in a poor condition, suggesting that it constitutes a largely redeposited assemblage. A further 131 pieces (508 g) of burnt unworked flint were also recovered.

The assemblage is composed mainly of flakes (nine pieces). Four pieces of unclassifiable debitage and a single bladelet are also present. Despite containing the largest assemblage of burnt unworked flint from the site (131 pieces weighing 508 g), only one burnt flake was recovered from the hearth, suggesting that the deposition of the worked assemblage was a separate event. Given its variable condition, the flintwork is perhaps most likely to represent a mixed, residual assemblage and as such, dating and interpretation are problematic.

Pit 995270

An assemblage of 41 flints, including 27 chips, was recovered from a single fill (995271) within possible pit 995270. The deposit also contained 23 pieces (36 g) of burnt unworked flint. Most of the material was retrieved through the environmental sampling of the deposit. The assemblage is composed entirely of unretouched flints, the majority of which are in poor condition. No diagnostic types are present, although the flake-based character of the assemblage and quantity of unclassifiable shatter might suggest a later prehistoric date. Given the condition of the material, however, it is likely to be redeposited and may be of mixed date.

LTCP phase II (BAACP00)

Several features contained relatively large, later Bronze Age assemblages in fresh condition. These include pits 113011, 119008, 134001 and 913804 and ditch 116013. The remaining Bronze Age assemblage formed a general background spread and includes three denticulated scrapers.

<u>Pit 113011</u>

A total of 41 flints, including 29 chips, were recovered from two deposits within pit 113011. Most of the material (33 pieces) was contained within the main deposit (113013). The flintwork probably dates to the Middle or Late Bronze Age and is in a fresh, uncorticated condition. Of particular note are the two side scrapers and one retouched flake with scraping use-wear, which might indicate that some scraping tasks (eg hide preparation, wood-working) were being performed in the area. A small quantity of burnt unworked flint (11 pieces, 92 g) was also recovered.

<u>Pit 119008</u>
Feature 119008, an Early Romano-British pit, contained an assemblage of 66 struck flints including 45 chips, and 14 pieces (136 g) of burnt unworked flint. The material is in a fresh, uncorticated condition and probably dates to the Mid or Late Bronze Age; it is possible that the later pit disturbed an existing deposit of flintwork. Given the density of Middle Bronze Age activity in the general area, this is not an unlikely scenario. The retouched component consists of two edge-retouched flakes and one notched flake. A single platform flake core (84g) was also recovered.

<u>Pit 134001</u>

A medium-sized assemblage of 155 struck flints (including 67 chips) was recovered from pit 134001 (Table 24.16). The flintwork is in fresh, uncorticated condition and is almost certainly contemporary with the associated sherds of Deveral Rimbury pottery. A further 29 pieces (221 g) of burnt unworked flint were also recovered from the pit.

The assemblage is characterised a large number of preparatory flakes (19 pieces), pieces of unclassifiable waste (36 pieces) and chips (67 pieces). Preparatory flakes and other types of trimming flake outnumber non-cortical flakes by more than 2:1. While no formal core types were identified, eight partially worked nodules with an average weight of 80.1 g were recovered from the lower deposit.

Very few retouched or visibly utilised pieces were identified. Indeed, very few *potentially* useable edges are present in this assemblage, which is composed largely of pieces of angular waste. Several fragments were identified that may have shattered from the same nodule but could not be directly refitted.

The composition of the assemblage is suggestive of a nodule-testing deposit or perhaps a cache of raw material. The absence of refitting pieces might suggest that certain pieces were removed from the deposit for systematic reduction elsewhere. The selection and removal of suitable pieces for use may explain the near absence of retouched tools and utilised edges.

Ditch 116013

An assemblage of 83 struck flints and 22 pieces (183 g) of burnt unworked flint was recovered from a single deposit (116009) in ditch 116013. Most of the material is in a fresh, uncorticated condition. The flintwork probably dates to the middle or Late Bronze Age on technological grounds, although no diagnostic tool types were present to confirm this.

The majority of the assemblage is provided by chips (53 pieces); unretouched flakes and unclassifiable waste contribute the remainder. The quantity of chips and pieces of unclassifiable waste implies an element of knapping waste, although no cores were found. Two of the flints are burnt, perhaps indicating that a small quantity of hearth waste was dumped in the ditch as well as knapping by-products.

LTCP phase III (BAACP01)

A limited number of features dated to the later Bronze Age contained small collections of flintwork. These include pit/posthole 449010, burnt mound deposit 464010 and pit 470040. No datable artefacts were present, and as a result it is only possible to ascribe a broad Bronze Age date to the material on technological grounds.

MTCP Evaluation (BAAMP99)

A small collection of probable Late Bronze Age flintwork was recovered from the site. This limited assemblage includes one end scraper, one denticulated scraper and one notched flake from the topsoil (5001) and one retouched flake from ditch 344386 (intervention 5008). It is possible that additional undiagnostic flake material has not been identified, and as such this figure probably represents a low estimate. A concentration of Bronze Age material was recovered from pit 2604, which provides a more distinct indication of Bronze Age activity in the area.

Pit 2604

An assemblage of 250 struck flints, including 36 chips, was recovered from four deposits within pit 2604. The flintwork can be dated to the Middle or Late Bronze Age, which is based on technological considerations and corroborated by the pottery. Most of the assemblage was contained in the upper fills, contexts (2605) and (2618), which provided 235 pieces or 94% of the total (Table 24.17). The flints are in very fresh condition and are corticated to a light or moderate degree. An additional 32 pieces (381 g) of burnt unworked flint were also recovered, again mainly from the upper fill (2605).

The assemblage is dominated by flakes (159 pieces). Pieces of unclassifiable debitage are also numerous (28 pieces). As would be expected in an assemblage of this date, blades and bladelike flakes are present only in small quantities and several of these are likely to be residual. Examples include the possible Mesolithic end scraper made on a blade (Fig. 24.3, no. 20) from context (2618).

Most of the flakes retain some dorsal cortex. A total of 111 trimming flakes and 30 preparatory flakes were recorded, compared to 60 non-cortical flakes. The majority have plain (74 pieces), cortical (36 pieces) or dihedral platforms (25 pieces); very few flakes have platforms of the more elaborate types, such as faceted (3 pieces). Platform edge abrasion, which is present in 18 cases but absent in 181 cases, was evidently a very minor part of the reduction strategy. The hammer mode usually involved direct hard-hammer percussion: a total of 60 hard-hammer flakes were identified compared to 19 soft-hammer flakes. Two stone hammers were recovered from context (2618). One of the hammerstones is a quartzite pebble; the other is of quartzitic sandstone. Both would have been available locally from the boulder clay. Given the context, it is very likely that these were used as flint knapping hammers.

One single platform flake core, four multi-platform flake cores, and eight partially worked nodules were contained within the pit. The average weight of complete cores is 43.2 g. The average weight of intact partially worked nodules is slightly larger, at 53.1 g. Most have been reduced with a hard-hammer and there is little evidence for platform preparation and maintenance.

The retouched component is restricted to four pieces, at least one of which (the end scraper, Fig. 24.3, no. 20) is probably residual from an earlier industry. The barbed and tanged arrowhead (Fig. 24.3, no. 19) may also represent a redeposited piece, as these types are more usually associated with the early and Middle Bronze Age contexts (Green 1980, 137-8). More typical of a Later Bronze Age industry is the scraper that has been manufactured on a thermal fragment. The notched flake is also likely to be contemporary with the rest of the assemblage. A small proportion of the assemblage exhibits macroscopic use-wear (11 pieces) and a further 12 pieces are burnt.

The composition of the flint assemblage is one where large numbers of cores, partially worked nodules, pieces of shatter and chips are combined with low numbers of retouched and utilised pieces. This suggests a dump of knapping waste, as in pit 134001, which was generated in the course of core reduction and nodule testing. Given the position of the pit on the periphery of the Middle Bronze Age village, it is perhaps unsurprising that efforts were made to keep the habitation area free from the larger elements of knapping by caching or discarding them in a pit.

Several knapping refits confirm that material from the same reduction sequence was being deposited together. These include three cores each with one or two refitting flakes. In two cases, preparatory flakes can be refitted to the core, indicating that the nodules were brought to the site in an unprepared state. Some of these were later abandoned following assessment, while others were more extensively reduced. Several large groups of related pieces were also identified but could not be refitted, suggesting that elements were removed from the range of debitage.

As in pit 134001, few of the flakes would have been suitable for use. Most are angular with high-angled, irregular edges. Retouched, utilised and burnt pieces are also rare, although their presence at all suggests that a small proportion of the material results from other activities besides knapping.

MTCP Excavation (BAAMP00)

Most of the flintwork from the MTCP excavation relates to the extensive evidence for Middle Bronze Age activity on the site. Several features, including the barrow and waterhole, produced very large quantities of material. Several pits within the fenceline of the village, and sometimes within the houses themselves, produced substantial assemblages of Middle Bronze Age flintwork. These assemblages represent a range of activities, some routine and others more specialised in character. As a group, however, the Middle Bronze Age collection shows little dramatic variation in technology.

<u>Pit 321029</u>

A total of 57 struck flints were recovered from this feature, which is located just inside the putative entrance of the roundhouse represented by the ring gully 321032 (Table 24.18). Most of these, along with two pieces (245 g) of burnt unworked flint, came from the upper fill (321030) of the pit. The flints are generally in a fresh condition, although many possess a slightly rolled and glossed appearance, perhaps resulting from a period of middening or surface exposure. The flintwork is technologically consistent with the Middle Bronze Age date given by the pottery.

The assemblage is dominated by flakes (28 pieces) and unclassifiable debitage (10 pieces). The results of the technological analysis represent a flake-based industry reliant on hard-hammer percussion and the occasional use of rough platform edge abrasion.

The pit contained six flake cores with an average complete weight of 47.2 g. A total of four partially worked nodules are also present in the assemblage; complete specimens have an average weight of 39 g. The retouched component includes two scrapers that have been manufactured on thermal blanks, a recurrent feature of later Bronze Age assemblages (Fig. 24.3, no. 21). Two notched flakes were also recovered. With the exception of one of the scrapers, all six tools came from the upper fill.

The assemblage contains a large number of cores, core fragments and pieces of Unclassifiable waste. In this respect, it shares similarities in its composition with that from pit 134001 (BAACP00) and pit 2604 (BAAMP99) and may have been deposited in similar circumstances. However, unlike these features, pit 321029 contains an unusually high number of retouched and utilised pieces. The flintwork does not, therefore, result solely from knapping activity. This is also implied by the absence of refits and of related flint groups.

<u>Pit 321080</u>

An assemblage of 85 struck flints and two pieces (38 g) of burnt unworked flint were recovered from five deposits in pit 321080 (Table 24.19). The majority of flints were contained within the upper fill (321081); very little material came from the lower deposits. Most of the flintwork is in fresh condition and is usually uncorticated or lightly corticated. With the exception of a small collection of worn and heavily corticated residual pieces, the flints can be dated to the Middle or Late Bronze Age.

The assemblage is composed mainly of unretouched flakes (28 pieces) and Unclassifiable waste (ten pieces), which tend to be thick and angular in form. The quantity of irregular shatter probably reflects both the quality of the raw material and the shortcomings of the knapping strategy. The flintwork is morphologically and technologically very similar to that from pit 321029. The use of soft-hammer percussion and platform edge abrasion occur very rarely and are usually associated with the residual component.

The pit contained nine formal core types, including eight multi-platform flake cores. Complete examples provide an average weight of 54.5 g, which is slightly higher than the average weight of intact partially worked nodules at 48.3 g. Attempts to find refits were unsuccessful, although several pieces of a similar flint type were noted. All stages of the reduction sequence are represented, with almost as many preparatory flakes (14 pieces) as non-cortical flakes (15 pieces). None of the deposits was sampled, which may explain the absence of chips.

The retouched component consists of nine pieces, which a broad range of types. Piercers are unexpectedly numerous (three examples, Fig. 24.3, no. 22), perhaps indicating some specialisation in activity. Other tools include three scrapers (Fig. 24.3, no. 23), one of which has been made on a thermal blank, and one distally-notched secondary flake. Use-wear is present on at least 21 pieces.

As in pit 321029, the assemblage seems to combine the larger elements of knapping waste (eg cores, partially worked nodules and unclassifiable waste) with retouched and utilised flints. A similar range of tool types are present in each case: edge-retouched flakes, notched flakes and scrapers. The assemblage from pit 321080 is distinguished by the unusually high number of piercers that it contains. The technological and compositional similarities between the assemblages suggest that they are not only broadly contemporary but also result from a similar range of activities. These activities seem to have been fairly general and varied, as might be expected in a settlement context.

<u>Pit 312031</u>

A medium-sized assemblage of 157 struck flints was recovered from nine deposits within Middle Bronze Age pit 312031 (Table 24.20). Contexts 312021 and 312023 produced the largest quantities of flint, a total of 49 and 38 pieces respectively. In addition, 51 pieces (4097 g) of burnt unworked flint were also recovered from the feature. By count, these derive mainly from context 312021; three large fragments weighing a total of 3733 g were also recovered from context 315063.

The flintwork is heavily corticated and generally in a fresh condition. As seen in pit 321029 (see above), the majority of flints have a slightly rolled appearance, which might result from surface exposure or repeated handling.

Technologically, the flintwork is typical of a Middle Bronze Age industry. As might be expected, the assemblage is dominated by flakes (75 pieces) with a much smaller representation of blades, bladelets and bladelike flakes (four pieces). Most of the flakes have been struck using direct hard-hammer percussion and hinge terminations are common. The flakes are usually thick with plain or cortical platforms. Cursory attempts were occasionally made to regularise the platform edge prior to removal, although in most cases the flakes seem to have been casually removed with little preparation.

Non-cortical flakes (30 pieces) are outnumbered by flakes retaining cortex (55 pieces) and preparatory flakes are well represented (16 pieces). Fragments of unclassifiable shatter are also common (15 pieces) and might suggest the presence of knapping waste. The quantity of chips recovered from the pit (52 pieces) also implies knapping activity in the area, and a series of three refitting flakes provides limited evidence that material from the same reduction sequence was deposited together. Two cores and two partially worked nodules were recovered from the pit, all of which were aimed at the production of flakes using multiple platforms. These pieces range in weight from 36 g to 101 g.

A total of seven retouched tools were recovered, including five retouched flakes and a spurred flake that has been minimally retouched and used as a piercer. Also present is a thermal flake with edge retouch. Numerous unretouched edges with use-wear were also noted. A small number of flints have been burnt (13 pieces). Technologically, the flintwork shares characteristics with the assemblages from pits 321029 and 321080. Compositionally, the assemblage is distinguished by the restricted number and range of retouched pieces and the relative under representation of cores, partially worked nodules and pieces of shatter.

Pit 320047

An assemblage of 136 struck flints and 6 pieces (77 g) of burnt unworked flint was recovered from Middle Bronze Age pit 320047, deriving mainly from deposit 320057 (Table 24.21). Most of the flints are in fresh condition with a light or moderate degree of cortication. Several residual pieces can be isolated on account of their technologically earlier appearance and poor condition. These pieces are usually accompanied by a dense white cortication and probably date broadly to the Neolithic.

The assemblage contains nine retouched tools (Fig. 24.3, no. 24). These include four retouched flakes, two naturally spurred flints with heavy piercing use-wear and a notched tool made on a flake. The unclassifiable tool from context (320051) consists of a retouched thermal fragment. An unusually high number of unretouched flakes exhibit macroscopic use-wear, suggesting a preference for unmodified edges that may relate to activity type.

A series of three refitting flakes was identified among the material from deposit (320055). Several additional pieces possessing the same orange coloured cortex were also noted but could not be refitted. Evidence for knapping activity is otherwise lacking. Cores and chips are notable by their near absence, and other largely non-useful knapping products such as preparatory flakes and pieces of shatter are also under represented. In compositional terms, the assemblage is thus distinct from that recovered from pit 321029 and 321080 and is more closely aligned with pit 312031. The flintwork also shares technological similarities with that from pit 312031. Despite brief attempts, no refits were found between the groups to confirm their likely contemporaneity.

Pit 323001

An assemblage of 108 struck flints and 24 pieces (275 g) of burnt unworked flint was recovered from five deposits within pit 323001 (Table 24.22). Most of the material was retrieved from deposits (323003) and (323018).

Technologically, the flintwork forms a coherent Middle Bronze Age assemblage characterised by thick, hard-hammer flakes and little core preparation. In this sense, the material is closely comparable to the Middle Bronze Age flintwork from pits 321029, 321080, 312031 and 32047. Unlike these assemblages, however, the material from pit 323001 consists mainly of small flakes with very few larger elements (eg cores, larger pieces of shatter, etc.). This may result from a sampling bias, as much of the material from the deposits was recovered through sieving. However, while sieving may lead to the increased recovery of smaller elements, the virtual absence of larger components is less conveniently explained and may therefore represent a real difference between this pit assemblage and its contemporaries.

Barrow 324078

A large assemblage of 1483 struck flints was recovered from 46 contexts (19 SG deposits) within the barrow ring ditch on the MTCP site (Table 24.23). A sizeable proportion of the assemblage is provided by chips, which number 903 pieces and account for 60.9 % of the total. A further 199 pieces (1611 g) of burnt unworked flint were also recovered from eleven of the SG deposits; slight concentrations were present in SG 324070 (45 pieces weighing 566 g) and SG 324062 (42 pieces weighing 421 g).

Further analysis was directed at the larger deposits of flintwork from SG deposits 324061, 324062, 324063, 324067 and 324070. Excluding chips, these deposits provided a sample of 412 flints. Microscopic use-wear analysis (see methodology) was then performed on a randomly selected sub-sample of 200 flints (approximately 50%). The results have been extrapolated for the entire assemblage and incorporated into the following discussion.

The flintwork forms a technologically coherent assemblage of Middle or Later Bronze Age date. The majority of flints are in an exceptionally fresh condition with sharp edges and arises; most are uncorticated. A small collection of residual flints, probably spanning the Mesolithic and Neolithic period, can be isolated on technological grounds. These pieces also tend to be accompanied by an incipient cortication and often appear lightly rolled, characteristics not generally seen in the Bronze Age component. Unlike certain objects from the waterhole, the residual material was probably unintentionally incorporated into the barrow assemblage.

The flintwork represents a fairly unsophisticated flake-based industry. The reduction strategy relied on the use of direct, hard-hammer percussion and little investment was made in platform preparation. The assemblage is dominated by unretouched flakes (316 pieces) and unclassifiable waste (132 pieces). Blades, bladelike flakes and bladelets are poorly represented by 23 pieces (4%, excluding chips). Many of these are likely to be residual Mesolithic or Neolithic pieces and the remainder probably represent fortuitous Bronze Age removals.

A total of 137 hard-hammer flakes (33.3%) were recorded compared to eleven soft-hammer flakes (2.7%); the remainder are of indeterminate hammer mode (64%). Where present, most platforms are either plain (127 pieces) or cortical (61 pieces). Very limited evidence of platform preparation is provided, with just 15 instances of platform edge abrasion occurring in a sample of 345 assessable pieces. Evidence for platform rejuvenation is also rare and is represented by a single crested blade. This piece almost certainly belongs to an earlier industry and is accompanied by a heavy cortication.

Cores and partially worked nodules feature heavily in the assemblage. A total of 47 formal cores were identified. Complete specimens range in weight from 15 g to 442 g and have an average of 97.9 g. Raw material was treated wastefully. Few of the cores were worked until fully exhausted, the most extreme case being the partially worked nodule. A total of 30 partially worked nodules were recovered, many of which were probably abandoned when thermal fractures were encountered during the preparatory flaking stage. Complete nodules range in weight from 20 g to 157 g with an average of 67.5 g. Also of note is a hammerstone made on a re-used multi-platform flake core (55 g) from context (327026).

With the exception of two blade cores from contexts 320132 and 320113, all of the cores and nodules have been directed at the production of flakes from one or more platforms. In accordance with the debitage component, there is very little evidence of platform preparation and maintenance. Platforms tend to be cortical, thermal or plain; many are marked with the incipient cones of percussion that result from unsuccessful attempts at flake removal using direct hard-hammer percussion. The recurrence of these traits has been recognised as a distinctively later Bronze Age characteristic (Young and Humphrey 1999, 233).

The barrow deposits contained numerous fresh chips (903 pieces), which form a homogeneous group and probably result from *in situ* knapping activity. Further evidence for the deposition of knapping debris is provided by the high numbers of cores, partially worked nodules, preparatory flakes and unclassifiable waste that were recovered from the barrow deposits. While several large groups of related flints were isolated, fewer refits were identified than expected. A total of ten refitting sequences were recorded, none exceeding three constituent pieces. Most of the refits were made between cores and pieces of unclassifiable waste. The pattern suggests a knapping scatter from which the useable flints were removed, leaving behind the non-useful elements such as discarded cores, shattered nodules and chips.

The retouched component is fairly limited in size but extensive in range. A total of 30 tools provide 5.2% of the assemblage (excluding chips). Simple edge-retouched flakes dominate (10 pieces). Piercers are also unusually common (five pieces, Fig. 24.3, no. 25) and may reflect some specialisation in activity. Other retouched items include scrapers (Fig. 24.3, no. 26), denticulated and notched flakes, spurred pieces and unclassifiable fragments. A small number of clearly residual tools are present, such as the Mesolithic burin from deposit 320136 and the backed knife made on a re-used blank from context 320114.

While retouched tools are not particularly numerous in the barrow assemblage, utilised edges are common. Use-wear was recorded on a total of 49 edges in a sample of 200 flints (Fig. 24.4). Hard density materials (eg seasoned antler, hard woods) and medium density materials (eg green bone, soft woods) are well-represented. Soft substances (eg meat, skin) have left no trace on the barrow flints, although this may not be representative given the high visibility threshold of soft use-wear (Brown 1989). The flints were applied to a range of tasks but were most frequently used for scraping (Fig. 24.5). Unretouched edges seem to have been preferred for this purpose, as formal scrapers are comparatively under-represented in the assemblage (two pieces). Similarly, natural spurs and notches were often selected for use in an unmodified state. This may be a corollary of the restriction in formal tool types that typifies later Bronze Age industries (Young and Humphrey 1999, 233).

The assemblage from the barrow seems to represent a deposit of flintworking debris, which was either knapped or dumped directly into the ditches. The paucity of refits suggests that the certain pieces were selected and removed for use elsewhere. The virtual absence of burnt struck flints (18 pieces or 1.2%) supports the proposition that material was deposited following *in situ* knapping activity rather than introduced from elsewhere (eg from hearths or from middens).

Although composed of predominantly of knapping by-products, the assemblage attests to a certain amount of tool-use. A range of tasks seems likely, with an apparent focus on scraping materials of a medium or hard density (Fig. 24.6). Piercing tools and piercing use-wear are also well represented. The small number of residual flints probably derives from the redeposited remains of previous activity on the site or from the re-use of earlier flakes. As a group they are fairly unremarkable and there is no evidence to suggest that they were deliberately curated and deposited.

<u>Waterhole 309075</u>

A total of 1733 struck flints and 131 pieces (1713 g) of burnt unworked flint were recovered from the fills of the Middle Bronze Age waterhole on the MTCP site (Table 24.24). The struck flint was spread across 17 SG deposits (35 contexts). The most prolific of these was SG deposit 309081 (417 pieces), which for this reason was used to provide the sample for detailed analysis. The burnt unworked flint formed slight concentrations in SG 309072 (35 pieces weighing 397 g) and SG 309081 (28 pieces weighing 488 g), but was generally widespread in its distribution across 12 SG deposits.

The flintwork can be dated to the Middle Bronze Age and is generally in a fresh, uncorticated condition. As in the barrow assemblage, the presence of cortication tends to accompany the technologically earlier pieces. Many of the flints possess a slightly glossy surface appearance, possibly resulting from repeated handling during use or perhaps from the particular conditions of a waterlogged deposit.

The assemblage contains large numbers of unretouched flakes (920 pieces) and unclassifiable waste (258 pieces). A further 176 chips were also recovered following an extensive sampling programme. Blades, bladelets and bladelike flakes are comparatively few in number (58 pieces or 3.7%, excluding chips) but proportionally equivalent to those from the barrow assemblage (23 pieces or 4%).

The technological analysis of the material from SG deposit 309081 reveals an industry similar in character to that from the barrow. Most of the flakes have been struck using hard-hammer percussion (126 pieces compared to 15 soft-hammer flakes). Where present, the platform is usually plain (123 pieces) or cortical (114 pieces) and unabraded (345 pieces). Evidence for platform maintenance during knapping is limited to two platform edge rejuvenation flakes and one rejuvenation tablet; these probably belong to an earlier industry.

The assemblage contains 95 cores, most of which are aimed at the production of flakes using a single platform (18 pieces) or multiple platforms (61 pieces). Three blade cores were also recovered; these exhibit careful preparation and removal are probably residual from a Mesolithic or Neolithic industry. Complete examples range from 10 g to 159 g and have an average weight of 48.6 g. Partially worked nodules are well represented by 85 pieces. Complete specimens are slightly larger than cores, weighing between 12 g and 235 g with an average of 62.2 g.

A total of 15 refitting groups were found within the assemblage from SG deposit 309081, none of which contain more than three pieces. Unlike that from the barrow, the waterhole assemblage contains very few refits between cores and flakes, which argues against a dump of knapping waste. Refits between utilised and retouched pieces are common, however, indicating that material knapped from the same core was used and then deposited together. Of particular note are the two refitting piercers from context 309110 (Fig. 24.3, no. 27), which point towards a relatively quick succession of manufacture, use and discard. Also of significance is the Neolithic polished axe fragment from context 309119 (Fig. 24.3, no. 28). Given the presence of an indirectly refitting flake from the same deposit, it seems likely that the axe was re-used as a core in the Bronze Age. While there is some evidence for the recycling of lithic material in later Bronze Age contexts (eg Young and Humphrey 1999, 233), the curation and re-use of an object as conspicuous as a polished axe may relate to the special character of the waterhole deposits.

While the barrow seems to be composed largely of knapping debitage, the assemblage from the waterhole is characterised by an unusually high number of retouched pieces and the frequency of use-wear is correspondingly high (Fig. 24.7). A total of 136 tools provide 8.7 % of the waterhole assemblage (excluding chips) compared to 30 pieces or 5.2% from the barrow. Simple edge-retouched flakes occur most frequently (63 pieces) and show a wide distribution across the deposits. Scrapers also feature heavily in the waterhole assemblage (22 pieces) but are comparatively rare in the barrow collection (two pieces). However, any corresponding increase in the frequency of scraping use-wear on the edges of flints is slight and a broadly similar range of tasks seem to have been performed in each case (Figs 24.8 and 24.9; compare Figs 24.5 and 24.6).

As seen in the barrow assemblage, piercers are unusually numerous and suggest that certain specialised activities were being performed in the area. A total of 21 piercers provide 15.4% of the retouched component from the waterhole. The assemblage from the barrow has a similar composition, with piercers providing 16.7% of all retouched tools. Furthermore, over 60% of all piercers recovered from Stansted came from either the barrow or the waterhole on the MTCP site; many more came from other Middle Bronze Age features. This spatial and temporal concentration of piercing tools may relate to a particular type of product manufacture. The results of the use-wear analysis indicate that many of the piercers were used to bore material of a medium or hard density and often to quite a depth (*c* 30 mm on one example). In general, it seems likely that the piercing tools were being used to work thick sections of wood or bone rather than thin pieces of soft material such as hide.

Other tools from the waterhole include denticulated scrapers, piercers, notched flakes, a possible arrowhead or knife roughout, and various unclassifiable retouched fragments (Fig 24.10, nos 29-31, 33). Also of note is the fabricator from context (309118) (Fig. 24.10, no. 32). This tool has been retouched on a re-used blade, probably of Mesolithic date, while the quality of the retouch is more reminiscent of Neolithic than of later Bronze Age workmanship. The fabricator therefore seems to have been in circulation for some time before it was finally deposited in the waterhole. This history of use and re-use is a recurrent feature of Middle Bronze Age flintworking at Stansted. Along with the polished axe and the fabricator, it seems plausible that other artefacts within the waterhole have a similar history of curation and redeposition. Some of these artefacts may have had a special significance and been formally deposited.

FLB excavation (BAAFL00)

The majority of the assemblage from the FLB excavation can be dated on technological grounds to the Middle or Later Bronze Age. With the exception of the small assemblage from pit 408013, the material is thinly scattered across the site and is probably largely residual.

M11 evaluation and excavation (BAALR00)

Compared to the quantity of Neolithic flintwork recovered from the M11 site, the Bronze Age is less well represented, forming a low-density spread of material. Against this fairly thin scatter, three large assemblages were recovered from pit 423049, pit 434013, and tree-throw 425005. These are located in the northern area of the site.

<u>Pit 423049</u>

An assemblage of 167 struck flints was recovered from a single deposit (423050) within pit 423049 (Table 24.25). Eight pieces (3 g) of burnt unworked flint were also present in the pit.

The assemblage is composed entirely of unretouched debitage. No retouched tools, datable or otherwise, were identified. When chips are excluded, the assemblage is actually rather small in size (29 pieces) and consequently difficult to date on technological grounds. The preponderance of thick, hard-hammer flakes suggests a date in the Bronze Age, although the variable condition of the flintwork implies some chronological mixing. The rejuvenation flake, for example, may represent a residual Neolithic piece.

Pit 434013

A total of 79 struck flints, including 52 chips, came from a single deposit in pit 434013 (Table 24.26). A further three pieces (28 g) of burnt unworked flint were also recovered. The majority of flints are in a fresh condition with a light, mottled cortication. Some of the more heavily corticated pieces are likely to be residual.

The assemblage is characterised by irregular, hard-hammer flakes and pieces of angular shatter that suggest a later Bronze Age date for the majority. As in pit 423049 (see above), chips are numerous (38 pieces) and may indicate some knapping activity in the area. No refitting flints or related groups were identified, however. Two single platform flake cores weighing 16 g and 53 g were also recovered and probably belong to the same later Bronze Age industry as the debitage. The retouched component is limited to one notched flake (Fig. 24.10, no. 34), although several utilised edges were noted.

Tree-throw 425005

A total of 68 struck flints were recovered from two deposits within tree-throw 425005 (Table 24.27). A small quantity of burnt unworked flint (three pieces weighing 21 g) were distributed between the fills. The majority of flints are in a fresh, moderately corticated condition and probably date to the middle or later Bronze Age.

The assemblage is composed mainly of flakes (22 pieces), unclassifiable debitage (21 pieces) and chips (17 pieces). Most have been struck with hard-hammer percussion and few pieces show any evidence of platform preparation prior to removal. One single platform and two multi-platform flake cores were recovered from the lower of the fills, 425003; these range in weight from 37 g to 61 g. A partially worked nodule (72 g) came from the same deposit. Although a few utilised edges were noted, retouched tools are limited in number and range to two edge-retouched flakes.

The assemblage combines large quantities of irregular shatter, chips and cores with low numbers of retouched and utilised flints. This composition strongly suggests a knapping deposit, although no refitting elements are present.

Discussion

The flint assemblage from Stansted extends from the Lower Palaeolithic to at least the Late Bronze Age and provides a valuable opportunity to examine many aspects of prehistoric behaviour. Much of the material is in an exceptionally fresh condition. This has allowed confidence that there has been fairly limited post-depositional disturbance, which in turn has recommended various groups for further analysis such as use-wear and refitting studies. These analyses have contributed in varying degrees to an understanding of flint procurement, treatment, use and deposition in each of the periods under consideration.

Before the Early Neolithic period, evidence for human activity in the Stansted area is fairly meagre. The duration of the Palaeolithic period is represented by two handaxes and a possible scraper. Further evidence comes from possible instances of lithic recycling. Examples include the sickle blade from the MTCP (BAAMP00) and the possible biface fragment from the M11 excavation (BAALR00).
The Mesolithic assemblage comprises a scatter of residual finds, most of which came from modern layers. The recurrence of Mesolithic flints in the topsoil and ploughsoil may reveal something of their primary context. The assemblage includes two microliths, six burins and three *tranchet* axes. Both microliths are of the broad-blade type usually associated with early Mesolithic assemblages, although the assemblage is too small to refine the date further.

Stratified Early Neolithic flint assemblages were recovered from pits, tree-throws and ditches on several sites. Substantial collections were recovered from a group of three tree-throws and one ditch terminus in the north-eastern area of the M11 excavation (BAALR00); two further pits may also be contemporary. Three tree-throws and a linear ditch feature from the SG site (BAASG03) produced Early Neolithic flintwork, as did pit 344278 on the MTCP site (BAAMP99/BAAMP00). These assemblages tend to be characterised by low numbers of tools and cores in combination with high numbers of burnt and utilised pieces.

The later Neolithic is represented by numerous isolated finds and several coherent assemblages. Notable groups include an activity scatter from the MTCP site (BAAMP00) and a pit assemblage from the M11 site (BAALR00). A hiatus follows in the Early Bronze Age and is registered by both the flint and pottery record. No stratified assemblages could be confidently dated to the Early Bronze Age, a deficiency also paralleled in the assemblage from the A120 (Cramp 2007). Slim evidence of Early Bronze Age activity is provided by three barbed and tanged arrowheads. These stray finds may derive from disturbed burial deposits or, perhaps more likely, represent chance losses during brief occupation.

The vast majority of flintwork seems to have been deposited during extensive settlement in the Middle and Late Bronze Age. Many features contained large quantities of general debris and knapping waste. Others, such as the waterhole, seem to represent more specialised deposits. There is recurrent evidence for the curation and re-use of earlier flintwork in this period, a phenomenon that serves to emphasise the longevity of human activity in the area.

Catalogue of illustrated flint Figs 24.1-24.3, 24.10)

1. MTCP (BAAMP00), context 301001 (topsoil), object 503, Handaxe
2. MTCP (BAAMP00), context 301001 (topsoil), object 507, Handaxe
3. LTCP (BAACP00), context 116023 (fill of tree-throw 116024), object 101, Long blade, possibly reused as sickle
4. LTCP (BAACP99), context 995001 (topsoil), object 2, *Tranchet* axe
5. LTCP (BAACP00), context 101003 (topsoil), object 104, *Tranchet* axe

6. LTCP (BAACP00), context 101005 (subsoil), object 4000, Microlith
7. M11 (BAALR00), context 441001 (fill of MIA ditch), object 10334, Burin
8. SG (BAASG03), context 497004 (fill of Late Saxon ditch 497043), object 13186, Microlith
9. SG (BAASG03), context 497041 (fill of Late Saxon pit 497038), object 13175, Scraper
10. LTCP (BAACP99), context 221387 (fieldwalking), object 5252, Flaked axe
11. M11 (BAALR00), context 435032 (fill of MIA ditch 440036), object 11387, Knife or arrowhead
12. M11 (BAALR00), context 434039 (fill of Early Neolithic tree-throw 434038), object 10386, Piercer
13. SG (BAASG03), context 492012 (topsoil), object 13131, Leaf-shaped arrowhead
14. LTCP (BAAMP00), context 301001 (topsoil), object 914, Leaf-shaped arrowhead
15. LTCP (BAAMP00), context 353013 (fill of Early Neolithic pit 344278), object 9074, Scraper
16. MTCP (BAAMP00), context 503 (fill of Early Neolithic pit 344278), object - , Serrated flake
17. MTCP (BAAMP00), context 324033 (spread of flint), object 8739, *Petit tranchet* arrowhead
18. LTCP (BAACP01), context 459027 (post-medieval spread 459029), object 1371, Barbed and tanged arrowhead
19. MTCP (BAAMP99), context 2605 (fill of MBA pit 2604), object 21, Barbed and tanged arrowhead
20. MTCP (BAAMP99), context 2618 (fill of MBA pit 2604), object - , Possible Mesolithic end scraper
21. MTCP (BAAMP00), context 321030 (fill of MBA pit 321029), object 8420, Scraper
22. MTCP (BAAMP00), context 321081 (fill of MBA pit 321080), object 8439, Piercer
23. MTCP (BAAMP00), context 321081 (fill of MBA pit 321080), object 8504, Scraper
24. MTCP (BAAMP00), context 320057 (fill of MBA pit 320047), object 7997, Scraper
25. MTCP (BAAMP00), context 320125 (fill of Bronze Age barrow ditch 324078), object 8152, Piercer
26. MTCP (BAAMP00), context 320118 (fill of Bronze Age barrow ditch 324078), object 8053, Scraper
27. MTCP (BAAMP00), context 309110 (fill of MBA waterhole 309075), objects 6676 & 6677, Refitting piercers
28. MTCP (BAAMP00), context 309119 (fill of MBA waterhole 309075), objects 131 & 7146, Polished axe and refitting flake
29. MTCP (BAAMP00), context 309108 (fill of MBA waterhole 309075), object 6616, Piercer
30. MTCP (BAAMP00), context 309083 (fill of MBA waterhole 309075), object 5995, Notched flake
31. MTCP (BAAMP00), context 309108 (fill of MBA waterhole 309075), object 140, End and side scraper
32. MTCP (BAAMP00), context 309118 (fill of MBA waterhole 309075), object 130, Fabricator
33. MTCP (BAAMP00), context 309119 (fill of MBA waterhole 309075), object 133, Denticulated scraper
34. M11 (BAALR00), context 434014 (fill of EIA pit 434013), object 10073, Notched flake

Table 24.1: Quantification of struck flint by site

Site code:	Site name:	No. of flints:		Total weight (g):	
CP99FW	1999 Fieldwalking on LTCP site	161	1.32%	1936	1.66%
BAACP99	LTCP phase I	823	6.73%	2931	2.52%
BAACP00	LTCP phase II	1350	11.03%	14179	12.17%
BAACP01	LTCP phase III	364	2.98%	2164	1.86%
BAAMP99	MTCP evaluation	700	5.72%	5687	4.88%
BAAMP00	MTCP excavation	6304	51.52%	69940	60.05%
BAAFL00	FLB excavation	47	0.38%	620	0.53%
BAALB00	LBR evaluation and excavation	14	0.11%	123	0.11%
BAALR00	M11 evaluation and excavation	2062	16.85%	14704	12.63%
BAASR00	Standby Runway evaluation	1	0.01%	3	0.00%
BAASG03	SG excavation	348	2.84%	3416	2.93%
BAANP03	NP excavation	1	0.01%	3	0.00%
Unstratified	Unstratified material - all sites	60	0.49%	756	0.65%
Total:		12235	100.00%	116462	100.00%

Table 24.2: Quantification of burnt unworked flint by site

Site code:	Site name:	Number of pieces:		Total weight (g):	
BAACP99	1999 Fieldwalking on LTCP site	373	3.80%	2037	2.24%
BAACP00	LTCP phase II	2200	22.44%	15071	16.59%
BAACP01	LTCP phase III	109	1.11%	900	0.99%
BAAMP99	MTCP evaluation	286	2.92%	3264	3.59%
BAAMP00	MTCP excavation	5111	52.13%	52414	57.70%
BAAFL00	FLB excavation	31	0.32%	470	0.52%
BAALB00	LBR evaluation and excavation	43	0.44%	346	0.38%
BAALR00	M11 evaluation and excavation	1357	13.84%	13030	14.34%
BAASG03	SG excavation	270	2.75%	3135	3.45%
BAANP03	NP excavation	25	0.25%	167	0.18%
Total:		9805	100.00%	90834	100.00%

Table 24.3: Summary of flint from all areas

Category:	Sub-category:	Total:
Flake	Primary	802
	Secondary	2765
	Tertiary	1315
	Flake from a polished implement	5
	Unclassifiable waste	1103
Blade	Primary	10
	Secondary	125
	Tertiary	114
Bladelet	Primary	5
	Secondary	28
	Tertiary	29
Bladelike flake	Primary	13
	Secondary	142
	Tertiary	104
Axe/adze thinning flake	Axe/adze thinning flake	2
Core preparation flake	Core face/edge rejuvenation flake	11
	Rejuvenation flake tablet	6
	Crested blade	4
Chip	Chip	4575
Core/core fragment	Single platform flake core	68
	Multi-platform flake core	173
	Keeled/non-discoidal flake core	1
	Single platform blade core	5
	Opposed platform blade core	1
	Multi-platform blade core	4
	Unclassifiable blade core	8
	Core on a flake	28
	Unclassifiable/fragmentary core	21
Nodule	Partially worked nodule	270
Retouched flake/blade	Retouched flake	208
	Retouched blade(let)	12
	Unclassifiable retouch	34
Scraper	Side scraper	18
	End scraper	26
	End-and-side scraper	13
	Unclassifiable scraper	25
Serrate/denticulate	Denticulate	11
	Notched piece	46
	Serrated piece	7
Knife	Backed knife	2
	Single-piece sickle	1
	Unclassifiable knife	1
Microlith/backed bladelet	Microlith	2
Burin	Burin	6
Axe/core tool	Handaxe	2
	Tranchet axe	3
	Flaked and polished axe	2
Arrowhead	*Petit tranchet*	1
	Leaf	2
	Chisel	1
	Barbed and tanged	3
	Unfinished arrowhead/blank	1
	Unclassifiable arrowhead	1

Miscellaneous tool	Piercer	43
	Spurred piece	13
	Fabricator	3
Unclassifiable	Hammerstone	9
	Natural	2
Total:		12235

Table 24.4: Assemblages selected for detailed analysis

Site code:	Cut/feature:	Phase:	No. of flints:
BAACP00	Pit 134001	MBA	163
BAAMP99	Pit 502 = 353011	EN	225
	Pit 2604	MBA	250
BAAMP00	Pit 353011 = 502	EN	86
	Pit 312031	MBA	157
	Pit 320047	MBA	136
	Pit 321029	MBA	57
	Pit 321080	MBA	85
	Waerhole 323001	MBA	108
	Scatter SG 324033	N	62
	Barrow 324078	MBA	1483
	Waterhole 309075	MBA	1733
BAALR00	Pit 423049	MBA	167
	Pit 434009	LN	119
	Pit 434013	EIA	79
	Tree-throw 425005	MBA	68
	Tree-throw 429002	N	19
	Tree-throw 434033	EN	30
	Tree-throw 434035	EN	61
	Tree-throw 434038	EN	62
	Tree-throw 440004	EN	27
	Pit 420068	LN	34
BAASG03	Tree-throw 501010	N	87
	Tree-throw 507030/491019	N	29
	Tree-throw 505015	EN	17
Total:			5344

Table 24.5: Flint by type from pit 420068

Category:	Sub-category:	Total:
Flake/broken flake	Secondary	5
	Tertiary	4
	Unclassifiable waste	8
	Flake from a polished implement	2
Blade/broken blade	Secondary	2
	Tertiary	4
Bladelike flake	Secondary	3
	Tertiary	1
Chip	Chip	5
Total:		34

Table 24.6: Flint by type from tree-throw 434033

Category:	Sub-category:	Total:
Flake/broken flake	Primary	4
	Secondary	2
	Tertiary	7
	Unclassifiable waste	2
Blade/broken blade	Secondary	4
	Tertiary	3
Bladelike flake	Tertiary	2
Chip	Chip	6
Total:		30

Table 24.7: Flint by type from tree-throw 434035

		Context:		
Category:	Sub-category:	434036 (lower fill)	434037 (upper fill)	Total:
Flake/broken flake	Primary		1	1
	Secondary		13	13
	Tertiary		17	17
	Unclassifiable waste		4	4
Blade/broken blade	Secondary		1	1
	Tertiary		2	2
Bladelet	Secondary		1	1
	Tertiary		3	3
Bladelike flake	Secondary		1	1
	Tertiary		6	6
Core preparation flake	Core face/edge rejuvenation flake		1	1
	Rejuvenation flake tablet		1	1
	Crested blade		1	1
Chip	Chip	2	3	5
Core/core fragment	Multi-platform flake core		1	1
Nodule	Partially worked nodule		1	1
Retouched flake/blade	Retouched flake		1	1
	Unclassifiable retouch		1	1
Total:		2	59	61

Table 24.8: Flint by type from tree-throw 434038

Category:	Sub-category:	Total:
Flake/broken flake	Primary	1
	Secondary	8
	Tertiary	5
	Unclassifiable waste	7
Blade/broken blade	Secondary	3
	Tertiary	3
Bladelike flake	Secondary	2
	Tertiary	6
Chip	Chip	24
Nodule	Partially worked nodule	1
Misc/Multi Tools	Piercer	2
Total:		62

Table 24.9: Flint by type from tree-throw 440004

Category:	Sub-category:	Total:
Flake/broken flake	Secondary	7
	Tertiary	9
	Primary	1
Blade/broken blade	Secondary	2
	Tertiary	2
Bladelet	Tertiary	1
Bladelike flake	Secondary	3
	Tertiary	2
Total:		27

Table 24.10: Flint by type from tree-throw 505015

		Context:			
Category	Sub-category	505016	505017	505018	Total:
Flake/broken flake	primary			1	1
	secondary			5	5
	tertiary		1	3	4
	Unclassifiable waste	1			1
Blade/broken blade	tertiary			1	1
Core preparation flake	Core face/edge rejuvenation flake			1	1
Chip	chip		2	1	3
Retouched flake/blade	retouched flake		1		1
Total:		1	4	12	17

Table 24.11: Flint by type from ditch 507032

		Context:			
Category:	Sub-category:	491021	507024	507001	Total:
Flake/broken flake	Secondary	6			6
	Tertiary	9	1		10
	Unclassifiable waste	1	1	1	2
	Flake from a polished implement	1			1
	Primary	4			4
Blade/broken blade	Secondary	1	1		2
	Tertiary	1			1
Retouched flake/blade	Retouched flake	1			1
Chip	Chip	1			1
Nodule	Partially worked nodule			1	
Total:		25	3	2	30

Table 24.12: Flint by type from tree-throw 501010

Category:	Sub-category:	Context: 501011 Upper fill	501012	501013 Lower fill	Total:
Flake/broken flake	Primary	3	2		5
	Secondary	10	3	3	16
	Tertiary	8	5	1	14
	Unclassifiable waste	2	2		4
Blade/broken blade	Secondary	1		1	2
	Tertiary	4			4
Bladelike flake	Secondary			1	1
	Tertiary	1			1
Chip	Chip	33	3	2	38
Retouched flake/blade	Retouched blade(let)	1			1
Natural	Echinoid fossil			1	1
Total:		63	15	9	87

Table 24.13: Flint by type from pit 344278

Category:	Sub-category:	Context: 503	353012	353013	Total:
Flake/broken flake	Primary	7		3	10
	Secondary	34		14	48
	Tertiary	30		10	40
	Unclassifiable waste	12	1	1	14
Blade/broken blade	Secondary	5		5	10
	Tertiary	14		10	24
Bladelet	Secondary			3	3
	Tertiary			3	3
Bladelike flake	Secondary	7		6	13
	Tertiary	6		8	14
Core preparation flakes	Core face/edge rejuvenation flake			2	2
Chip	Chip	102	2	13	117
Nodule	Partially worked nodule	1	1		2
Retouched flake/blade	Retouched flake	2		1	3
	Retouched blade(let)	1		1	2
Serrate/denticulate	Serrated piece	3		1	4
Scraper	End scraper			1	1
Arrowhead	Fragmentary/unclassifiable arrowhead	1			1
Total:		225	4	82	311

Table 24.14: Flint by type from scatter 324033

Category:	Sub-category:	Total:
Flake/broken flake	Primary	2
	Secondary	11
	Tertiary	27
	Unclassifiable waste	7
Blade/broken blade	Secondary	2
Bladelike flake	Secondary	3
	Tertiary	2
Chip	Chip	2
Core/core fragment	Multi-platform flake core	1
	Unclassifiable/fragmentary core	1
Retouched flake/blade	Retouched flake	1
Serrate/denticulate	Notched piece	1
Arrowhead	Petit *tranchet*	1
Miscellaneous/multiple tools	Spurred piece	1
Total:		62

Table 24.15: Flint by type from pit 434009

Category:	Sub-category:	Total:
Flake/broken flake	Primary	11
	Secondary	23
	Tertiary	12
	Unclassifiable waste	9
Bladelike flake	Tertiary	1
Chip	Chip	61
Core/core fragment	Multi-platform flake core	1
Miscellaneous/multiple tools	Piercer	1
Total:		119

Table 24.16: Flint by type from pit 134001

Category:	Sub-category:	Context: 134005	134006	Total:
Flake/broken flake	Primary	10		10
	Secondary	19		19
	Tertiary	13	4	17
	Unclassifiable waste	36		36
Bladelike flake	Secondary	2		2
	Tertiary	1		1
Core preparation flake	Core face/edge rejuvenation flake	1		1
Core/core fragment	Multi-platform flake core	1		1
Nodule	Partially worked nodule	8		8
Retouched flake/blade	Retouched flake	1		1
Chip	Chip	67		67
Total:		159	4	163

Table 24.17: Flint by type from pit 2604

Category:	Sub-category:	Context: 2605	2618	2622	2623	Total:
Flake/broken flake	Primary	11	14	2		27
	Secondary	53	21	4	1	79
	Tertiary	43	8	2		53
	Unclassifiable waste	13	10	5		28
Blade/broken blade	Secondary		1			1
	Tertiary		1			1
Bladelike flake	Secondary	1				1
	Tertiary	1			1	2
Core preparation flake	Core face/edge rejuvenation flake		1			1
	Rejuvenation flake tablet	1				1
Chip	Chip	34	2			36
Core/core fragment	Single platform flake core		3			3
	Multi-platform flake core	2	1			3
	Core on a flake		1			1
Nodule	Partially worked nodule	5	1			6
Retouched flake/blade	Retouched flake		1			1
	Unclassifiable retouch	1				1
Scraper	End scraper (blade)		1			1
	Unclassifiable scraper	1				1
Serrate/denticulate	Notched piece	1				1
Arrowhead	Barbed and tanged	1				1
Unclassifiable	Hammerstone	1				1
Total:		169	66	13	2	250

Table 24.18: Flint by type from pit 321029

Category:	Sub-category:	Context: 321030	321031	Total:
Flake/broken flake	Primary	2		2
	Secondary	17		17
	Tertiary	9		9
	Unclassifiable waste	9	1	10
Bladelet	Secondary	1		1
Bladelike flake	Secondary	1		1
Core/core fragment	Single platform flake core	2		2
	Multi-platform flake core	2		2
	Core on a flake	1		1
	Unclassifiable/fragmentary core	1		1
Nodule	Partially worked nodule	2		2
Retouched flake/blade	Retouched flake	2		2
Scraper	End scraper (flake)	1		1
	Unclassifiable scraper	1	1	2
Serrate/denticulate	Notched piece	2		2
Unclassifiable	Hammerstone	2		2
Total:		55	2	57

Table 24.19: Flint by type from pit 321080

Category:	Sub-category:	Context: 321081	321082	321083	321085	321090	Total:
Flake/broken flake	Primary	6	1				7
	Secondary	22			1		23
	Tertiary	9			1		10
	Unclassifiable waste	20				1	21
Bladelike flake	Tertiary	1					1
Core/core fragment	Single platform flake core	1					1
	Multi-platform flake core	4					4
	Core on a flake		1				1
	Unclassifiable/fragmentary core	1					1
Nodule	Partially worked nodule	4		1			5
Retouched flake/blade	Retouched flake	1					1
	Unclassifiable retouch	1					1
Scraper	End-and-side scraper	1					1
	End scraper (flake)		1				1
	Unclassifiable scraper	1					1
Serrate/denticulate	Notched piece	1					1
Miscellaneous/multiple tools	Piercer	2	1				3
Unclassifiable	Hammerstone	2					2
Total:		77	4	1	2	1	85

Table 24.20: Flint by type from pit 312031

Category:	Sub-category:	Context: 312021	312022	312023	312025	312026	312027	312028	312030	315058	Total:
Flake/broken flake	Primary	3	2		2		2		1		10
	Secondary	10	6	17	2	2	2		1		40
	Tertiary	11	3	3		2	3		3		25
	Unclassifiable waste	5	1	5	1		2		1		15
Blade/broken blade	Secondary			1							1
	Tertiary						1				1
Bladelet	Tertiary			1							1
Bladelike flake	Secondary						1				1
Chip	Chip	13	5	10	3	3	7	3	8		52
Core/core fragment	Multi-platform flake core	1					1				2
Nodule	Partially worked nodule	1								1	2
Retouched flake/blade	Retouched flake	2	2	1							5
	Unclassifiable retouch	1									1
Miscellaneous tool	Spurred piece	1									1
Total:		48	19	38	8	7	19	3	14	1	157

Table 24.21: Flint by type from pit 320047

Category:	Sub-category:	Context: 320051	320052	320055	320056	320057	Total:
Flake/broken flake	Primary			9		10	19
	Secondary			18		46	64
	Tertiary	3		4	1	22	30
	Unclassifiable waste			1		6	7
Core preparation flake	Core face/edge rejuvenation flake					1	1
Chip	Chip					2	2
Core/core fragment	Core on a flake					1	1
Nodule	Partially worked nodule	1	1			1	3
Retouched flake/blade	Retouched flake			1		3	4
	Unclassifiable retouch	1					1
Scraper	End scraper (flake)					1	1
Serrate/denticulate	Notched piece					1	1
Miscellaneous tool	Spurred piece	1				1	2
Total:		6	1	33	1	95	136

Table 24.22: Flint by type from pit 323001

Category:	Sub-category:	Context: 323002	323003	323017	323018	323019	Total:
Flake/broken flake	Primary		6		7		13
	Secondary		10	1	14	2	27
	Tertiary	1	11		6		18
	Unclassifiable waste		5		10		15
Blade/broken blade	Secondary				1		1
Bladelike flake	Primary				1		1
	Secondary		2				2
Chip	Chip		21		1		22
Core/core fragment	Single platform flake core		1				1
	Unclassifiable/fragmentary core				1		1
Nodule	Partially worked nodule		1		1		2
Retouched flake/blade	Retouched flake		3				3
Serrate/denticulate	Notched piece				1		1
Miscellaneous tool	Piercer		1				1
Total:		1	61	1	43	2	108

Table 24.23: Flint by type from the barrow 324078

		SG deposit:																			
Category:	Sub-category:	309294	316103	316105	324061	324062	324063	324064	324065	324066	324067	324068	324069	324070	324071	324072	324073	324075	324076	324077	Total:
Flake/broken flake	Primary		1		7	5	23	3	2	2	7	2		6	7		3		7		75
	Secondary		5	1	18	19	42	9	4	5	21	10		17	7	1	4	3	4		170
	Tertiary		2		10	6	17	7	1	3	9	6		4	3		1	1	1		71
	Unclassifiable waste		6		10	21	45	4		4	11	1		22	3	1	2		2		132
Blade/broken blade	Secondary					2					1	1					1		1		6
	Tertiary						1	1		1		2					1		1		7
Bladelet	Secondary						1							1							2
	Tertiary				1							1									2
Bladelike flake	Secondary				1			1													2
	Tertiary							2			1								1		4
Core preparation flake	Crested blade							1													1
Chip	Chip	3	70	77	116	19	52	72	75		89	108	3	78	40			34	63	4	903
Core/core fragment	Single platform flake core					1	6			1	1			3					2		14
	Multi-platform flake core		1		1	5	8							3	1	1					20
	Single platform blade core													1							1
	Opposed platform blade core																		1		1
	Core on a flake						4												1		5
	Unclassifiable/fragmentary core				3	1	1							1							6
Nodule	Partially worked nodule		2		2	3	12	2	2		2			1	1	1			2		30
Retouched blade/flake	Retouched flake				2	2		2			2				1			1			10
	Retouched blade(let)					1		2													3
	Unclassifiable retouch		1				1			1											3
Scraper	End scraper (flake)													1							1
	Unclassifiable scraper				1																1
Serrate/denticulate	Denticulate						1														1
	Notched piece						1							1							2
Knife	Backed knife																		1		1
Miscellaneous tool	Piercer				1	1	2				1										5

	Spurred piece					1									1					2
Burin	Burin											1								1
Unclassifiable	Hammerstone						1													1
Total:		3	88	78	173	87	218	106	84	17	145	132	3	139	64	4	12	39	87	4	1483

Table 24.24: Flint by type from the waterhole 309075, BAAMP00 (MTCP excavation)

		SG deposit:																	
Category:	Sub-category:	309076	309077	309081	309087	309088	309092	309099	309104	309105	309113	309114	309115	309126	309127	309128	309129	309130	Total:
Flake/broken flake	Primary	5	12	30		3	4	8		3	13				6	1		19	104
	Secondary	26	110	144	1	16	11	34	1	20	65		4	2	62	27	2	87	612
	Tertiary	12	32	61	1	9	8	4		1	19	1		2	19	3	1	31	204
	Unclassifiable waste	4	35	55		9	6	20	4	6	41		3		18	12	2	43	258
	Flake from a polished implement																	1	1
Blade/broken blade	Primary					1												1	2
	Secondary	1	5			1	1	1		1	1							2	13
Bladelet	Secondary			1														1	2
	Tertiary						0											2	2
Bladelike	Primary																	1	1
	Secondary	1	9	15		1	1	3	1		1							1	33
	Tertiary	2	1	1		1													5
Core preparation flake	Core face/edge rejuvenation flake			2															2
	Rejuvenation flake tablet			1															1

Chip	Chip	1		19				2			13				52			89	176
Core/core fragment	Single platform flake core		2	9		2					3				1	1			18
	Multi-platform flake core	3	8	18		3	2	2		2	8		1		3	2		9	61
	Keeled/non-discoidal flake core																	1	1
	Single platform blade core										1								1
	Multi-platform blade core										1							1	2
	Core on a flake	1	1	3							1					1		1	8
	Unclassifiable/fragmentary core			4															4
Nodule	Partially worked nodule	2	14	11	1	8	2	8		3	13		2		6	5	1	9	85
Retouched flake/blade	Retouched flake	2	7	22		2	2	1		2	8				4	2		11	63
	Retouched blade(let)		1																1
	Unclassifiable retouch			6											1			2	9
Scraper	Side scraper	1		2			1	1											5
	End scraper (flake)			2											1				3
	End-and-side scraper		1	1			1												3
	Unclassifiable scraper			2		2	1			1	1				2	1		1	11
Serrate/denticulate	Denticulate		1				1			1	1							1	5
	Notched piece		1	2							1		1					3	8
Axe/core tool	Polished axe																	1	1
Arrowhead	Unfinished arrowhead/blank							1											1
Miscellaneous tool	Piercer		2	5		2	1	3			1				2	2		3	21
	Fabricator							1											1
	Spurred piece			1							1					1		1	4
Unclassifiable	Hammerstone										1								1
Total:		61	242	417	3	60	42	89	6	40	194	1	11	4	177	58	6	322	1733

Table 24.25: Flint by type from pit 423049

Category:	Sub-category:	Total:
Flake/broken flake	Primary	3
	Secondary	10
	Tertiary	7
	Unclassifiable waste	4
Core preparation flakes	Core face/edge rejuvenation flake	1
Chip	Chip	138
Core/core fragment	Multi-platform flake core	2
	Unclassifiable/fragmentary core	2
Total:		167

Table 24.26: Flint by type from pit 434013

Category:	Sub-category:	Total:
Flake/broken flake	Primary	4
	Secondary	15
	Tertiary	1
	Unclassifiable waste	4
Chip	Chip	52
Core/core fragment	Single platform flake core	2
Serrate/denticulate	Notched piece	1
Total:		79

Table 24.27: Flint by type from tree-throw 425005

		Context:		
Category:	Sub-category:	425003	425004	Total:
Flake/broken flake	Primary	6	1	7
	Secondary	10	3	13
	Tertiary	2		2
	Unclassifiable waste	14	7	21
Bladelike flake	Secondary	1		1
	Tertiary		1	1
Chip	Chip	17		17
Core/core fragment	Multi-platform flake core	1	1	2
	Single platform flake core	1		1
Nodule	Partially worked nodule	1		1
Retouched flake/blade	Retouched flake	2		2
Total:		55	13	68

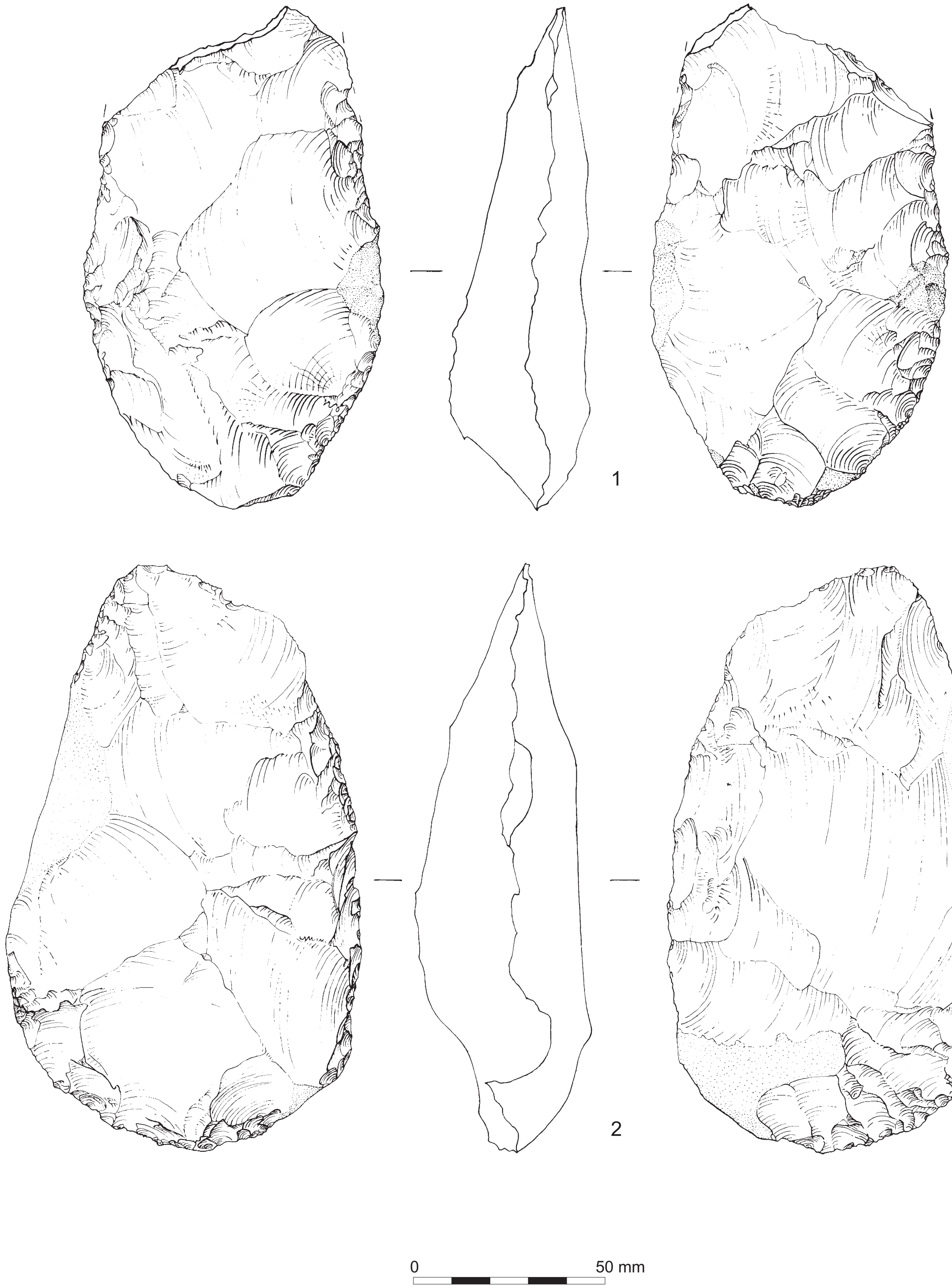


Figure 24.1: Selected flint (details in the catalogue)

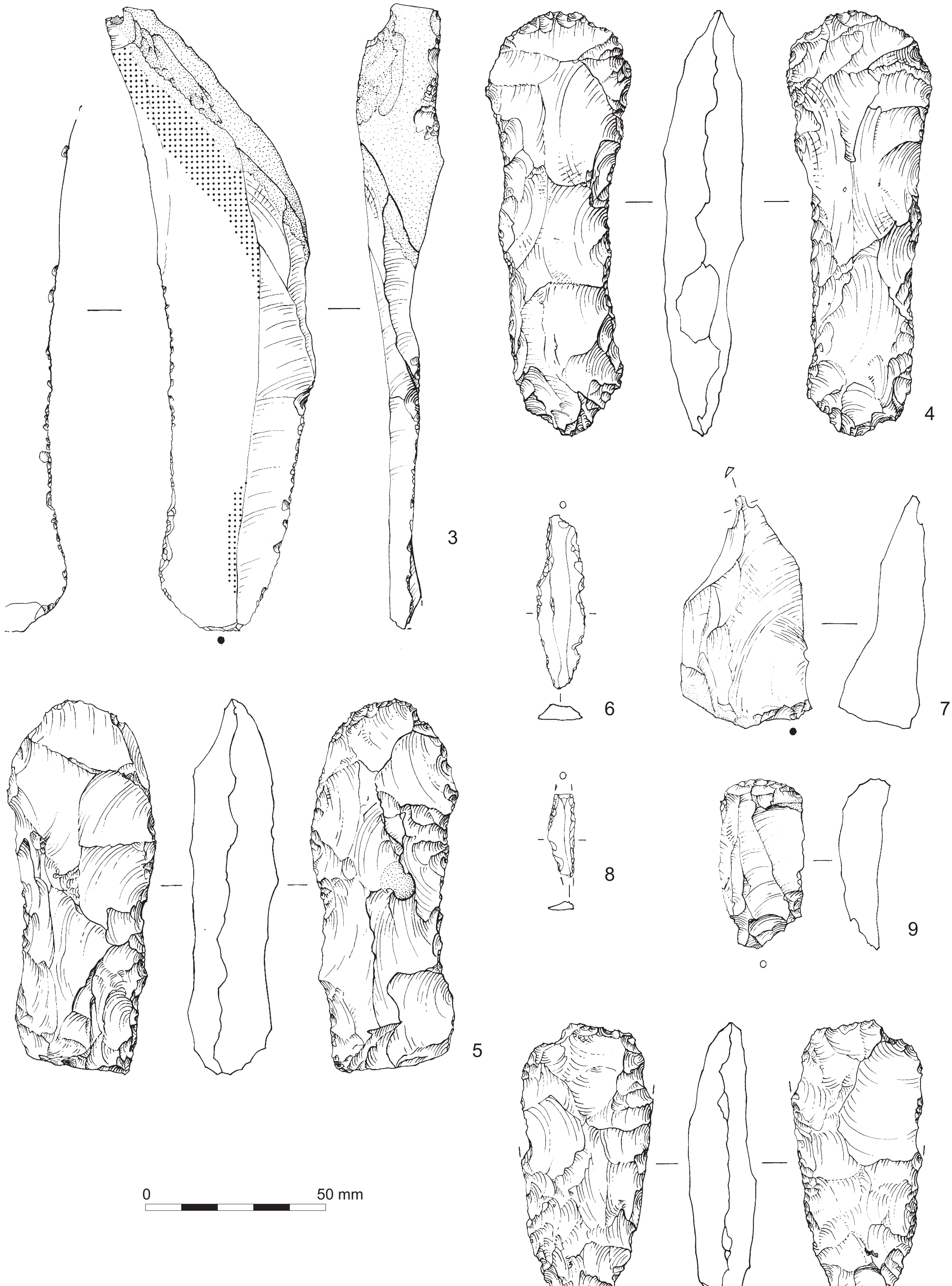


Figure 24.2: Selected flint (details in the catalogue)

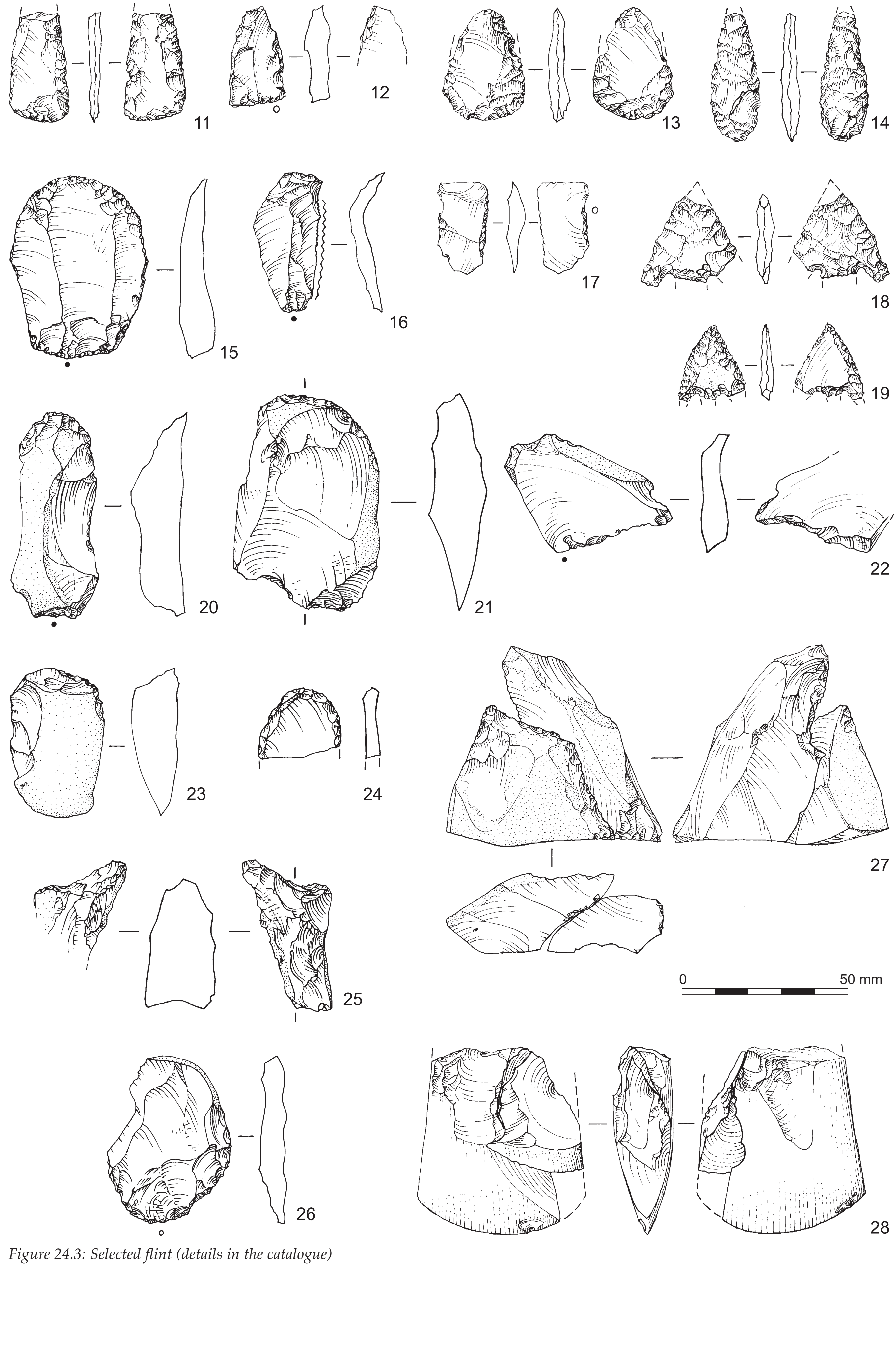


Figure 24.3: Selected flint (details in the catalogue)

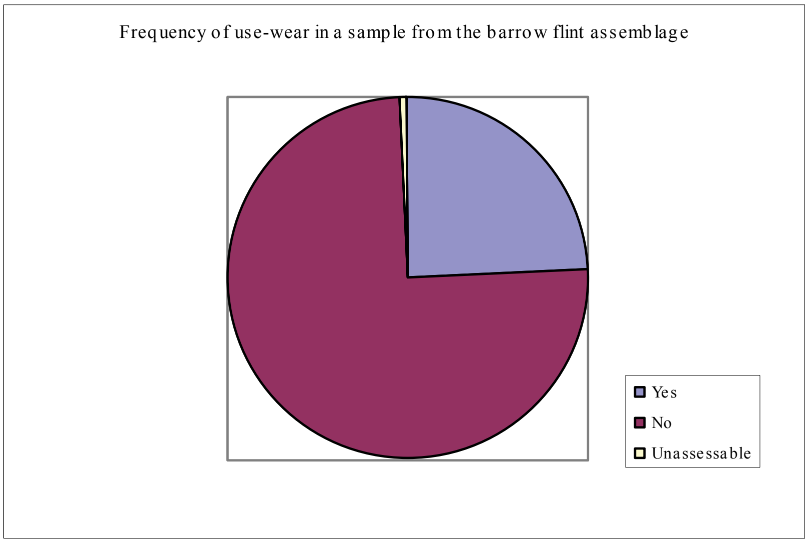


Figure 24.4: Frequency of use-wear in a sample of flint from the barrow

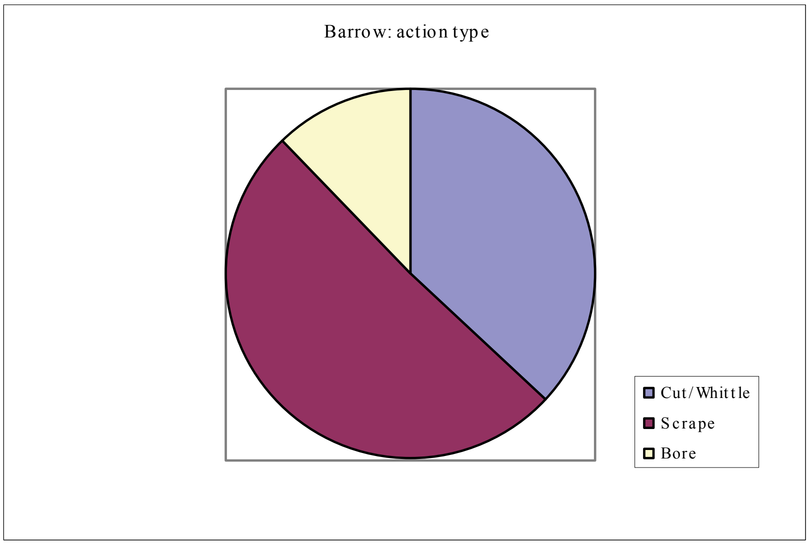


Figure 24.5: Barrow: action type

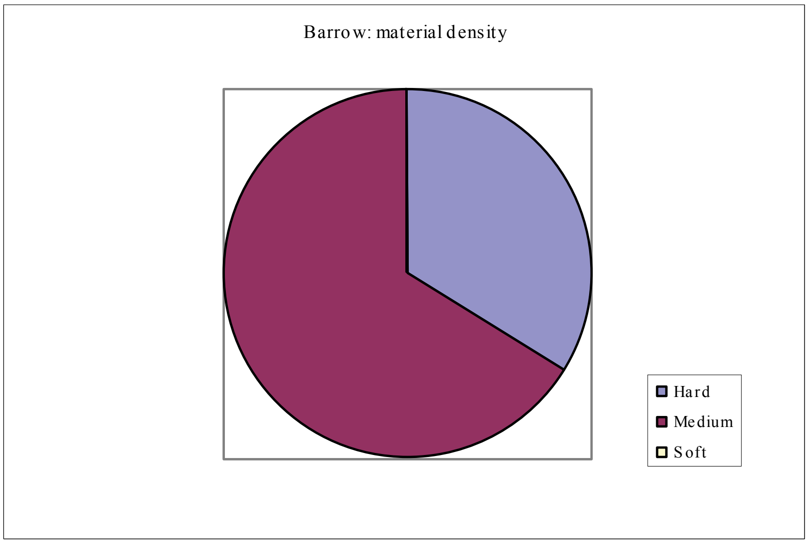


Figure 24.6: Barrow: material density

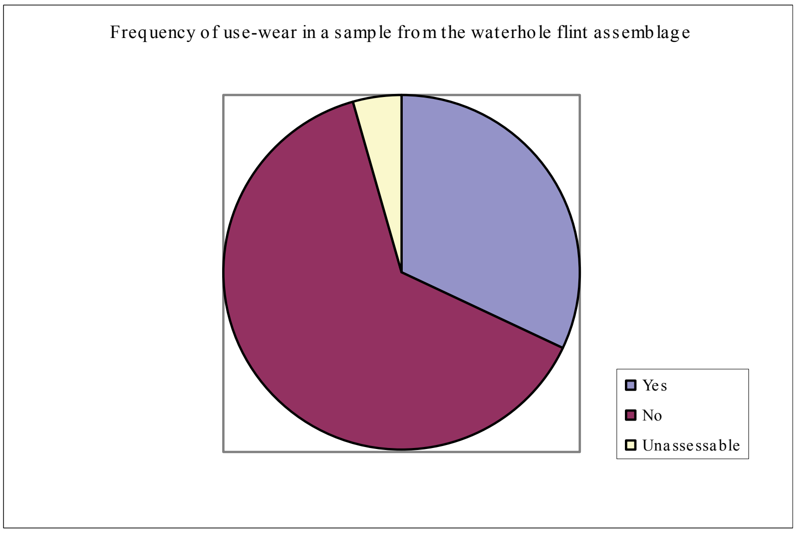


Figure 24.7: Frequency of use-wear in a sample from the waterhole

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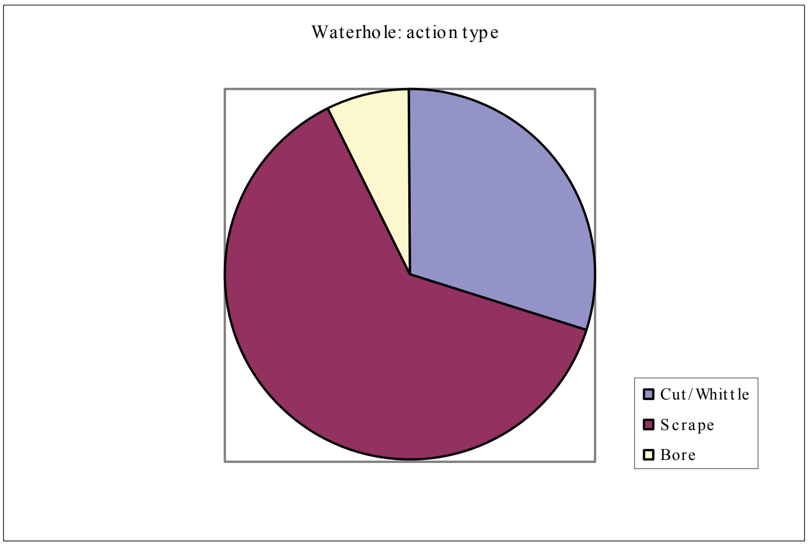


Figure 24.8: Waterhole: action type

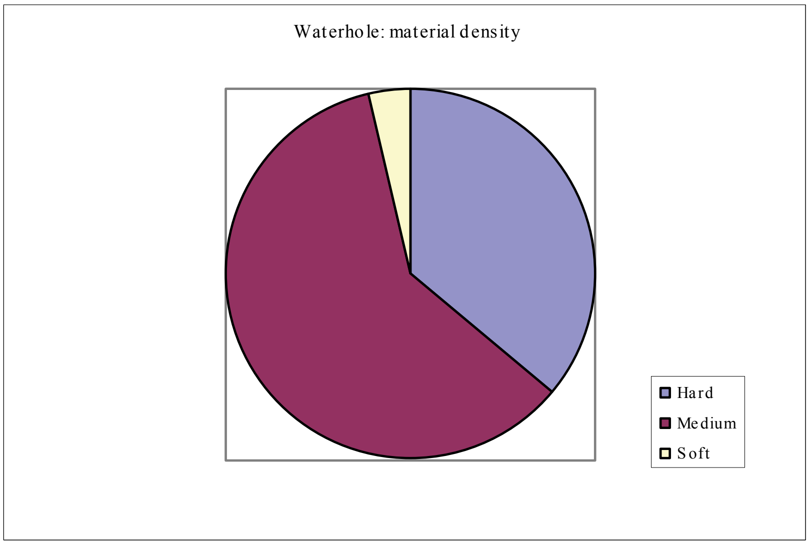


Figure 24.9: Waterhole: material density

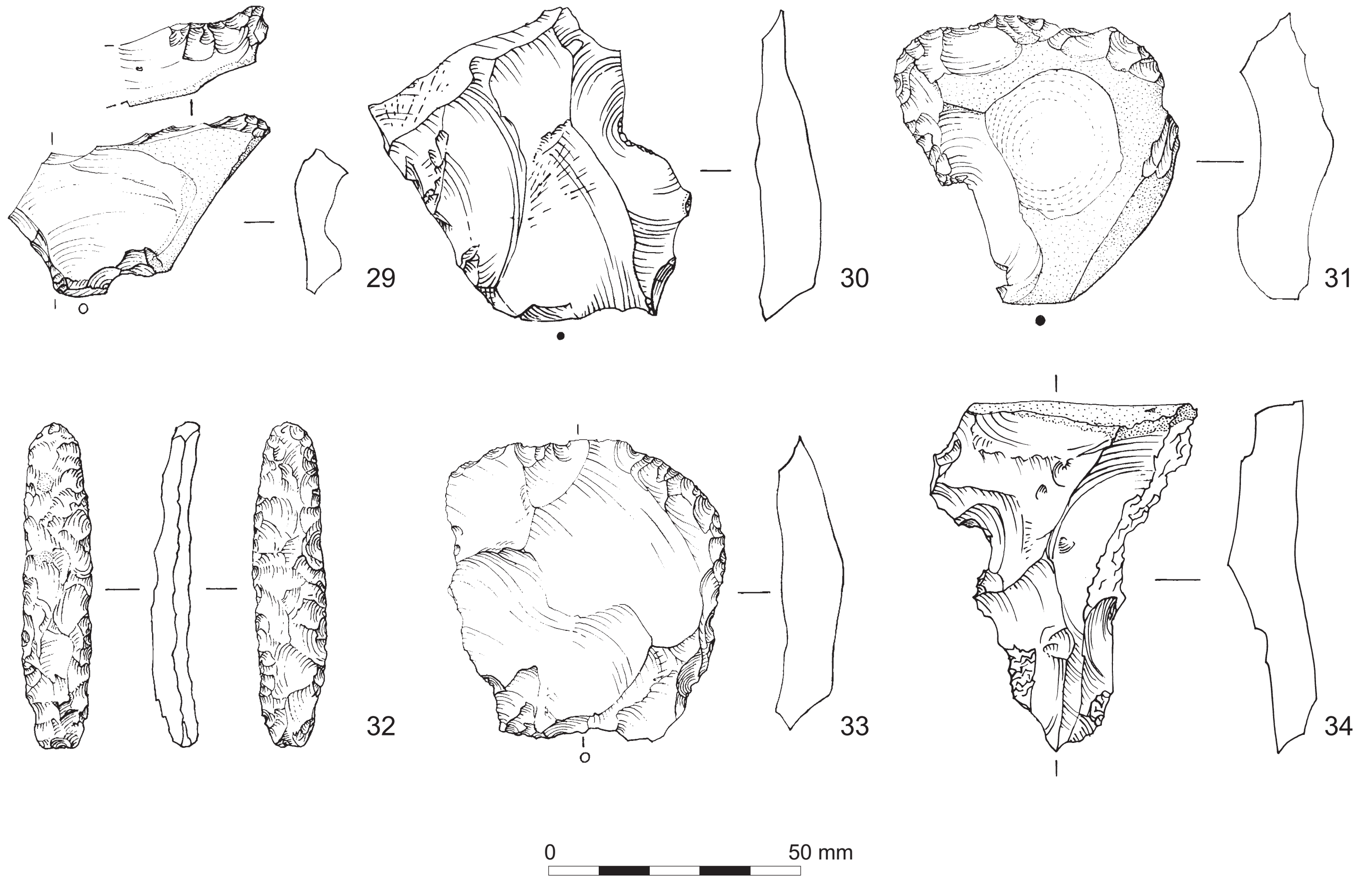


Figure 24.10: Selected flint (details in the catalogue)

CHAPTER 25

Worked stone

by Ruth Shaffrey

25 Worked stone

Ruth Shaffrey

A total of 85 stone objects was recovered from all phases of activity at Stansted; a summary of these is provided in Table 25.1 and selected artefacts are illustrated in Figure 25.1. Approximately two thirds of the worked stone (68%) was used for corn grinding, starting with saddle querns, and progressing to rotary querns, millstones and mortars. There are also eight hammerstones, seven whetstones and 12 miscellaneous items including two polishing stones (probably pot burnishers), two spindlewhorls and one Roman weight. These are discussed according to each major period.

Early prehistoric

A single probable hammerstone was found in an Early Neolithic tree-throw (429001 fill of 429002). This utilises an unusual type of Hertfordshire Puddingstone, very different to the variety used during later phases, with this specimen being formed of grey pebbles in a grey matrix. It is presumably from a different source, although it has not been possible to pinpoint where.

Bronze Age

A total of twenty worked stone objects were retrieved from Bronze Age contexts. These include eight rubbers, six hammerstones, two grinding stones, two probable quern fragments, one point sharpener and one item of unknown function. A limited range of lithologies were utilised, mostly fine grained quartzitic and sometimes micaceous sandstones, all probably acquired locally. The majority of these are types of Tertiary sandstone, which occurs just to the north of the airport (Ellison and Zalasiewicz 1996, 93) and which was used in particular for saddle querns and rubbers. Quartzite and vein quartz pebbles from the nearby boulder clay (Millward *et al*. 1987, 35) were also used for hammerstones and a single quern fragment is made from Hertfordshire Puddingstone.

The saddle quern of Hertfordshire Puddingstone particularly stands out because it is a lithology more commonly utilised for rotary querns during the early Romano-British period and saddle querns of it are hitherto unknown from contexts of Bronze Age date. Only a few saddle querns of Puddingstone have been found in Essex in any period (Major pers. comm.; Buckley and Major 1995, 72), and all are from Iron Age or later dated contexts. They include only one from Little Waltham (Drury 1978, 112), and two probable examples from Boreham, near Chelmsford (Tyrell 1999, 19) and Woodham Walter (Buckley and Hedges 1987, 16).

Saddle querns of all lithologies, not just Puddingstone, are rare finds in Essex and the majority are of Greensand from the southern part of the county (Buckley 1988, 73-4). Twelve fragments were produced in previous excavations at Stansted but all were small and could just as easily have been from rubbers as saddle querns (Major 2004a 34). The presence of two other saddle quern fragments from later contexts and probably of prehistoric origin (although not necessarily Bronze Age), are therefore of interest. There is one from a late Romano-British context (primary fill of ditch

335024) and one from topsoil (424001). The latter appears to have been made from a boulder but has a grinding surface prepared by pecking, while the former has a concave grinding surface that has been worn smooth through use.

Other Bronze Age finds include six hammerstones all utilising quartz and quartzite pebbles which were discarded in pits (2604, 309066 (Fig. 25.1, no. 9), 3204, 322014 and 345052) and a point sharpener from a Middle Bronze Age fill of waterhole 302001. This has been used on two faces (Fig. 25.1, no.1) but it is not a shaped artefact and makes use of a rough piece of stone. Six items, all either rubbers or grinding stones, were found in placed deposits; five were in 334063 (fill of 334059) and one was in 316086 (fill of 316085). The condition of none is remarkable, which makes their deliberate deposition rather puzzling and it is likely that they were of minor significance in relation to other deposited items.

Iron Age

Only four rubber fragments were recovered from Middle Iron Age contexts. No noticeable change was visible in the exploitation of stone from the Bronze to the Iron Age: the same lithologies continued to be used. The presence of rubber fragments indicates that domestic food preparation was taking place although no saddle quern fragments were recovered.

Seven objects were recovered from Late Iron Age contexts, including three quern or rubber fragments, two whetstones, one pot burnisher and one incised chalk fragment. The three quernstones are made from micaceous sandstone, Greensand and Hertfordshire Puddingstone; the latter being the only definite rotary quern. Two unworked fragments of Puddingstone were also found (140029 and 431039) and since Puddingstone had to be imported to the site, these fragments either represent broken up querns or waste from quern production/repair. The presence of a Puddingstone rotary quern in a late Iron Age/early Romano-British context (433025, intervention 433020, ditch 433033) is unusual, as few rotary querns of any material have been found in certain pre-Roman contexts in Essex (Major 2004d, 135). Evidence for the Iron Age use of Puddingstone has been seen only at Ivy Chimneys (Buckley and Major 1999, 115). The presence of Puddingstone at Stansted is perhaps less surprising given its Bronze Age use, however, for it continues the same patterns of exploitation.

The early use of, and familiarity with, Puddingstone at Stansted might also help explain why there is evidence for the early use, and possibly manufacture of, rotary querns in general at the site. The presence of a stratified pre-Roman rotary quern compliments one recovered during previous excavations at Stansted (Major 2004d, 135) and further evidence for the Iron Age use of rotary querns here is also suggested by a complete Greensand rotary quern (SF 103; Fig. 25.1, no. 4). This was unfortunately recovered from the ploughsoil on the LTCP site, but it is of the same design as rotary querns known to be of Iron Age date, such as one seen at Ivy Chimneys, Witham (Buckley and Major 1999, 115) and it is therefore very likely to date to this period.

Stone was utilised on the site for more than just grinding and two whetstones were also recovered. One of these is a secondary whetstone (Shaffrey in prep); it made use of a large slab of stone which now has a worn surface and it is of a type probably used for the sharpening of smaller blades (Parkhouse 1997, 419). The second whetstone is of some note. It is a complete primary whetstone of an unusual flat diamond shape with a small piercing in one of the corners (Fig. 25.1, no. 7). It was mostly utilised across the face but the edges are also worn indicating that it was used for the sharpening of a number of different tools. The piercing suggests it was suspended from a tool belt and it was probably a personal belonging rather than from a workshop, hence its inclusion in the deliberate backfill of a cremation (151005 fill of 151004). A single polishing pebble, probably a pot burnisher, was also found in a placed deposit, this time in a ditch fill (439050, intervention 439047, ditch 433054). A small fragment of chalk, found in 439048 (intervention 439047, ditch 433054, Fig. 25.1, no. 2), appears to have been deliberately incised in a similar way to a number of chalk pieces found in various contexts at Avebury (Smith 1965, 134 and fig 57).

Romano-British (including Late Iron Age/ early Romano-British transition)

A total of 23 stone items were retrieved from Romano-British or late Iron Age/Roman contexts. These include two possible whetstones, four rubbers, fragments from four millstones and six rotary querns, one saddle quern, two indeterminate quern fragments, one probable spindlewhorl or personal ornament, one hammerstone and one weight. A variety of lithologies were exploited and alongside the locally available quartzites, chalk and Tertiary sandstones of earlier phases, it is during the Romano-British period that imported stone first appears at Stansted in the form of lava and Millstone Grit. Both materials were extensively imported to the region at this time and it is therefore no surprise to find them at Stansted. The more local stones such as the Tertiary sandstones continued to be utilised, in particular finer grained varieties, which were found to be suitable for whetstones.

Rotary querns and millstones

All the grinding equipment was recovered from the fills of ditches, gullies and pits. Of the ten probable rotary querns or millstones, six are made from Millstone Grit (plus the two indeterminate fragments), three are made from Niedermendig lava and one is made from Hertfordshire Puddingstone. Lava fragments were found in three contexts (347019, 6309 and 323014); they are all very weathered fragments so it is difficult to be sure precisely how many querns they formed originally, but they are few in number and three querns therefore seems plausible.

Millstone grit was used for half the rotary querns and all the millstones and appears to have been the material of choice for grinding at Roman Stansted. Millstone Grit was utilised in some form on the majority of sites in Essex and was the dominant material on others nearby including Church Langley, Harlow (Medlycott 2000, 61). Whether the predominance at Stansted is due to actual patterns of use, or to patterns of survival, is difficult to say, but as the lava fragments are all very weathered, it would be inadvisable to read too much into the numbers retrieved.

Technology

Six potential millstones were recovered from both the MTCP and LTCP sites. Of these, three are only tentatively identified as such – they are very thick but their diameters are indeterminate and it is therefore possible (but unlikely) that they could be thicker than usual rotary querns. Two millstones are of small to average size (600-750 mm in diameter) and late Roman in date, having been recovered from late Roman enclosure ditch 143007 (context 143007, intervention 143001 and context 152005, intervention152001) while a third is of similar size (SF 1046) but unstratified. Interestingly, having been imported to the site from Derbyshire, the two Roman millstones imitate the lava querns in having a raised kerb around the upper outer rim – a purely stylistic and non-functional feature (SF 362 Fig. 25.1, no. 8). Millstone Grit querns with kerbs are unusual but there are other examples from Essex including Stebbing Green (Major 1999, 17) which is close to Stansted (see Major 2003, 87 for a review of these). It may be that there was more imitation in the eastern counties closest to where lava querns entered the country.

The presence of millstones at Stansted suggests a fairly substantial Roman settlement with some kind of centralised organisation and the difference in millstone size indicates the presence of more than one mill (whether simultaneous or sequential is impossible to say). No structural evidence for mills was found at either site, but two small watercourses which traversed the site (Pincey Brook and the Stansted channel) might have provided the water to operate a mill if animal power were not used.

Other worked stone

Amongst the Late Iron Age/early Roman assemblage are eleven other stone objects including some material which is likely to be residual from earlier phases of activity such as one saddle quern (from the fill of late Romano-British ditch 344052 (intervention 335024) and four rubber fragments. There are also two whetstones of the tertiary sandstone used during the prehistoric period. Both whetstones utilise existing slabs of stone, rather than being primary whetstones shaped to serve that purpose. This is in keeping with the rest of the county which has produced very few primary whetstones (Major 2003, 88).

The other items of worked stone include a possible palette and a chalk spindlewhorl (SF 879, not illustrated). The palette is not a shaped stone but is a flat slab that appears to have been utilised. A small flat-bottomed bun-shaped object (SF 26; Fig. 25.1, no. 6) retrieved from the secondary fill of late Romano-British ditch 306165 (context 6526, intervention 6525) is probably a weight. It resembles almost exactly an object found in a Romano-British context at Little Waltham (Drury 1978, 112 and fig 65) which was also interpreted as a weight and another similar but more crudely fashioned weight from an Iron Age context at Birdlip in Gloucestershire (Parry 1998, 61). The example from Stansted weighs 155 g but is slightly damaged and in its complete form would probably have weighed the same as half a Roman libre (168 g, Parry 1998; Frere 1972, 160).

Medieval and post-medieval

The bulk of the medieval worked stone assemblage consists of rotary quern fragments, all of lava and mostly very fragmentary. These were retrieved from nine contexts, mostly pit and ditch fills, though some fragments were also found in hearth 324002. This sole use of lava for rotary querns fits well with the evidence from previous excavations at Stansted and in the county as a whole, which have shown that in Essex medieval rotary querns are, almost without fail, made from Lava (Major

2004g, 397). In addition, there is a single small perforated object (SF 255, Fig. 25.1, no. 5) which may have been a spindlewhorl or, as it is rather irregular in shape, a piece of personal ornament.

The post-medieval worked stone assemblage is small but comprises two rotary querns, one whetstone, one mortar and one probable pot burnisher. Both rotary querns are made from Niedermendig lava; one was found in a midden layer (457014) and the other in the backfill of ditch 449089 (459016, intervention 459014). Both were well used but had been finely grooved on the grinding surface. The whetstone is in three fragments (having been broken in antiquity but deposited together in the deliberate backfill of construction cut 461038) and is made from a probable Greensand (Fig. 25.1, no. 3). It is a long rod type with square cross-section which has been worn to rounded edges through use. The probable pot burnisher was found in the fill of ditch 326081 (intervention 309133), where it may have been redeposited from an earlier phase; it is not worked but is a well rounded pebble, used sufficiently to create polish on one surface.

A single Purbeck Marble mortar (SF 1379, Fig. 25.1, no. 10) was found in the cessy fill of a garderobe at the hunting lodge (LTCP), reinforcing the suggestion that this was a fairly high status establishment. A second (Jurassic limestone) mortar is unphased but utilises the same stone type as a single fragment of building stone, which may be part of a post-medieval doorway or porch. None of the post-medieval worked stone is unusual either in the types of objects retrieved or in the material used.

Discussion

The excavations at Stansted have produced a broad range of worked stone artefacts from all periods. These provide evidence of domestic activities including food preparation (querns, rubbers, palette and mortars), industry (whetstones, pot burnisher, hammerstones, a weight) and personal belongings (a possible pendant for a necklace).

The main lithologies utilised at Stansted were Tertiary and other sandstones along with Greensand, Lava, Millstone Grit and Hertfordshire Puddingstone. The patterns of use varied with time as some lithologies came in or out of use. Hertfordshire Puddingstone, for example, appears to have been used sparsely but throughout all the earlier periods of occupation with worked pieces from Bronze, Iron Age and Roman contexts. Additional unworked fragments were also found, suggesting that the stone may have been brought to the site as a raw material and worked there, rather than finished objects being acquired. The recovery of stratified saddle querns of Hertfordshire Puddingstone from Bronze Age contexts and of rotary querns from Iron Age contexts are of particular interest as the latter are rare and the former are hitherto unknown.

It is difficult to be sure of a precise source for Hertfordshire Puddingstone as it can be found in many locations, both as outcrop and in the form of glacial erratics and although it was known locally, near Bishop’s Stortford (Potter 1998, 290), it occurred mainly between Chesham and Ware (Ellison and Zalasiewicz 1996, 106). With the exception of one Mesolithic or Neolithic fragment which differs, the type of Puddingstone found at Stansted is consistent throughout all periods, a cream coloured matrix containing dark flints with iron stained rims. This type is very similar to that found at nearby excavations along the route of the A120 (Shaffrey 2007) and it seems likely that the stone came from a similar source.

In contrast to the Hertfordshire Puddingstone, Niedermendig Lava was first introduced to the region during the Romano-British period and appears in all subsequent phases, either as identifiable rotary querns or more commonly in the form of small weathered fragments. All the identifiable querns are from medieval or post-medieval contexts but at least one is of Roman design (301001) and is therefore probably residual. Lava is a material that is easily broken down by weathering so it is not unusual to find only small fragments as evidence that rotary querns of it existed. Other materials appear to have been utilised at more specific times, notably the Millstone Grit which was only found in Roman contexts.

In general, the types of stone utilised at Stansted are comparable to other sites in the vicinity although the evidence for the early use of Hertfordshire Puddingstone is of particular interest. The technological range of artefacts is broad and includes items of high status (the Purbeck Marble mortar) and unusual finds such as the stone weight. In addition, the assemblage indicates the high significance and long tradition of food preparation in the area (ie flour production) starting with rare finds of stratified Bronze Age saddle querns and progressing to unusual finds of early rotary querns. This theme continues with the recovery of a number of millstone fragments indicating central organisation and management.

Catalogue of illustrated worked stone objects

1. MTCP (BAAMP00), context 302004, Point sharpener
2. M11 (BAALR00), context 439048, Worked fragment
3. LTCP (BAACP01), context 461027, Two whetstone fragments
4. LTCP (BAACP00), context 101001, SF 103, Complete upper rotary quern
5. FLB (BAAFL00), context 401013, SF 255, Possible spindlewhorl
6. MTCP (BAAMP99), context 6526, SF 26, Weight
7. LTCP (BAACP00), context 151005, SF 356, Pierced whetstone
8. LTCP (BAACP00), context 143006, SF 362, Two fragments of upper millstone
9. MTCP (BAAMP00), context 309067, Hammerstone
10. LTCP (BAACP01), context 447012, SF 1379, Mortar rim fragment

Appendix 1: thin section

A medium-grained, moderately well sorted quartz sandstone mainly comprising polycrystalline quartz, feldspars and clays. It has been subject to pressure solution and compaction with the result that it has very low porosity and deformed mineral edges. It is largely cemented with clay, some of which has formed from the weathering of feldspars; the remaining feldspars are mainly orthoclase with some plagioclase. Rarer minerals include microcline feldspar, muscovite and a ?hornblende; there are also very few rock fragments. The combination of the pressure solution, high clay but low haematite and rock fragment content, along with the presence of microcline, mean this is not a fragment of Old Red Sandstone from either South Wales, the Wye Valley, Portishead or the Mendips (Saunders 1998). It seems most likely that it is Millstone Grit but it is not an absolute identification without detailed microscopic study of Millstone Grit.

Table 25.1: Summary of stone artefacts by period

Phase	**Grinding**	**H/stone**	**W/stone**	**Other**	**Other type**	**Total**
Early prehistoric		1				1
Bronze Age	12	6	1	1	Unknown	20
Iron Age	7		3	2	1 pot burnisher, 1 incised piece	12
LIA-ERB	4		1	1	Palette	6
Romano-British	14	1	1	2	1 spindlewhorl, 1 weight	18
Medieval	10			1	1 possible spindlewhorl	11
post-medieval	3		1	2	1 pot burnisher, 1 architectural	6
Unstratified	8			3	3 unknowns	11
	58	8	7	12		85

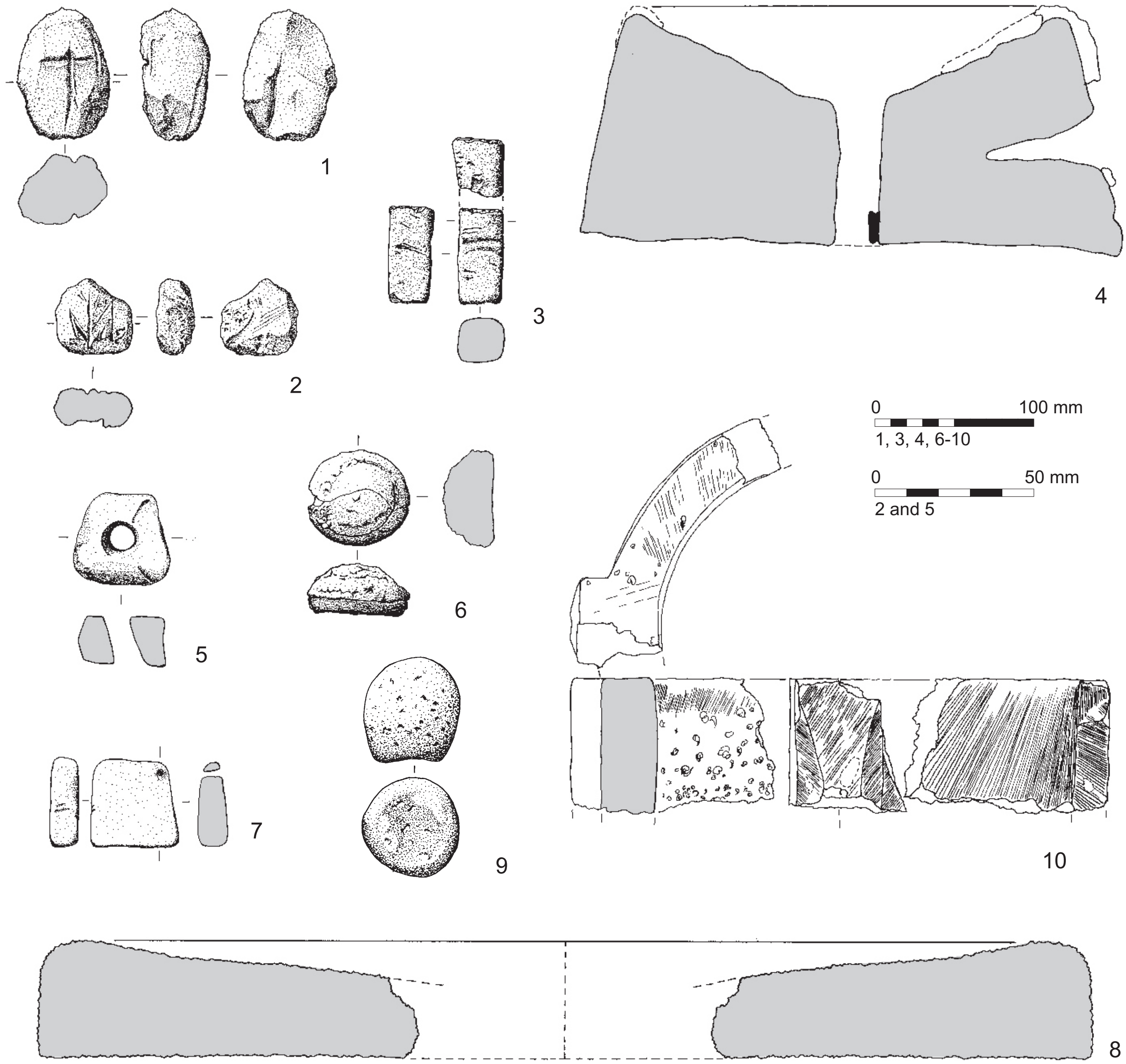
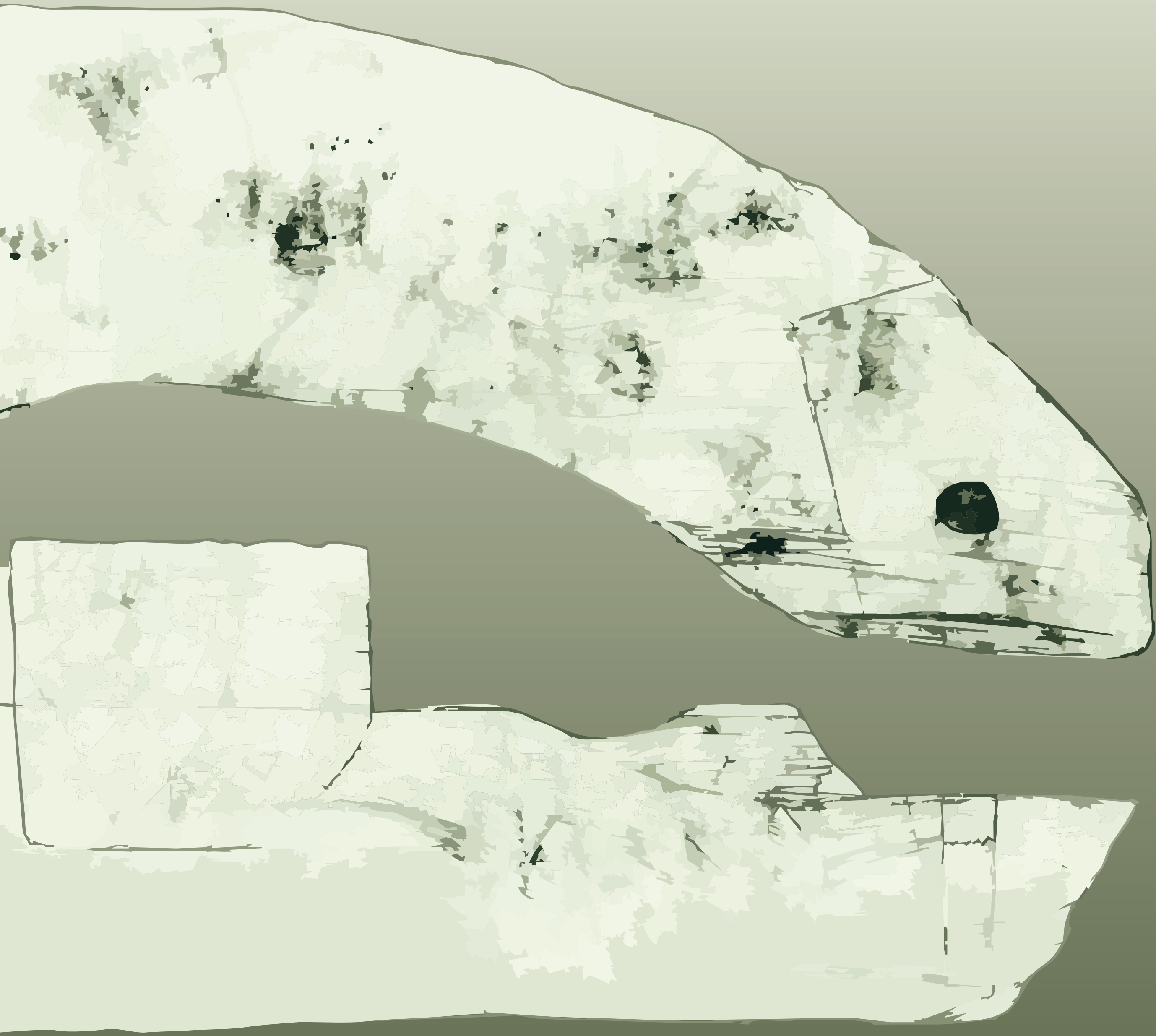


Figure 25.1: Selected pieces of worked stone (details in the catalogue)

CHAPTER 26

Worked wood



by S J Allen

26 Worked wood

S J Allen

Methodology

The author was asked to report on an assemblage of material recovered by Framework Archaeology from excavations in advance of construction work in and around Stansted Airport, Essex. The material in question had been excavated and placed in temporary packaging awaiting assessment and study. An assessment and list of the timbers had previously been prepared and prior to the assessment, some pieces had been looked at and may have been discarded. So far as is known, all of the remaining assemblage has been available to study.

The artefacts from the assemblage had generally been individually wrapped in finds bags, usually double wrapped and often with thin black polythene bin liners around them. In some cases thick black plastic sheet has been used for the larger timbers. All had been secured with adhesive tape. Occasionally, more than one timber had been packed in the same bag and there were some instances where it could not be determined whether a bag contained one piece of wood broken up in transit or several separate pieces of wood had gone into the same bag.

After delivery to the Wet Wood Laboratory in York, each bag was in turn opened, emptied and the contents washed under cold running water. Each piece was recorded and sampled for species identification, then returned to its original packaging for return to Oxford or for further work. Some objects whose packaging had disintegrated whilst being unwrapped were repacked freshly in Layflat polythene tubing.

Little if any of the wood had been cleaned prior to arrival in York and it can be said therefore that its recorded condition fairly reflects the condition when it was excavated. Little sign of deterioration was evident and only occasional signs of modern excavation damage. Overall the wood was in a good state of preservation and it may be concluded that waterlogged anoxic conditions had been maintained in all contexts in which wood was found, up to the time of excavation.

Species identification was carried out on an item by item basis. Each sample was examined in transverse, radial longitudinal and tangential longitudinal sections under a microscope; all species identifications follow Schweingruber (1982). All identifications carried out in this way are incorporated into the database using their scientific names.

The records consisted of hand written notes supplemented where necessary by pencil sketches. These records were then summarised where necessary and added to a database created in Microsoft Access which forms part of the site archive.

Species and Common Names. Most of the wood can only be identified to a particular genera. Although, for example, there are many different species of willow, their wood cannot be differentiated. The following list gives the common names of the scientific identifications used in this report and the database.

Acer campestre L.	Field Maple
Alnus spp.	Alder
Frangula alnus Mill.	Alder Buckthorn
Fraxinus excelsior L.	Ash
Quercus spp.	Oak
Salix spp.	Willows
Ulmus spp.	Elms

Summary of assemblages

Bronze Age- the M11 (BAALR00) and MTCP sites (BAAMP00)

Waterlogged wood was recovered from two sites with Bronze Age dates - the ring ditch of barrow 324078 at the MTCP site (various primary and secondary deposits) and a waterhole or well on the M11 site.

The wood from the barrow ring ditch may be divided into the wood from the primary ditch fill, the wood from the secondary ditch fills and the wood (316126, 320132) from the fills of cuts through the ring ditch. The earliest material from the primary ditch fills consists of elm and field maple heartwood chippings (320114) and alder heartwood chippings and field maple roundwood fragments and chippings (320117). All of these have eroded surfaces and only the fragment of alder has any indication of charring. It may be presumed that this material derives from light woodworking taking place in the vicinity and is unlikely on its own to have formed a placed deposit.

The wood from the secondary fills indicates some burning nearby with charred oak offcuts (309240, 320151) and fragments (309243, 309246). A small group of oak timbers with a single piece of field maple (320133, Fig. 26.1, no. 2) may be the remains of some sort of burnt structure but no indication of any joints, fixings or fastenings survive which would confirm this. In fact all of the recovered wood from these secondary fills is burnt, perhaps representing some clearance of a nearby wooden structure.

Wood from the fills of ditches cutting the ring ditch consists of willow heartwood chippings (316123) and unidentifiable bark chippings (320132) with no indication of burning. This would seem to emphasise the significance of the burning episode.

The wood from the waterhole (434076) consists primarily of stakes and offcuts, which may be the degraded remains of stake tops. The stakes are likely to have been the remains of a revetting placed to retain the sides of the waterhole during its use. The best preserved of these (426034) was a very simple length of oak prepared from a halved piece of roundwood, with both opposing edges axe hewn to create a sub rectangular cross-section tip. Much of the remaining wood from this feature, including the fragment of withy tie (431036) (Fig. 26.1, no. 1), was eroded and would seem to have arrived in its burial context as waste or rubbish, emphasised by the presence of a stump of very knotty field maple (431038).

Post-medieval: the LTCP site (BAACP01)

In contrast to the wood from the previous two areas, much of this assemblage is clearly derived from structural timber. Two groups appear to be present.

The first is a tank lining of oak boards (448008, 448010-11, 448014 and 448019) and oak, ash and hazel stakes (448015-7) each with sub triangular cross-section section tips. All but one of the boards are radially faced, with very eroded surfaces, the exception being 448014, a tangentially faced board with faint marks indicating it was produced by through and through sawing. Nail holes suggest that some of the boards may have been nailed to the stakes rather than just being retained by them, or perhaps that the boards are reused.

According to the site records, associated with this group is a channel, built from a tangentially faced oak board to which are nailed a pair of tangentially faced oak rails, one along each edge. Erosion has removed any tool marks or technology. and the form of the junction with the tank is not known.

The second group of timbers (461028, 461030-35, 461040) is of great interest. Four curved elm timbers (461031-461033, 461040) are jointed together to make a roughly rectangular frame with curved edges, on which the brick lining of a well rested. A small stake (461035) may have been used to help anchor the frame but the remainder of the wood comes from the fill of this well. In addition to the occasional offcut and the discarded ends of two carpenters pegs (461034, 464051) this fill contained a pump tube in two parts, of which one (461030) was recovered (Fig. 26.2, no. 3).

Catalogue of selected artefacts

A number of the artefacts and timbers merit further comments. These are grouped here by date and object type.

M11 (BAALR00)

431036 Withy Tie. Six disarticulated strands from a withy tie. All strands "S" twisted and presumably plaited in a "Z" fashion. Form of tie no longer possible to reconstruct from the fragments. Strands 53-121 mm l, 11-12 mm dia. All cut from young shoots with two years annual growth present. All pieces *Fraxinus excelsior L.*

MTCP (BAAMP00)

320133 A. Length of quartered timber, no bark surviving. Slightly tapering along length, very heavily charred on all surfaces. Split longitudinally and broken up. 627 mm l, 65 mm w, 62 mm th. *Quercus spp.*

320133 B. Tangentially faced heartwood offcut. Slightly tapering. Wider end, most of one face and one edge heavily charred. 247 mm l, 93 mm w, 34 mm th. *Acer campestre L.*

320133 C. Length of box halved timber. Both ends hewn. Partially charred along one edge and one face. Very soft and decayed, surfaces eroded. 1,414 mm l, 102 mm w, 78 mm th. *Quercus spp.*

LTCP (BAACP01)

448014 Board. Tangentially faced with faint saw marks on both faces. Four 07 dia nail holes through face along intact edge, one with Fe nail present. Slight damage at each end, one edge broken away and missing. 544 mm l, 242 mm w, 24 mm th. Quercus spp.

461030 Wooden pump tube. Cut to approximate octagonal cross-section from Roundwood log, some sapwood remaining. Axial hole 57 dia. augered through length of log along axis of pith. One end hewn off square to axis of timber. Other end evenly tapered over length of 400 mm to a circular cross-section at tip. Rectangular socket 138 l, 97 w, 122 deep cut into face towards thicker end to intersect with axial hole. Remains of 9 nail holes unevenly distributed around periphery of socket. 1,656 mm l, 253 mm w, 227 mm th. *Quercus spp.*

461030 Bung or stopper. Roughly circular cross-section cut from roundwood. Exposed end hewn flat. Fixed into axial hole of water pipe 461030 and fastened there by a single square cross-section Fe nail driven through the end of the bung and into the wall of the tube. 75 mm l, 54 mm dia. *Salix spp.*

461031 Baseplate. Length of timber box quartered from a piece of straight grained trunk wood. Outer and inner edges hewn to curve along its length, ignoring trend of grain. Laid on face. Half lap housing cut into upper face at each end, one to engage with 461032, the other with 461040. Each housing pierced by single 24 dia through auger hole, one of which retains fragments of radially faced *Salix spp.* peg. 1.420 m l, 170 w, 160 th. *Ulmus spp.*

461032 Baseplate. Length of timber box halved from a piece of curving branch wood. Outer and inner edges hewn to curve along its length, following trend of grain. Laid on face. Half lap housing cut into lower face at each end, one to engage with 461031, the other with 461033. Each housing is pierced by a single 24 dia through auger hole, one of which retains the fragments of a radially faced *Salix spp.* peg. 886 mm l, 130 mm w, 105 mm th. *Ulmus spp.*

461033 Baseplate. Length of timber box quartered from a piece of straight grained trunk wood. Outer and inner edges hewn to curve along its length, ignoring the trend of the grain. Laid on face. Half lap housing cut into upper face at each end, one to engage with 416032, the other with 461040. Each housing pierced by single 24-26 dia through auger hole, both of which retain fragments of radially faced *Salix spp.* pegs. 1,068 mm l, 19 mm 0 w, 150 mm th. *Ulmus spp.*

461040 Baseplate. Length of timber halved from slightly curving branch wood. No bark present. Inner edge hewn to curve following trend of grain. Cleft surface uppermost in ground, laid on waney face. Half lap housing cut into lower face at each end, one to engage with 461031 the other with 461033. One housing pierced by single 25 dia through auger hole. Other lap housing broken through and missing the portion where any auger hole would have been located. 827 mm l, 165 mm w, 100 mm th. *Ulmus spp.*

461034 Tip of radially faced carpenters peg. One end has five cut facets creating a roughly hexagonal cross-section tip, with fine tool signatures present. Other end broken and missing. 146 mm l, 24 mm w, 23 mm th. *Acer campestre L.*

464051 Head and part of non refitting shaft from radially faced carpenters peg. Head shaped to roughly septagonal cross-section. Both pieces worn and eroded with much Fe mineral staining. Head 67 mm l, 28 mm w, 23 mm th; Shaft 97 l, 27 w, 22 th. *Quercus spp.*

Discussion

Bronze Age

The withy tie 431036 (Fig. 26.1, no. 1) is one of a class of artefacts which have become steadily better known in recent years, parts of plaited ropes prepared from young, pliable wooden shoots. Most of these finds to date are prehistoric, specifically Iron Age, though this find adds to the number of those known to be Bronze Age. It is unlikely that they all have the same function. Some are clearly used to fasten boat planks together (Ferriby, East Yorkshire - Wright 1990, 65), others are finds from waterholes where a boat connection seems less likely (Perry Oaks, Middlesex WPR98 - Allen 2001). To date, only one other example in ash has been recovered, from the Perry Oaks site (Allen 2001, SF 3319) a straight fragment of three strands. It is not possible to identify what the function of the tie under discussion here was, but it seems to have been discarded with waste material and probably represents an offcut rather that a finished artefact.

The significance of the burnt timbers from the secondary fills of the barrow ring ditch cannot yet be confirmed. All of the wood from these contexts, including up to sixty nine assorted fragments of roundwood was partially or wholly charred, unlike that from the earlier ditch fills and the fills of later cuts. It is tempting to associate these with the cremation rites as suggested in the Project design update (Framework Archaeology 2004, Note 2, section 3.2.12). They certainly have no structural function as found. Unfortunately there are no joints or technology which would indicate how these timbers might have fitted together.

Very little can be said about the woodscape of the period from this assemblage owing to its small size. Alder, ash, elm, field maple and oak were being exploited for timber and field maple, alder and alder buckthorn for small diameter roundwood but any method of exploitation or management cannot be determined. The assemblage reflects the presence of very localised waterlogged burial conditions on the site rather than the utilisation pattern of wood on and around the site and as such, can only hint at the activities taking place.

Post-medieval

Much of the wood from this phase was eroded and little can be said about the woodworking technology, especially where the boards, offcuts and stakes are concerned. It is evident that some timber framed construction work was taking place nearby. Normal practice in pegging a joint together was to prepare a peg much longer than the hole into which the peg was intended to be driven, drive the peg home, then trim off the protruding head and tip flush with the surface of the joined timbers. The two finds of carpenters' pegs are the waste from just such practice.

The base frame for the well lining is of considerable interest, not least in demonstrating that a brick lined well may have timber components at its base (Figs 26.2-3, nos 4-7). Unfortunately, though sapwood is present on the waney faces of some of the components, they are not suitable for dendrochronology. The carpentry is very straightforward, with four plates (two larger and two smaller) being joined to their neighbours by simple half laps fastened by single pegs. The shoulders on the laps of the two smaller elements 461032 and 461040 (Figs 26.2, no. 5 and 26.3, no. 7) were sawn and the waste hewn away. The stops on the laps of the larger elements, 461032 and 461033 (Fig. 26.3, no. 6), would not allow their shoulders to be sawn. Surviving marks show these were cut with a chisel or small hewing tool.

The frame appears to have been fastened together before being placed in the ground as the outer edges and some of the protruding ends of the laps have been hewn away with an axe of over 114 mm blade width, to avoid fouling the edges of the construction shaft for the well. The inner edges of the timbers have also been hewn, this time with an adze with a 65 mm blade width, probably to conform to the circular lining which was to rest above it.

All four elements were cut from elm. The pegs are, unusually, willow. Both species are traditionally thought of as having suitable properties for use under water. Similar frames have been excavated at the Bedern and 16-22 Coppergate, in York (Richards 1983, 169; Hall and Hunter-Mann 2002, 749), Scale Lane/Lowgate, Hull (Armstrong 1980, 31) and Tarring, Sussex (Barton 1963, 30). The Bedern example is of early 13th-century date and, as at Stansted, employs two larger curved timbers (both reused) joined by single pegged halved lap joints to two smaller curved timbers cut from naturally curving branch wood. These pieces were oak and overall slightly lighter than the Stansted timbers, perhaps because the lining the Bedern frame supported was composed of coopered vessels rather than brick. At 16-22 Coppergate a stone lined well of c1500 rested on a rectangular frame of reused oak timbers. The Hull find dates from the late 14th/15th centuries and is more irregular, made up from five timbers in a horseshoe plan with the brick lining resting on top. The form of the pegged joints used and the type of wood is unclear from the published account. The Tarring find is a rectangular frame supporting a stone lining and dates to the late 15th or early 16th centuries. Unfortunately, no other details of its form were recorded.

The final timber to be discussed is the pipe from a water pump associated with the well (Fig. 26.2, no. 3). Water pipes, particularly in the early post-medieval period are often fashioned from hollowed roundwood logs, usually elm, shaped to fit together end to end to provide a continuous conduit. Though similar, the Stansted example is cut from oak and is the lower end of a pump, rather than a pipe. One end is cut square to the axis and would not fit to a neighbouring pipe section. A willow bung has been nailed into the open end of the tube to prevent the ingress of water. Finally a rectangular socket has been cut into one face, 102 mm from the stoppered end, deep enough to intersect with the tube. This socket would allow water to enter the tube and be drawn up by the pumping machinery whilst keeping the entry point for the water above the base of the well where silt and debris might otherwise have clogged the tube. The nail holes present around the periphery of the socket indicate the former presence of a filter plate, a perforated lead or copper alloy sheet nailed in place to stop debris being sucked into the tube.

There are few excavated parallels for a pump tube of this date, though they are well known from documentary sources, especially those dealing with ship fittings and fixtures. A heavily rotted portion was found at Whitefriars Street Car Park, Norwich (Ayers and Murphy 1983, 11), of uncertain date; as such this is an unusual find and makes an important contribution to our knowledge of water handling.

Catalogue of illustrated worked wood (Figs 26.1-3)

M11 site (BAALR00)

1. 431036 Withy tie

MTCP site (BAAMP00)

2. 320133 B and C Two partially burnt timbers from secondary fill of Barrow ditch (third piece (A) was not illustrated)

LTCP site (BAACP01)

3. 461030 Lower part of wooden pump tube
4. 461031 Baseplate
5. 461032 Baseplate
6. 461033 Baseplate
7. 461040 Baseplate

Figure 26.1: Selected pieces of worked wood (details in the catalogue)

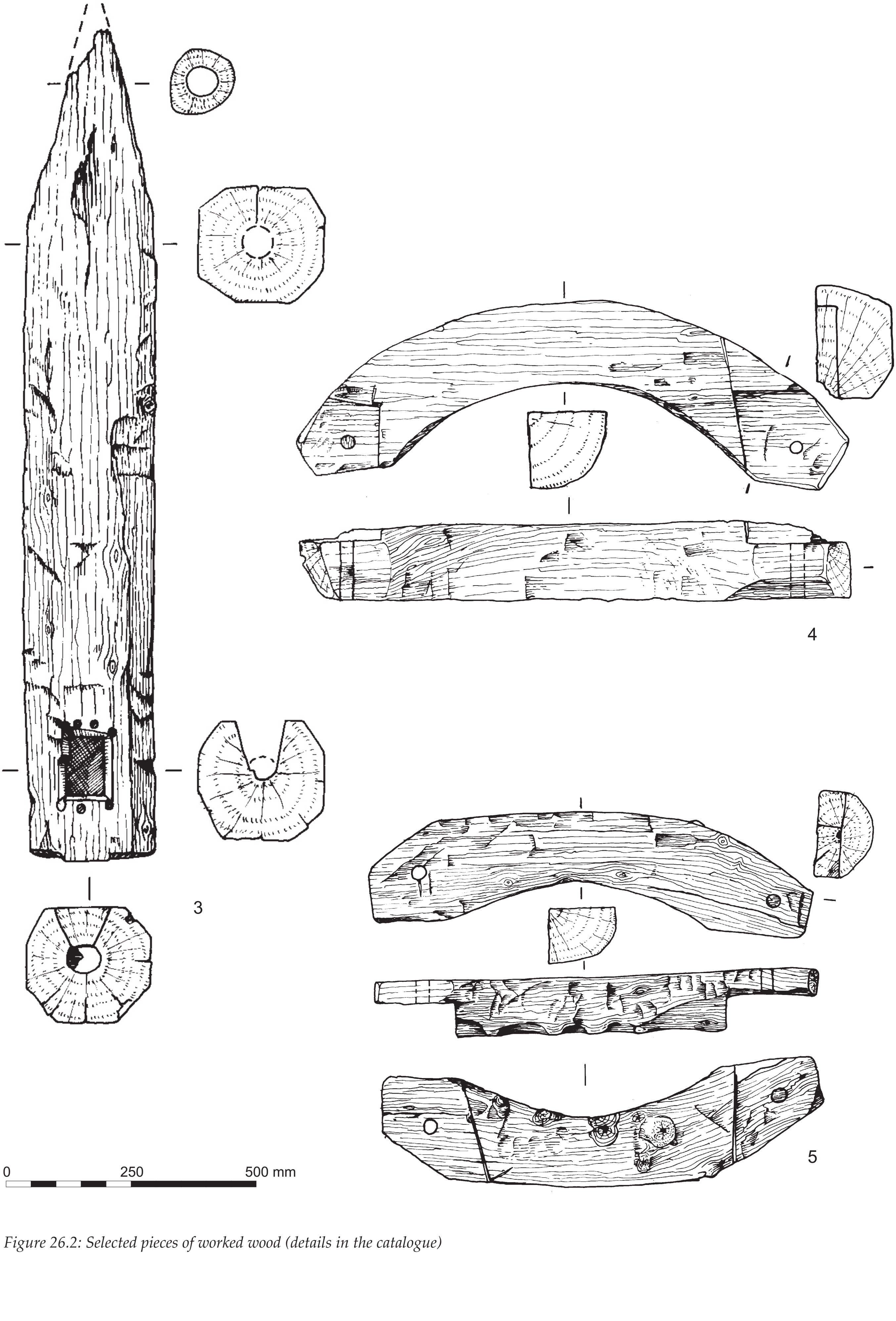
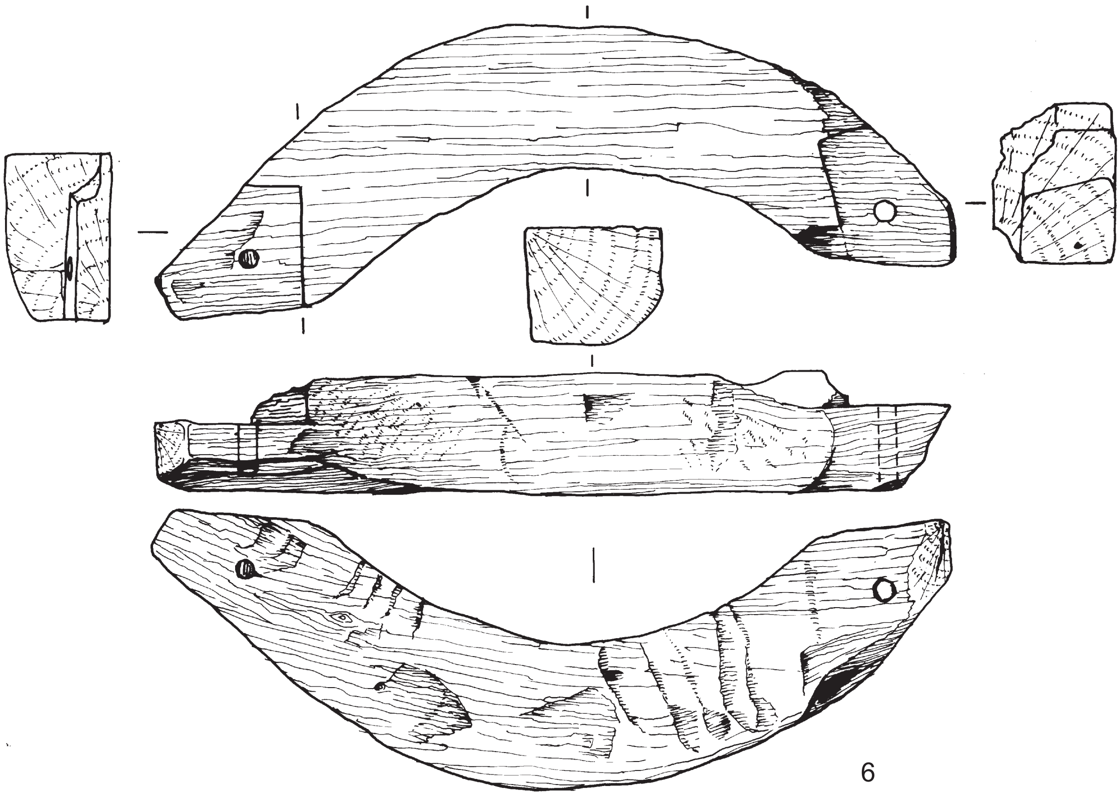
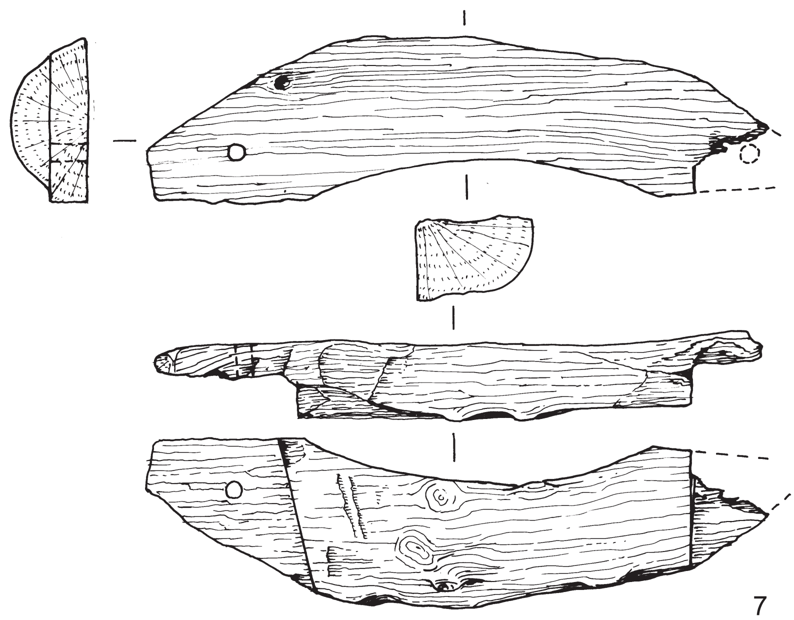


Figure 26.2: Selected pieces of worked wood (details in the catalogue)



6



7

0 250 500 mm

Figure 26.3: Selected pieces of worked wood (details in the catalogue)

CHAPTER 27

Cremated bone

by Jacqueline I McKinley

27 Cremated bone

Jacqueline I McKinley

Cremated human bone from 137 contexts was received for analysis, including 117 contexts from the MTCP site to the east of the present airport (BAAMP99 four contexts, BAAMP00 113) and 20 from the LTCP site on the west side of the airport (BAACP99 three contexts, BAACP00 17).

The deposits cover a broad temporal range from the Middle Bronze Age to the mid Romano-British period. All except one of the 46 Middle Bronze Age contexts were recovered from the MTCP site (Fig. 4.28), where most were associated with the ring ditch situated in the north-eastern area of the site; the one Late Bronze Age feature, also from the MTCP site, lay in an isolated position. The 21 Late Iron Age/early Romano-British contexts were split between the LTCP (12) and MTCP (9) sites (Figs 6.6-6.7, 6.16, 7.7-7.9, Plate 7.5). All except one of the 40 Romano-British contexts are from the MTCP site. Two other deposits, one from the MTCP site and one from the LTCP site, were undated.

The deposit types include 11 burials from the LTCP site and 28 from the MTCP site. Those from the former comprise the remains of four urned, five unurned and one burial of uncertain form, all of Late Iron Age/early Romano-British date, and one undated unurned burial. The burials from the MTCP site include 13 urned (two later Iron Age/early Romano-British, ten early Romano-British and one mid Romano-British), 10 unurned (two Late Iron Age/early Romano-British, seven early Romano-British and one mid Romano-British), and three of uncertain form (one Late Iron Age/early Romano-British and two early Romano-British). The categorisation of two other Late Iron Age and early Romano-British deposits is uncertain. The nature of the Bronze Age deposits is unclear but most included fuel ash and all were redeposited.

The fill of one grave (332014) from the MTCP site contained unburnt bone fragments from a young infant, probably redeposited.

Methods

Ten deposits (six from BAAMP00 and four from BAACP00) had been excavated as a series of between two and nine sub-contexts (spits or other internal sub-divisions) to allow greater detail of the burial formation process to be studied. These divisions were maintained throughout analysis (the weights of bone from these contexts are shown together in Table 27.1 but separately within the archive).

Recording and analysis of the cremated bone followed the writer's standard procedure (McKinley 1994a, 5-21; 2000a; 2004a). The small fraction residues (1 mm and 2 mm) were scanned by the writer; identifiable fragments were recovered and included within the recorded bone weights. A subjective note of the quantity of bone remaining amongst the unsorted residue was made and is presented in the archive.

Age was assessed from the stage of skeletal and tooth development (Beek 1983; Scheuer and Black 2000), and the degree of age-related changes to the bone (Brothwell 1972; Buikstra and Ubelaker 1994). Sex was ascertained from the sexually dimorphic traits of the skeleton (Bass

1987; Buikstra and Ubelaker 1994). The variable integrity of the attributed sex is denoted in Table 27.1 as; '??'most likely, '?' probable, and un-questioned.

Results

A summary of the results from analysis is presented in Table 27.1. Full details are in the archive.

Disturbance and Condition

Most of the cremation graves had suffered some level of disturbance as a result of either plough damage, the insertion of land drains or animal activity. The insertion of land drains generally affected only one part of the grave fill and may not have impinged on the remains of the burial itself. Plough damage generally resulted in truncation of the upper levels of the grave fill, but the severity of the damage and the affect on the remains of the burial varied. The surviving grave depths at the LTCP site ranged from 0.07 m to 0.40 m and the remains of unurned burials within graves of a minimum depth of 0.17 m survived undisturbed (denoted by * in Table 27.1). There is no record of the depth of most of the graves excavated on the MTCP site but from the few where measurements are given the range is similar to that from the LTCP site at between 0.06 m and 0.35 m; graves are otherwise described as 'very shallow', 'truncated' or 'disturbed'. Undisturbed urned and unurned burials were recovered from graves of between 0.18 m to 0.35 m in depth (* Table 27.1). In many cases, bone was visible at excavation surface level and it is likely that at least some bone will have been removed and lost from many graves. Disturbance to burials, even where little or no bone loss occurs, may result in pressure damage to the bone, reducing the size of the surviving bone fragments.

The majority of the bone is visually in good condition. A few fragments of bone (generally individual fragments) from 11 contexts (8%) appear slightly worn and/or chalky, with slight root marking in one instance; this includes fragments from a tree throw and one of the Bronze Age ring ditch deposits. In most cases, the affected bone is poorly oxidized (see below) which may have contributed to its slightly poorer level of preservation, though the contexts from which most of these fragments derived also contained other poorly oxidised bone which did not appear worn. There is only one instance (330053/5) where all the bone from a context appears worn and chalky. The implication is that the burial environment from which these worn fragments derived was slightly more acidic than elsewhere, suggesting the micro-environment within individual deposits could vary slightly.

Trabecular bone (the first to be lost in soil conditions adverse to bone survival; McKinley 1997a, 245; Nielsen-Marsh *et al.* 2000) is generally moderately or well represented within deposits. Of the *c* 18% of burials where trabecular bone is well represented most were urned and half – urned and unurned – were undisturbed. The natural geology within the area – as with much of Essex - comprises boulder clay with gravel patches, the acidic nature of which may be expected to result in low recovery of trabecular bone but such is not the case either at Stansted or at the nearby contemporaneous site at Strood Hall (McKinley 2004b). The additional protection afforded by an urn (forming a physical barrier between the bone and the soil matrix) appears to have been a significant factor in good bone survival, as does the lack of disturbance; disturbance potentially exposing the burial to a more aggressive burial microenvironment. The presence of fuel ash in *c* 41% of the grave fills may also have had a moderating effect on the natural soil acidity and have assisted in bone survival.

Although present, trabecular bone is not particularly well represented within the deposits from the Middle Bronze Age ring ditch, where all the bone was redeposited. The condition of the bone does not suggest prolonged exposure or repeated disturbance and redeposition; the one deposit comprising bone of chalky appearance was from the ditch re-cut. The nature of the original deposits is, however, uncertain, the quantities of bone in individual context is generally very small and in this instance there many be numerous additional factors affecting the quantity of trabecular bone observed (see *formation processes* below).

Demographic Data

The remains of a minimum of 48 individuals were identified within the cremated bone assemblage including; 12 from BAACP and 36 from BAAMP (Tables 27.2 and 27.3). One of the early Romano-British burials from BAAMP (330039) and one of the Late Iron Age/early Romano-British burials (5075) from BAACP may each have include bone fragments from a second individual but the evidence is not conclusive.

The Bronze Age deposits all comprise small quantities of bone and appear to represent redeposited material; all were in relatively deep features (0.21-0.31 m) but two had clearly been disturbed and some bone may have been lost. With the exception of the minimum of four individuals represented by the material from the ring ditch (Table 27.1), the deposits were widely dispersed and it is unlikely, given the distances involved, that any derived from the same original deposit and/or cremation. The minimum number of eight individuals from the assemblage as a whole is based on minimum number counts, assessed age and spatial distribution. One deposit may represent a disturbed and redeposited burial (334060) but the presence of the non-burial contexts indicate that cremation was undertaken in the area and burials derived from the same cremation as these deposits may exist in the vicinity or have been destroyed (see *formation processes* below). Large numbers of mostly urned Middle Bronze Age cremation burials have been recovered in association with ring ditches from Essex, including individual cemeteries containing up to 40 graves (Brown 1996, 26-29).

A minimum of 16, possibly 17, individuals were identified from the Late Iron Age/early Romano-British burials. Of the ten burials of this date from the LTCP site, seven formed a single-phased group associated with a series of small rectilinear enclosures, two others each lay within individual square mortuary enclosures some distance to the south-west, whist a singleton lay in a partially silted droveway ditch to the north-east. No immature individuals were identified within the small group from the LTCP area. Few of the adults could be attributed a closer age range than >18 yr., but the group includes at least two mature adults and one of >30 yr. It was possible to attribute sex to only three individuals (37%), including one female, one possible female and one possible male. The absence of immature individuals within the group is a little anomalous and may indicate an age-dependant distinction being made in the place of burial. The graves within the mortuary enclosures contained the remains of adults, both likely to be female, a few fragments of skull vault from one (5073) appearing to have derived from a second, younger individual. If such small quantities of immature bone was all that was routinely included in a burial, particularly those representing deposits from a dual cremation (see below), this may be one factor affecting the apparent dearth of immature individuals within the assemblage as a whole. The singleton buried within the ditch fill also represented the remains of an adult female (grave 143075). The small group-size and distribution of the graves seems typical for the late Iron Age period in this area, Whimster

(1981, 362-371) listing 43 sites in Essex where small groups or individual burials have been recovered, though some larger cemeteries did exist eg Mucking (30 burials; Sealy 1996, 58).

The six late Iron Age/early Romano-British burials from the MTCP area were interspersed amongst early Romano-British burials, together forming a small cemetery of 15 graves on the northern margins of the site, indicating a continuity of use and probably of population across the temporal range. A second, slightly smaller group of 11 early Romano-British burials lay to the south, with two 2nd-3rd century graves – the latest from the area – situated towards the eastern margins of the group.

As at the LTCP site there is a dearth of immature individuals, with just one infant in the northern group (328009, an early Romano-British dual burial), and one early Romano-British juvenile/subadult in each group, both >9 yr. (Tables 27.1 and 27.3). The one other young infant identified was represented by a single unburnt tooth crown redeposited in a Romano-British cremation grave fill; it may have been redeposited from an earlier phase or indicate differential treatment of the dead dependant on age. Although low, the proportion of immature individuals in the groups (*c* 11%) is similar to that observed in some other contemporaneous cremation cemeteries, for example; 13% from the Iron Age phases at King Harry Lane, St. Albans, Hertfordshire (Stirland 1989) and 12% from Westhampnett, West Sussex (McKinley 1997b); 8% and 13% from the early Romano-British cremation cemeteries at Puckeridge/Skeleton Green, Hertfordshire and Cirencester, Gloucestershire (Wells 1981) and King Harry Lane (Stirland 1989); 9% and 14% from the similarly multi-period cemeteries excavated at Stansted 1986-91 (Garland 2004, table 68) and at Strood Hall, Great Dunmow (McKinley 2004b). A variety of possible factors have been suggested to explain the relatively low proportions of immature individuals in these cases. The bone from Stansted is generally well preserved and there is no evidence to suggest loss of immature bone due to preferential destruction. The figures may indicate a low fertility rate, cultural factors resulting in the burial of young individuals elsewhere or, as discussed above, a masking of their presence within dual cremation burials.

The adults include both males and females, with close to even numbers of each being identified, though it should be noted that only 43% of adults were sexed. A broad age range is represented amongst the adults with at least one (early Romano-British) individual of over 45 years and eight (35% of adults) of more than 30 years.

The size and form of the grave groups on the MTCP site are similar to those observed in the earlier excavations at Stansted, where a total of 43 late Iron Age and Romano-British cremation burials, distributed as several small groups of up to 14 or as singletons, were found on the west side of the airport (Havis and Brooks 2004, fig 5).

An attempt at estimation of population size is hampered by the potentially broad temporal range and the probability that all members of the population were not being disposed of in the cemetery (ie immature individuals placed elsewhere?). There is some temporal overlap between these small cemeteries and they probably served individual households/farmsteads across the temporal range, the burial rate varying over time.

Pathology

A few minor pathological lesions were observed in the remains of 15 individuals (*c* 31% of the population) including; two Late Iron Age/early Romano-British, 11 early and one mid Romano-British, and the undated individual (Table 27.1).

Ante mortem tooth loss was observed in two of 18 dentitions (one female and one male), 12.5% of maxillary and 8% of mandibular; with the loss of a single molar in each instance. A small carious lesion was observed in the cervical region of one tooth root (female). Evidence for dental caries is rarely recovered from cremated bone assemblages due to the characteristic shattering of tooth crowns in cremation (McKinley 1994a, 11) and the calculation of rates would be misleading. Slight periodontal disease (alveolar resorption due to a gum infection) was observed in two dentitions (female and male).

Lesions related to some form of joint disease were observed in the remains of eight individuals; seven early and one mid Romano-British. Lesions indicative of osteoarthritis (Rogers and Waldron 1995) were observed in one joint surface of one early Romano-British female (328015). Degenerative disc disease, resulting from a breakdown in the intervertebral disc, generally reflects wear-and-tear and is related to age. Two individuals (early Romano-British) each had slight lesions in one cervical vertebra (*c* 4% vertebrae). Where they occur alone, osteophytes (new bone on joint surface margins) are largely seen as age-related. Slight lone lesions were seen in six individuals (five early and one mid Romano-British) across a range of spinal (four individuals) and non-spinal (four individuals) joints (Table 27.1); more than one joint was affected in two individuals.

Exostoses (new bone at tendon/ligament insertions) and various types of destructive lesions (including pitting) may develop in response to a number of conditions and it is not always possible to ascertain the specific cause of individual lesions (Rogers and Waldron 1995). Pitting, probably reflective of the early stages of degenerative joint disease, was observed in the remains of two individuals. Exostoses were observed at between one and three sites in three individuals; all were lone lesions and are most likely to be indicative of repetitive minor muscle stress.

Pyre Technology and Cremation Ritual

Efficiency of cremation

Most of the cremated bone from the majority of the deposits was white in colour, indicating a high level of oxidation (Holden *et al* 1995a and b). Some colour variation – hues of grey and blue to black (charred) – indicative of different levels of oxidation (*ibid.*) was, however, observed in variable quantities of bone fragments from most graves including 50% of the Late Iron Age/early Romano-British graves, 85% of the early Romano-British and both mid Romano-British graves. Bone from four of the Middle Bronze Age deposits also showed some variation in oxidation.

In *c* 31% of cases only a few bone fragments from a single skeletal element show variable oxidation; in *c* 28% of cases two skeletal areas are involved with some including several different skeletal elements; three skeletal areas are affected in 25% of cases; and all areas of the skeleton, often including all the major elements, in 13%. The bones of the lower limb are most frequently affected (*c* 38% of cases), elements of skull and upper limb less so (*c* 24% and 23%

respectively), and the axial skeleton relatively rarely (8% cases); the latter may be misleading since the trabecular bone of the axial skeleton may have been subject to preferential destruction whilst in the ground (see above). Less well oxidised bone may also have been subject to preferential loss due to soil acidity (see *condition*). The vault was most frequently subject to lower levels of oxidation amongst the skull fragments, particularly the endocranial surface and the diploe. In the upper limb, variations were most commonly observed in the humerus and ulna, with the bones of the hand being involved in only one Middle Bronze Age deposit and one early Romano-British burial. In the lower limb variations were most commonly seen in the femur. Variable oxidation across a single bone fragment was observed in several cases. Extensive poor levels of oxidation were seen in all periods including; two Middle Bronze Age deposits (316133 and 316136) from the southern segment of the ring ditch (probably the same individual), where some foot bones were either unburnt or just slightly scorched; one of the Late Iron Age/early Romano-British deposits (*c* 14% of those affected); half of the affected early Romano-British and both mid Romano-British case. Both males and females appeared to be similarly affected. There is no apparent distinction between the phases other than in the proportion of burials affected, or between the northern and western cemetery groups on the MTCP site.

Numerous intrinsic and extrinsic factors may affect the efficiency of cremation, a combination of which may come into effect in any one case. The incomplete oxidation of individual bone fragments is likely to reflect a specific factor late in the cremation process: for example, a bone fragment falling outside the confines of the pyre or falling through the pyre and becoming partly or fully buried within the fuel ash (cutting-off the heat and/or oxygen supply). Both observations could indicate a lack of tending of the pyre throughout the cremation process. Incomplete oxidation of specific skeletal areas may reflect intrinsic and/or extrinsic factors. For example: poor oxidation of the skull vault may be related to the peripheral position of the head on the pyre (insufficient heat), to the deceased wearing a leather/fur hat or hood (cutting off oxygen), or the head lying on a solid surface (deflecting the flame and cutting off oxygen supply); lack of oxidation to the feet may indicate a short pyre; crossing (and possibly, by implication, binding) the hands and forearms across the chest would shield them form the heat source for some time longer than other parts of the body; the mass of soft tissues around the hips and thighs slows down exposure of the underlying bone to burning. An overall shortfall suggest a more general problem; insufficient fuel for cremation, a cut-off in oxygen supply as may result if the individual was wrapped in or laid on a skin/fur, or curtailing of the process (inclement weather).

Although variability in degrees of oxidation is relatively common within the mortuary rite, the percentage of Romano-British burials containing bone with varying levels of oxidation is high in comparison with some other contemporaneous cemeteries eg up to *c*. 66% from the East London cemeteries (McKinley 2000b, 268-269), *c* 23% from the rural cemetery at Westhampnett (23%; McKinley 1997a), and *c* 5% from the northern-frontier cemetery at Brougham, (McKinley 2004c). Similarly high levels of poor oxidation were observed at the contemporaneous cemetery at Strood Hall (McKinley 2004b) and together the figures may reflect a regional variation in mortuary practice. Although variations in levels of oxidation were observed in the bone from the earlier excavations at Stansted, the skull apparently being most frequently involved as here, no figures are given (Garland 2004, 249).

Weights of bone for burial

The weights of bone recovered from individual burials varied from a minimum of 3.9 g from a heavily disturbed burial of unknown form (late Iron Age/early Romano-British) to a maximum of 1408.6 g from an undisturbed urned burial (early Romano-British), both from the MTCP site (Tables 27.1 and 27.4). The type of burial and level of disturbance represent primary factors in the average weights of bone recovered (McKinley 1994b); as demonstrated here by the noticeably higher average from the early Romano-British urned burials compared with the unurned ones and from the undisturbed burials compared with the rest (Table 27.4). The number of individuals within the burial and the sex of the individual appear to have no significance with regard to the quantity of bone. The one conclusive dual cremation/burial has a weight of 525.7 g, which is not the highest in its group (early Romano-British urned burials). The maximum bone weight from the assemblage as a whole (1408.6 g) was from the grave of an adult male, but the next highest weight (1220.5 g) was recovered from a the grave of a female.

The weight of bone recovered from the undisturbed urned adult burials represents *c* 13-88% (ERB) and 20.9% (MEB) of the average expected weight of bone from an adult cremation (McKinley 1993); that from the unurned burials *c* 15.6 – 51.7% (LIA/ERB) and 76.3% (MRB).

Comparison with other contemporaneous cemeteries is hampered by the low proportion of undisturbed deposits and the unknown level of bone loss from the rest. The maximum bone weights from the late Iron Age and Romano-British graves are generally in the upper ranges of weights of these dates and commensurate with those from Strood Hall and the earlier Stansted excavations, both of which had greater numbers of undisturbed deposits (Stirland 1989; McKinley 1997a, 68-9; 2004b; 2004c tables 6.5 and 6.6; Garland 2004, table 68). Cremation burials of any period very rarely, if ever, contained all the bone which would have remained at the end of cremation (McKinley 1997c; 2000a and c) and wide ranges in bone weights are common. It is currently unclear why such great variations existed; one potentially significant factor may be the ‘status’ of the individual, whatever criteria that may be measured by – wealth, occupation, or the esteem in which they were held.

Fragmentation

Numerous intrinsic factors may affect the size of cremated bone fragments including the nature of the material, the burial conditions, levels of disturbance and excavation/post-excavation processing of the bone (McKinley 1994a; 2000a; 2004c, 298). Here, as expected given the natural soil acidity and common disturbance to deposits, the recorded size of bone fragments is relatively small with most bone being recovered from the 5mm sieve fraction (Table 27.5). The increased bone fragmentation resulting from disturbance and the protection afforded by an urn being demonstrated by the figures for most periods (Table 27.5). There is no conclusive evidence to suggest deliberate fragmentation of the bone occurred prior to burial.

Skeletal elements

Bone fragments are classified as ‘identifiable’ only where they can be allocated to a specific bone. The ease with which this can be done depends on the level of fragmentation and on the area of the skeleton represented, eg small fragments of skull are more morphologically distinctive than small fragments of long bone shaft. Where only small quantities of bone survive within a deposit the proportional amount of 'identifiable' bone may give a bias view of the skeletal elements present.

A wide range of between 14-53% of the bone from individual burials could be classified to skeletal element; 14-46% for the later Iron Age/early Romano-British, 23-55% for the early Romano-British and 27-35% for the mid Romano-British, with a slightly shorter range of 26-53% for the undisturbed burials. In general there appears to have been a 'normal' distribution of skeletal elements – some identifiable fragments from all four skeletal areas being present in most burials. Most variation was observed in the skull and axial skeleton categories. There is no convincing evidence to suggest that specific skeletal areas were being preferentially included or excluded from the burials.

Tooth roots and the small bones of the hands and feet are commonly recovered from cremation burials of all periods. Between one and 25 of these small skeletal elements (as distinct from small fragments of bone) were recovered from the majority of burials (*c*. 89%). The average frequency of occurrence is similar across the temporal range (Table 27.6). Although such elements occur with slightly greater frequency in the remains of unurned as compared with urned burials across the date range, the grave from which the greatest number of such small skeletal elements was recovered (328052) contained the remains of an urned burial. It is believed that the frequent presence of these bones may be linked with the mode of recovery employed to collect bone from the pyre site for burial, with *en masse* recovery followed by subsequent winnowing rather than the hand recovery of individual fragments (McKinley 2004b; 2004c, 300-1). The variability of their presence in the burials from Stanstead suggests a consistent mode of recovery of bone for burial was not necessarily followed for different cremations.

Pyre goods

Small quantities (0.2-4.5 g) of cremated animal bone were recovered from three late Iron Age/early Romano-British (18.7%), seven early Romano-British (36.8%) and one mid Romano-British burial (50%). Species identifications are given elsewhere (see Bates, CD Chapter 32), but included the bird (?chicken) and immature pig commonly observed in Romano-British burials (eg Rielly 2000, table 26, 76; Harman 1985). Unburnt animal bone – representing the remains of grave goods as opposed to pyre goods - was also recovered from three of the Late Iron Age/early Romano-British and three of the early Romano-British graves.

The inclusion of cremated animal remains in Late Iron Age and Romano-British burials is relatively common, and there are close similarities between the periods in terms of frequency of occurrence and the species recovered. There is limited British data for the Iron Age, but pig and domestic fowl tend to feature strongly both here and elsewhere in Europe (Menial 1993; McKinley *et al.* 1997). There is a wide range in the number of Romano-British burials containing cremated animal bone within individual cemeteries (McKinley 2004c, 331-2). At Strood Hall, *c* 54% of the late Iron Age/Romano-British burials contained cremated animal bone (McKinley 2004b). Some of the animal bone recovered from the earlier burials from Stansted was cremated but most was unburnt (ie representing the remains of grave goods) and there is no clear indication of how many burials contained cremated bone (Hutton, 2004b; Havis and Brooks 2004, table 54, 251-253).

Dual cremation

Only one burial – from the early Romano-British grave 328008 – conclusively contained the remains of two individuals, an infant and an adult, possibly male. Expressed as a percentage of the number of burials (5.5%) this is within the range commonly identified from all periods in which the rite was used (McKinley 1994a, 100-102; 1997c; 2000b, 272; 2004c, 303-4). A possible second dual burial was discussed above (see *demography*), and, as has been observed elsewhere, the true number may have higher particularly where a young immature individual was cremated with an adult (eg McKinley 1994a, 102). No dual burials were recorded amongst the *c*. 35 subject to osteological examination from the earlier excavations at Stansted (Garland 2004, 248-9).

Redeposited pyre debris

Variable quantities of fuel ash – most, if not all, representing redeposited pyre debris - were recovered from the fills of 15 graves and 21 of the Bronze Age deposits. Pyre debris was most commonly observed in the Late Iron Age/early Romano-British graves (50%) where it occurred exclusively in association with the unurned burials (77%). A smaller proportion of the early Romano-British graves contained pyre debris (36.8%), its presence in this phase being slightly more common in association with urned burials (42.9%) in comparison with the unurned ones (30%). Neither of the mid Romano-British deposits included pyre debris. The inclusion of pyre debris within grave fills is common throughout most of the temporal range and British geographic areas (McKinley 1997c; 2000c, 41-42; 2004c, 304-306), and is indicative – amongst other things - of the proximity of the pyre site to the place of burial.

In at least four graves fuel ash was described as ‘occasional’ or as ‘flecking’ and it is possible that its inclusion was incidental rather than deliberate (the close proximity of the pyre site to the place of burial would make the former as feasible as the latter). In at least four other graves the quantities of fuel ash were substantial and clearly represented deliberate deposits. Elsewhere there was no clear statement of the quantities of fuel ash observed and the interpretation is, consequently, inconclusive.

The distribution of the fuel ash within the grave fill is not always clear either due to a lack of recording, or a lack of clarity resulting from disturbance or, with some of the unurned burials, visual distinction between the remains of the burial (bone concentration) and the deposit of pyre debris; the latter having intermingling with the former in the period between deposition and excavation. Where contexts had been excavated in spits and or blocks, however, it was often possible to broadly distinguish between the deposit types in analysis. In the undated grave 107058 the bone was concentrated (79%) in the upper 0.06 m of the 0.12 m deep fill; though it does not appear that pyre debris was deposited in the base of the grave, rather that the lower 0.06 m may have formed a deep interface. In the undisturbed Late Iron Age/early Romano-British grave 143075, the bone was concentrated in the lower 0.02 m on the west side of the cut (83%), the rest of the bone being dispersed throughout the pyre debris within the grave fill with a possible concentration in the east. The burial in grave 151004 was recorded as being made in the south-west quadrant and surrounded by a charcoal rich fill; the bone was concentrated (78%) in the central 0.10 m of the 0.16 m deep cut, suggesting the original presence of an organic container. In grave 349136 the pyre debris appears to have been deposited over the burial comprising the unurned bone overlain by the ceramic grave goods. In the undisturbed Late Iron Age/early Romano-British grave 332009, the bone was concentrated (75%) in the central 0.08 m of the 0.18 m deep cut suggesting that pyre debris may have been deposited both before and after the burial was made, probably within a bag of some sort. In most cases it appears that the pyre debris was deposited over or around the formal burial.

Just over half of the contexts containing cremated bone from the Bronze Age ring ditch included some fuel ash, the lower levels comprising charcoal-rich fills. The formation processes and probable nature of these deposits is discussed below. The other three Bronze Age deposits all contained some fuel ash. Small quantities of both bone and fuel ash were recovered from cut 115001, but animal disturbance rendered interpretation of the nature of the deposit inconclusive. Cut 334059 contained a clearly redeposited matrix which may originally have been an *in situ* burial with redeposited pyre debris. Cut 323008 contained a charcoal rich fill in two levels with only 20.2 g of bone deriving from two individuals. This deposit has the appearance of a formal deposit of pyre debris; deposit of this type have been recognised both within the Bronze Age and later periods (McKinley 1997a, 139; 2004c, 304-306). It is not clear why such deposits were made; from a purely practical view point, clearance of the pyre site would have maintained a 'tidy' cemetery but there are features of these deposits which suggest they were made as a formal part of the mortuary rite (*ibid.*).

Formation processes

Although the Bronze Age ring ditch was slightly shallower on the west side than elsewhere in its circuit (range 0.52-0.78 m depth), most of the cremated bone was recovered from the lower fills (peat layers and lower levels of mound redeposition) and it is unlikely that much, if any, bone was lost from the west side as a result of truncation (Figs 4.28, 4.30-4.31). The largest quantity of bone from a single segment was recovered from the south-west of the ditch (segment 316130; 270.4 g) with similar quantities being recovered from northern and eastern segments (309238, 320143, 320131, 320111; 117.8-132.1 g). Only small quantities of bone were recovered from the western segments (0.3-36.9 g). Although the ring ditch was excavated in its entirety, only a sample of segments were subject to hand excavation, the rest being removed by machine under constant archaeological supervision (see Chapter 4). The lack or absence of bone from other than the north-east machine excavated section may be genuine, but it is possible that some bone – which occurred in only small quantities anyway – was missed.

The deposits from the ring ditch containing cremated bone all ultimately derived from the mound material which was redeposited, via weathering, in the ditch fill over what appears to have comprised a *c* 200 year period. The early silting is likely to have occurred as a series of rapid influxes with intervening periods of waterlogging. This early phase coincides with the larger deposits of bone and more frequent fuel ash inclusions. With a single exception (from the later re-cut), none of the bone appears particular worn or abraded suggesting its reburial was rapid and that it had not previously undergone repeated disturbance. A minimum of four individuals could be identified from the deposits (Table 27.1). The neonatal remains were confined to the north-east segment (320131). The infant remains were apparently confined to the north-east quadrant (320131, 320111) though some bone fragments from the south may potentially have derived from this individual. The juvenile remains were mostly from the west (309288) though fragments from this individual may also have been recovered from segments to the north and south. The adult remains were predominantly from the eastern half. There was no apparent distribution of particular skeletal elements in any one part of the ring ditch.

The question remains as to the nature of the deposits from which this material derived. The activity to which they related appears to have been concentrated in the south, east and north of the mound. Given the broad distribution outlined above and provided the minimum numbers are not totally misleading, it is likely that the material derived from a variety of deposit types relating to individual cremations. Pyre debris may have been redeposited within or scattered throughout the mound construction. Burials, with or without redeposited pyre debris may also have been incorporated within the mound material rather than being cut into the underlying subsoil. The pyre sites may also have lain on the partially constructed mound, to subsequently be covered by further mound material. Whilst the small number of individual indicated, bone distribution and potential mix of deposit types may suggest a rapid development of the ring ditch and mound associated with the cremation of these four individuals, a note of caution is needed. In total, very little bone was recovered (297.6 g) and although there were no identifiable duplicate fragments relatively little distinctive skeletal elements were present and the remains could have derived from a larger number of individuals.

The formation process of some of the late Iron Age and Romano-British burials containing pyre debris has been discussed above (see *redeposited pyre debris*). Where further detail of the formation processes within individual burials could be assessed (via spit or block excavation of contexts) there appeared to be no horizontal distribution of skeletal elements, rather a random mix throughout the depth of the deposits. In several cases, joins between bone fragments recovered from different spits were noted; eg between spits 3 and 4 in grave 328052, and between spit 4 and bone from spits 5 and 6 in grave 332009. Joins between bone fragments from different deposit types were also observed in two graves, eg between bone from the redeposited pyre debris and the formal burial in graves 330033 and 349136. The implication here is for mixing of the bone prior to burial – as may occur where the bone was collected from the pyre site by raking and winnowing as outlined above, or if there was transference of material between receptacles (one for collection and another for burial) – as opposed to bone being placed in the burial receptacle as it was collected from the pyre site by hand with recovery commencing at one end of the pyre site and progressing to the other (eg head to foot end).

Variable levels of disturbance in at least 11 graves had resulted in the redeposition of some bone in ceramic vessels included as grave goods (eg graves 330008, 330018, 330041); there are no conclusive cases of genuine dual distribution of bone (ie joint urned and unurned) within any of the graves.

Table 27.1: Summary of results from analysis of cremated bone

KEY: * - undisturbed/only slightly disturbed; u. – urned; un. – unurned; rpd - redeposited pyre debris

context	cut	deposit type	phase	bone weight	age/sex	pathology	pyre goods
BAAMP 99							
1724	1718	un. burial	ERB	342.4 g	adult *c* 30-50 yr.	exostoses – iliac crest	
BAACP 99							
5075	5073	u.burial	LIA/ERB	549.5 g	1) adult >35 yr. ??female ?2) infant/juvenile *c* 3-10 yr.		unbunt animal bone (?grave good)
5078	5080	u.burial	LIA/ERB	240.1 g	adult >18 yr. ?female		0.2g animal bone
BAACP 00							
107056/7	107058	un. burial + rpd	?	72 g	adult >18 yr.??female	*ante mortem* tooth loss	
113073-5	113072	un. burial + rpd/?rpd	LIA/ERB	42.8 g	adult >18 yr.	morphological variation – wormian bone	
115002	115001	redeposited ?rpd	MBA	7.1 g	subadult/adult >13 yr.		
146006	146005	u. burial	LIA/ERB	115 g	subadult/adult >13 yr.		Fe nails
143077 *****	143075	un. burial + rpd	LIA/ERB	437.0 g	adult *c* 25-45 yr. female	dental caries	burnt & unburnt animal bone
150006/8	150007	un. Burial	LIA/ERB	148.1 g	adult >18 yr.		animal bone. Fe nail shank
150011	150009	u. burial?	LIA/ERB	44.4 g	adult >18 yr.		
150013	150012	un. burial ?+ rpd	LIA/ERB	209.1 g	adult >18 yr.??male		Fe nail
151007 *****	151004	un. burial + rpd	LIA/ERB	249.4 g	adult *c* 23-45 yr.		
151009	151008	?burial ?+ rpd	LIA/ERB	205.3 g	adult >30 yr.		0.6g animal bone; Fe nail
BAAMP 00							
309242/44/46-8/ 59/66/91/93-5, 316086/88/92, 3160103/06/01/ 11/29/31/33/36/ 54/59, 320113/16-20/25/ 27/29/32/34-7/39/ 40/42/44/47/48	309238/53/65 /88, 316085/92, 316101/09/28 /30/59, 320150/11/28 /31/43/ 46	redeposited burials + rpd and/or rpd	MBA	297.6 g	minimum 4 individuals: 1) neonate 2) infant *c* 2-4 yr. 3) juvenile *c* 7-10 yr. 4) adult *c* 25-45 yr. ?female		*c.* 1.7g burnt animal bone possibly associated with cremated human bone
323007	323008	?rpd	MBA	20.2 g	1) subadult/adult *c* 13-35yr 2) infant *c* 0.5-5 yr.		1.4g animal; u/b or charred animal

context	cut	deposit type	phase	bone weight	age/sex	pathology	pyre goods
325035/7	325038	un. Burial	ERB	606.5 g	adult *c* 18-60 yr. ?female		0.8g ?animal bone
328007 ?*	328006	u. burial	ERB	205.8 g	adult >45 yr. ??female	osteophytes – mandibular condyle; degenerative disc disease – cervical	0.9g bird bone
328009 **?***	328008	u. burial	ERB	525.7 g	1) infant 0-3 yr. 2) adult >35 yr. ??male	osteophytes – auricular surface	
328013	328012	u. burial	LIA/ERB	207.5 g	subadult/adult >13 yr.		
328015	328014	un. Burial	ERB	227.6 g	adult >40 yr.	osteoarthritis – temporo-mandibular; osteophytes – thoracic/lumbar, metacarpal	copper alloy frags.
328031/3	328032	u. burial	ERB	633.6 g	adult *c* 35-45 yr. ?female	periodontal disease	.2g ?bird bone
328037	328036	un. burial + rpd	ERB	274.3 g	adult *c* 18-45 yr. ?female		copper-alloy frags.
328039 **?***	328038	un. Burial	ERB	358.1 g	juvenile/subadult c. 11-14 yr.	destructive lesion – proximal humerus	
328045/7/9/51	328044	u. burial + rpd	ERB	618.7 g	adult *c* 25-45 yr. ?male	osteophytes – axis	
328053-6 *****	328052	u. burial	ERB	1408.6 g	adult *c* 25-45 yr. ?male	periodontal disease; pitting – rib facets; exostoses - patella	2.2g animal bone; fragments u/b animal in upper fill
33007/9	330008	u. burial	ERB	457.0 g	adult *c* 35-50 yr.	degenerative disc disease – cervical	
330011	330010	u. burial	LIA/ERB	111.4 g	adult >18 yr.		
330013	328018	u./un. burial + rpd	ERB	195.3 g	adult >18 yr.		
330017	330018	u. burial	ERB	371.5 g	juvenile/subadult *c* 9-15 yr.		worked bone objects; copper-alloy frag.
330021	330020	un. burial + rpd/?rpd	LIA/ERB	366.9 g	adult >35 yr. ??female		
330023/5	330022	u./un. Burial	LIA/ERB	3.9 g	subadult/adult >13 yr.		
330034/5	330033	un. burial ?+rpd	ERB	706.3 g	adult >40 yr.	exostoses – femur, iliac crest, patella	4.5g burnt & u/b animal (piglet)
330037	330036	?un. burial	LIA/ERB	100.9 g	adult >18 yr.		
330039	330038	u. burial + rpd	ERB	436.9 g	1) adult >30 yr. ??male ?2) subadult/adult (>13 yr.)	osteophytes – finger phalanx	burnt & unburnt animal bone (1.2g)

context	cut	deposit type	phase	bone weight	age/sex	pathology	pyre goods
330042/46/50-1 **?***	330041	un. burial	MRB	334.8 g	adult c. 20-45 yr. ??female		
330053/5	330052	u./un. Burial	ERB	135.7 g	subadult/adult >13 yr.		
330059	330058	redeposited	?	7.8 g	subadult/adult >13 yr.		
332010 /11*****	332009	un. burial + rpd	LIA/ERB	827.4 g	adult >40 yr. male	*ante mortem* tooth loss – mandibular	2 frags. unburnt animal bone
332016/21	332014	?redeposited in grave fill	ERB	28.1 g	1) infant 6-9 mth. (unburnt) 2) adult >18 yr. (probably =332018)		
332018 **?***	332014	u. burial	MRB	1220.5 g	adult *c* 20-40 yr. ?female	osteophytes – atlas, thoracic/lumbar; pitting – rib facet	1.3g animal bone (inc. bird)
334060-3/5	334059	redeposited - ?crd	LBA	2.2 g	subadult/adult >13 yr.		min. .5g animal
349125	349124	?un. burial/?crd	ERB	174.1 g	subadult/adult		
349127/29/31	349126	u. burial	ERB	354.2 g	adult >18 yr.		
34133-4/45	349136	un. burial + rpd	ERB	313.5 g	adult >18 yr. ??male		
349147/49/53/54	349139	u. burial + rpd	ERB	267.1 g	adult *c* 30-50 yr.		frags. burnt & unburnt animal bone; glass frag.

Table 27.2: Summary of demographic distribution for the LTCP site (BAACP99 and BAACP00) see Table 27.1 for more detailed definition of ages

	Bronze Age	**Late Iron Age/early Romano-British**	**undated**
infant/juvenile 3-10 yr		?1	
mature adult 25-45 yr.		2 (1F)	
mature/older adult >30 yr.		2 (1??F)	
adult >18 yr.		5 (1?F, 1M)	1??F
subadult/adult >13 yr.	1	1	
total	1	10/?11 (3F, 1M)	1

Table 27.3: Summary of demographic distribution for the mid-term car park (BAAMP) see Table 27.1 for more detailed definition of ages

	Bronze Age	**Late Iron Age/early Romano-British**	**Romano-British**
neonate 0-0.5 yr.	1		
infant 0-5 yr.	2		1 + *1 unburnt*
juvenile 5-12 yr.	1		
juvenile/subadult 9-15 yr.			2
young/mature adult 18-45 yr.			2 (1?F, 1??F)
mature adult 25-45 yr.	1?F		4 (2 ?F, 2 ?M)
mature/older adult >30 yr.		2 (1M, 1??F)	7 (2??M)
older adult >45 yr.			1 ??F
adult >18 yr.		2	4 (1?F, 1 ??M)
subadult/adult >13 yr.	2	2	2/?3
total	7	6 (1F, 1M)	23/?24 (7F, 5M) *+ 1 unburnt*

Table 27.4: Bone weight ranges and averages for different burial types and conditions by phase

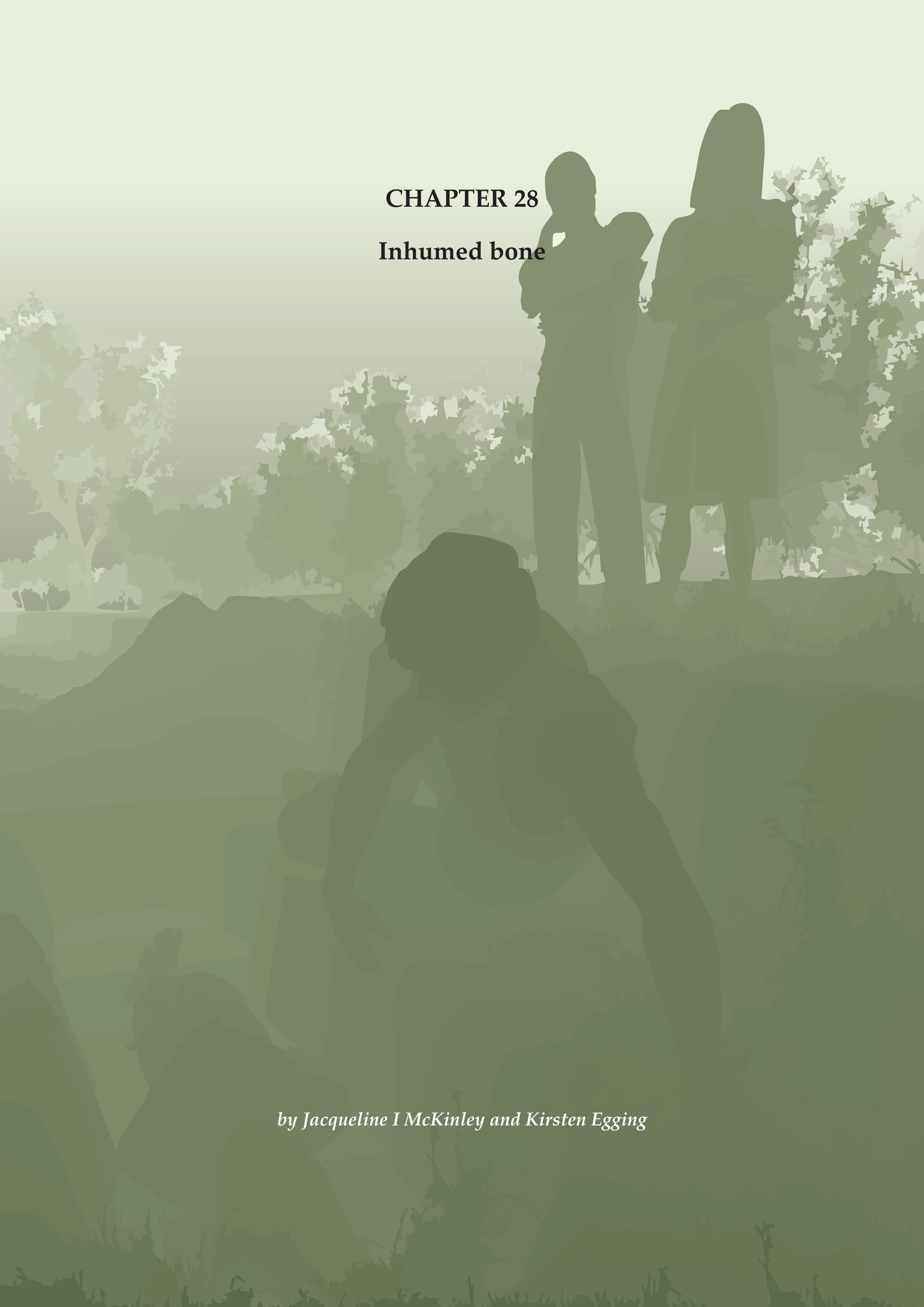
burial type/ condition	**LIA/ERB**	**ERB**	**MRB**
urned burials			
overall	range: 44.4 – 549.5 g average: 237.2 g	range: 205.8 – 1408.6 g average: 527.9 g	
undisturbed (*)		range: 205.8 – 1408.6 g average: 713.4 g	334.8 g
unurned burials			
overall	range: 42.8 – 827.4 g average: 297.7 g	range: 227.6 – 706.3 g average: 404.1 g	
undisturbed (*)	range: 249.4 - 827.4 g average: 504.6 g	358.1 g	1220.5 g

Table 27.5: Summary of levels of fragmentation by period

burial type and condition	**maximum fragment**	**sieve fraction distribution**
Late Iron Age/early Romano-British		
overall undisturbed unurned	20-78 mm 25-77 mm	33% majority in 10 mm fraction, 67% in 5mm fraction majority in 5 mm fraction
early Romano-British		
overall undisturbed urned	26-74 mm 74 mm	40% majority in 10 mm fraction, 60% in 5 mm fraction majority in 10 mm fraction
mid Roman-British		
undisturbed urned undisturbed unurned	50 mm 46 mm	majority in 10 mm fraction majority in 5 mm fraction

Table 27.6: Frequency of occurrence of tooth roots and hand/foot bones per burial

phase	**average no. tooth roots per burial**	**average no. hand/foot bones per burial**
late Iron Age/ early Romano-British	2.2	3.2
early Romano-British	2.0	4.4
mid Romano-British	1	3.5



CHAPTER 28

Inhumed bone

by Jacqueline I McKinley and Kirsten Egging

28 Inhumed bone

Jacqueline I McKinley and Kirsten Egging

Human bone from twelve contexts (seven from the MTCP site (BAAMP00), four from the LTCP site (BAACP00) and one from the M11 site (BAALR00)) was analysed, including the remains of one Late Iron Age/early Romano-British and four late Romano-British *in situ* burials. Other contexts comprised bone redeposited in the fills of various pits and ditches including one Middle Bronze Age, two Late Iron Age, one mid Romano-British, one late Romano-British, and one undated (Table 28.1).

Methods

The degree of erosion to the bone was recorded following McKinley (2004, fig 6). Age was assessed from the stage of skeletal development (Bass 1987; Scheuer and Black 2000) and the patterns and degree of age-related changes to the bone (Buikstra and Ubelaker 1994). Sex was ascertained from the sexually dimorphic traits of the skeleton (Buikstra and Ubelaker 1994). A standard suite of measurement were taken where possible (Brothwell and Zakrzewski 2004) but insufficient evidence remained for the calculation of any indices. Non-metric traits recorded (Berry and Berry 1967; Finnegan 1978).

Results

A summary of the results is presented in Table 28.1; details are in the archive.

The depth of the surviving grave cuts ranged from 0.05 m (121048) to 0.40 m (359024). There was clear plough damage to some graves and most of the bone was moderately to heavily (context 359026) fragmented. There was a lower percentage of skeletal survival within the shallow graves in comparison with that from the deeper ones – 20-25% in graves of 0.05-0.10m compared with 55-98% in those >0.30 m – indicating direct bone loss and possibly a detrimental change in the burial environment with decreased grave depth. The bone is generally in good condition (graded 0-2) with some localised heavier erosion (up to grade 5+). Brown discoloration to the bone from context 323028 suggests it was buried in an organic-rich environment, whilst the greenish staining to the bone from context 110090 implies the presence of cess within the ditch.

A minimum of ten individuals were identified; five from the *in situ* burials (three juvenile and two adults) and a minimum of five from the redeposited bone (one juvenile and four adults). The *in situ* burials included one late Iron Age/early Romano-British juvenile, and two juveniles and two adults from late Romano-British deposits. The redeposited bone includes one Middle Bronze Age juvenile, two Late Iron Age adults, one mid Romano-British adult and two late Romano-British adults. The dating of the disarticulated, redeposited bone is based on contextual association, however, and bone may have been redeposited in much later contexts. Poor bone survival and low levels of skeletal recovery limited the assessment of the sex of individuals, only one of the adults (late Romano-British) being tentatively sexed as male.

The inhumation burials and redeposited human bone from the LTCP site were all recovered within close proximity of one another, suggesting continuity in burial location from the Late Iron Age into the late Romano-British period (Figs 6.9, 8.2). The numbers are too small, however, for this to represent the only mortuary area for even a small community. The two inhumation burials from the MTCP site are also within the general vicinity of one another (Figs 8.7-8.8), most of the redeposited bone – from all periods – being recovered from the southern portion of the site. The overall impression is a common one for rural areas in the later prehistoric and Romano-British periods of small grave groups or singletons dispersed across agricultural areas within the proximity of farmsteads.

Minor pathological lesions were observed in the remains of eight of the identified individuals (Table 28.1). Slight to moderate dental calculus (calcified plaque/tartar; Brothwell 1972, fig. 58b) was observed four of the five dentitions recovered, including all the juvenile dentitions. Small, occlusal caries were observed in molar teeth from two of the adult Romano-British dentitions, giving an overall rate of *c* 2.6%, which is low compared with the average of 7.6% for the period (Roberts and Cox 2003, table 3.10). Non-specific infection, in the form of healed periosteal new bone, was observed in the leg bones of one Romano-British individual. Slight eburnation, indicative of osteoarthritis (Rogers and Waldron 1995) was observed in the remains of one Romano-British individual (Table 28.1), giving an overall rate of 2.5% for non-spinal joints. Destructive lesions may form in response to a number of conditions and it is not always possible to ascertain the specific cause of individual lesions. Similarly, it is not always possible to be conclusive with respect to the aetiology of exostoses, bony growths which may develop at tendon and ligament insertions on the bone. Causative factors include advancing age, traumatic stress, or various diseases. Poor bone recovery and dispersed nature of this small multi-period assesmblage preclude any meaningful general comment on health and lifestyle.

Table 28.1: Summary of results

Context	Cut	Deposit type	Quantification	Age/sex	Pathology
LTCP (BAACP00)					
110090	110084	LIA/ERB *in situ* burial	*c* 98%.	juvenile c. 9-12 yr.	calculus; mv - retarded eruption maxillary canine
121047	121048	LRB *in situ* burial	*c* 25% a.u.l.	juvenile *c*. 10-12 yr.	
121077	121074	C2 – C3 redep.	3 frags. l.	adult > 18 yr.	exostoses – tibia, 5th metatarsals
134025	134027	LRB *in situ* burial	*c* 30%	adult *c*. 25-35 yr. ??male	caries; eburnation – left talus; destructive lesion – distal tibia; exostoses – femur, calcanea;
MTCP (BAAMP00)					
306039	306038	LRB redep.	*c* 33 frags. l.	adult >18 yr.	periosteal new bone – right tibia, fibula
309119	309075	MBA redep.	1 bone s.	juvenile c. 8-10 yr.	calculus
324015	324016	u/d redep.	10 frags. l.	adult >18 yr.	
323028	323025	LIA redep.	*c* 26 frags. s.	adult > 25 yr.	mv - wormian bone
355047	?	LRB redep.	22 frags. u.	adult >15 yr.	
355067	355068	LRB *in situ* burial	*c* 20% s.u.l.	adult *c*. 17-25 yr.	calculus; caries
359026	359024	LRB *in situ* burial	*c* 55%.	juvenile *c*. 6-8 yr.	calculus; mv – wormian bone
M11 (BALR00)					
434005	434004	LIA redep.	1 frag. l.	adult > 25 yr.	

KEY: s. – skull; a. – axial skeleton; u. – upper limb; l. – lower limb; m.v. – morphological variation

CHAPTER 29

Environmental overview

by Wendy Carruthers

29 An environmental overview

Wendy Carruthers
drawing on reports by Andrew Bates (CD Chapter 32); Wendy Carruthers (34); Rowena Gale (35); Elizabeth Huckerby, Sylvia Peglar and Denise Druce (31); Richard Macphail and Crowther and John Crowther (30); Mark Robinson (36); Sarah Wyles (33) and unpublished assessments by Patricia Wiltshire (pollen) and Michael J. Allen (land snails)

Archaeological deposits at Stansted Airport are located on a clay plateau rising to around 90-100 m aOD. The plateau is cut by a number of watercourses, including an undated palaeochannel that crosses the northern area of the site from east to west. The main watercourse still in existence today is Pincey Brook, which flows across the south-eastern corner of the excavated area and eventually meets the River Stort near Harlow. Early farmers would have found the clay soils difficult to work, and waterlogging would have been a problem in the lower-lying areas of the site. The clay ranges from calcareous to non-calcareous in different areas, but chalky till is the predominant geological substrate (Macphail and Crowther).

Before the Middle Bronze Age

Although development associated with Stansted Airport over the past two decades has led to the recovery of a large amount of environmental information concerning Middle Bronze Age and later settlement in the area, very little is known of the first forests that developed on the clay plateau following the last glacial period. The lack of suitable pollen-bearing deposits in the area means that records of human activity prior to the Middle Bronze Age are sparse and poorly dated.

A palaeochannel sequence was investigated at Stebbingford, Felsted (Murphy and Wiltshire 1996), about seven miles east of Stansted. The pollen evidence indicated an open landscape with birch and pine, suggesting that an early Holocene or Late Devensian date was probable, although no scientific dating was obtained. Charcoal fragments were frequent in the samples, perhaps indicating that human activities were taking place during the Mesolithic.

Excavations at Stansted Airport during 1986-91 (Wiltshire and Murphy 2004a) produced a pollen and plant macrofossil sequence through a palaeochannel at BRS, to the north-west of the Airport near Stansted Brook. Although not scientifically dated, the evidence suggested that, at the time the earliest sediments were accumulating in the channel in the Early Bronze Age, the surrounding vegetation consisted primarily of alder fen carr on the wetter land along the channel, with lime/oak/hazel woodland on the drier soils. The relatively high level of lime pollen indicated that lime woods must have been growing nearby. The presence of microscopic charcoal could indicate some clearance, but there was no pollen or plant macrofossil evidence for cereal cultivation in the area.

Excavations at Stansted Airport discussed in this report revealed a palaeochannel (327003) in the northern half of the MTCP site located fairly high up the slope, running parallel to the Pincey Brook. The earliest sediments provided some evidence for livestock management, including possible stabling refuse and indications of trampling (Macphail and Crowther), Unfortunately, pollen from this feature was too poorly preserved to be useful (Wiltshire).

An Early Neolithic tree throw on the SG site produced a few poorly preserved cereal grains and a trace of free-threshing wheat (a chaff fragment). However, a radiocarbon date on some flax seeds from this feature demonstrated that contamination had occurred, so the origin of these cereal remains is suspect. At the MTCP site there were some indications that ceremonial activities were taking place during the Neolithic period. The lower fill of a Neolithic pit, 353011, produced possible ritually placed deposits of worked flint and a few poorly preserved charred plant remains. These included a bread-type wheat grain and frequent small fragments of hazelnut shell (NZA-20960: 3640-3490 ±35 cal BC), indicating that both cultivated and wild food resources were being exploited. Since only a few, eroded and fragmented charred plant remains were present, the cereals could have been brought to the site for ritual purposes, rather than been grown on the local clay soils.

Small quantities of residual Mesolithic and Neolithic worked flint from features such as the Middle Bronze Age barrow at the MTCP site were further evidence that low level activities were occurring in the area through the early prehistoric period. In addition, a small number of Mesolithic/Neolithic tree-throw features, Neolithic features and a few scatters of flintwork were excavated, suggesting that small clearings may have been made from time to time in an otherwise relatively undisturbed, forested landscape.

A similar scarcity of evidence for early anthropogenic activity was encountered on the nearby A120 sites, with scattered finds hinting at a comparable level of later Mesolithic to Early Bronze Age small-scale clearances (Timby *et al.* 2007). The earliest clear evidence for settlement was at Greenfields, where Mid/Late Bronze Age activity was focussed around a pingo and produced evidence for metalworking. Even though significant quantities of pottery were present at this site, the economy was still possibly primarily pastoral in nature, since only traces of charred cereal remains were recovered.

Taking the evidence as a whole, it seems likely that the heavy, boulder clay soils in the Stansted area were not brought into cultivation to any significant extent until at least the Middle Bronze Age. The clay soils are difficult to work, often liable to seasonal waterlogging, and are said to be of limited use for spring cultivation (Jarvis *et al*. 1983). Prior to the introduction of iron ploughshares and spelt wheat, a hardy hulled wheat better suited to cold, clay soils than emmer (Jones 1981), the Stansted landscape appears to have remained predominantly wooded, perhaps with short-lived, small clearances being made by small groups of people. Larger scale, more settled occupation in the Essex region appears to have been primarily occurring on low-lying land around the coast, fens and river valleys (Brown and Murphy 1997), as demonstrated by the substantial charred plant evidence from The Stumble (Murphy 1989). Both wild plant foods and a variety of cultivated crops (including mainly emmer wheat, with some bread-type wheat, naked barley, einkorn and cultivated flax) were recovered from the Stumble, indicating that the economic basis of the settlement was diverse and well established.

Middle Bronze Age

Evidence of human activity was more substantial for the Middle Bronze Age, consisting of scattered features at the M11 site to the west and a settlement of post-built roundhouses on the MTCP site to the east. A greater quantity of environmental information was recovered because the low-lying nature of the deposits led to the preservation of waterlogged organic remains. Despite the presence of the settlement, however, charred cereal assemblages were limited to two pits; one close to roundhouses at MTCP and one near a large pit group dating from the Middle Bronze Age to Early Iron Age at the M11 site. The first of these (pit 322014) produced a small amount of emmer and spelt cereal processing waste from a top fill, probably derived from the piecemeal processing of grain prior to cooking. The second sample, from the base of pit 423049, produced an assemblage that was richer in grain, chaff and weed seeds. It may have originally consisted of burnt whole ears or spikelets, complete with twining/scrambling weeds such as cleavers and black bindweed. Again, both emmer and spelt wheat were identified, with a small amount of barley and possible oat. The frequency of cleavers seeds suggested that at least some of these crops were being autumn-sown. Perhaps the cultivation of both emmer and the hardier crop, spelt, allowed the work and risk to be spread over both seasons of cultivation. As noted earlier, the heavy clay soils are better suited to autumn sowing, so the introduction of spelt wheat in the Middle Bronze Age could well have been a reason for the expansion of settlement onto the Essex boulder clay in this period. Small quantities of hazelnut shell in some of the samples showed that wild food resources were still being exploited.

The structure providing the most information about the Middle Bronze Age landscape was the remains of a barrow constructed on the floodplain near Pincey Brook (see Chapter 4). According to the dating evidence, the barrow may have been constructed before the settlement at the MTCP site, but it continued to be used for funerary rites, as demonstrated by the charcoal and cremated bone on the site. A radiocarbon date from the middle of the sequence of silting up produced a date of 1435 BC to 1272 BC cal. Trees and shrubs that may have been used for pyre fuel included hazel, hawthorn/*Sorbus* -type and probably oak (Gale). Pollen samples, soil thin sections and bulk samples, waterlogged plant macrofossils and insect remains from sediments accumulating in the ring ditch (324078) were analysed, providing details of the surrounding landscape during use of the monument. All of the evidence indicated a predominantly open, grassland environment around the site at MTCP, to the east of Stansted Airport. Much of the clearance appears to have taken place before the construction of the barrow, and Middle Bronze Age tree-throw features were found on several of the sites excavated. Pollen counts from the lower levels of silting of the ring-ditch indicated a less than 20% tree cover, falling to 5% (Huckerby *et al*.), and nearly all of the terrestrial insects were species associated with grassland (Robinson). Alder, hazel and sporadic larger trees existed nearby but there was no substantial tree cover close to the barrow, since only 1% of the beetles were dependent on wood or trees (Robinson). The pollen evidence suggested that some cereal cultivation was taking place in the vicinity of the monument (Huckerby *et al*.), although cereal pollen could also have come from crop processing activities taking place nearby, or from the ritual deposition of cereal-based foods and grain.

The barrow ditch appears to have held standing water from the time of its construction, since seeds from plants such as the aquatic buttercup crowfoot (Carruthers) and duckweed (Carruthers, Robinson) and their associated insect taxa were frequent, and organic preservation was good. The fluctuation of the water table increased through time, bringing about the formation of peat within the ditch (Macphail and Crowther). The environmental evidence as a whole suggested that human activity in the area was only ever at a low level, with no indication from the insect assemblage that settlement features occurred nearby (Robinson). However, worked wood including off-cuts, wood chips and stakes of elm, field maple, alder and oak was present in the lower ditch fills, demonstrating that some activities were taking place close to the ditch. These remains may explain the presence of a few plant macrofossils from woody plants in the ring ditch, such as sloe, hawthorn, blackberry and cf. maple, or they may be derived from material brought onto the site in dung, for leaf fodder or perhaps for human food. Marsh insects and plant remains were relatively infrequent, suggesting a sharp change in the vegetation from the water-filled ditch to dry grassland. The plant and insect remains were indicative of pasture rather than meadows, and the recovery of dung beetles confirmed the presence of grazing animals (Robinson). However, nutrient enrichment of the ditch sediments was not excessive, according to the plant assemblage (Carruthers) and soil phosphate levels (Macphail and Crowther). Therefore, grazing must have been occurring at a fairly low level in the vicinity of the barrow, as water-filled features inevitably attract animals coming to drink.

There was some pollen evidence to suggest that small trees/shrubs such as alder, hazel and field maple may have increased as the barrow fell into disuse. Pollen from the top of the ditch sequence and from the upper layers of a waterlogged pit (316118) close to the barrow showed an increase in these taxa, perhaps indicating scrub regeneration or an increased use of hedgerows.

A finds-rich waterhole (309075), located close to roundhouses in the entrance to the settlement, produced high phosphate levels and abundant soil micromorphological evidence to suggest that livestock had been trampling the damp soils around the margins (Macphail and Crowther). In contrast, waterhole 302043, south-west of the settlement, produced much lower phosphate levels and fewer signs of trampling.

To the west of the airport on the M11 site, a Late Bronze Age waterhole, 430084, produced well-preserved plant macrofossil and insect assemblages that suggested that, at the time the sampled deposits were formed and in this area at least, scrub or woodland was an important component of the landscape. The insect remains showed that the waterhole held stagnant water, and thirteen percent of the terrestrial beetles were from wood or tree-dependent taxa. There was some evidence for pasture, and beetles that feed on the dung of large herbivores were fairly frequent (13%), but there was no evidence that human habitation existed nearby. The waterlogged plant remains confirmed this description of the local environment. Aquatics such as crowfoot, buttercups and duckweed were frequent, suggesting that the waterhole was not intensively used by humans. In contrast, most of the waterholes at Perry Oaks, Heathrow (Carruthers 2006) contained very few aquatics, probably because they were kept clear of vegetation during the main period of use. Indicators of nutrient-enriched soils, such as stinging nettles, chickweed and docks, were abundant, and this was probably due to use of the waterhole by grazing animals. The deposition of domestic waste may also have been responsible for raising the nutrient status, as pot sherds were frequent in some layers of deliberate backfill, and a few fragments of economic plant waste were recovered (an emmer/spelt glume base and three fragments of cultivated flax capsule). These remains demonstrate that the cultivation of hulled wheat and flax was probably taking place locally, but that this was on such a small scale or over a short period that few environmental remains were preserved. The wide range of plant taxa from woodlands or scrub (including alder buckthorn, hawthorn, blackthorn, maple, rose, elderberry and blackberry) reinforce the insect evidence that this type of vegetation occurred nearby, particularly since twigs, thorns and leaf fragments were present. As all of the taxa were of a scrubby nature it is possible that the seed and insect samples represent a period of abandonment of the feature, when livestock may still have been using the waterhole but humans had started to backfill it with domestic waste. Scrub rapidly grows up around abandoned features of this type (Mark Robinson, pers. com.), particularly nitrophilous shrubs such as elderberry. However, numerous Middle Bronze Age and later waterholes at Heathrow (Perry Oaks and T5, Carruthers 2006) have produced evidence indicating that hedgerows, scrub or woodland had been growing nearby, even where primary fills producing little domestic waste were examined. Perhaps waterholes were positioned in the corners of hedged fields, or in clearings within scrub/woods. This is a subject worthy of further investigation.

Sheep and cattle were the main domesticates during the Bronze Age at Stansted, according to evidence from the bone assemblages, with small amounts of horse, goat and pig (Bates). By far the largest number of bones (>90%) came from the settlement site at MTCP, with 45% being derived from waterhole 309075 and most of the remainder being found in pits to the west and south-west of the settlement (Bates). A small number of red and roe deer bones in the samples from the MTCP site and an aurochs tibia from the barrow ditch provided evidence of some of the wild artiodactyls that could have been hunted in surviving areas of woodland.

Taking the structural and environmental evidence as a whole, the Middle Bronze Age landscape appears to have been a mixture of surviving woodland on the boulder clay plateau which provided opportunities for hunting game and gathering wild fruits and nuts, with lightly grazed grassland over much of the remaining slopes. The range of larger woodland trees represented included oak (charcoal and worked wood), and elm (worked wood), with the smaller trees/shrubs hazel, field maple and hawthorn/*Sorbus*-group growing as an under storey. It was not possible to determine precisely how heavily wooded the plateau was without further pollen samples being taken from a variety of locations away from the river valleys, but the fact that pollen samples from features at the

M11 site, some distance west of the settlement also produced low tree/shrub percentages (<25% and <10%) suggested that the landscape was predominantly open. It is uncertain to what extent livestock was allowed to range free, combining woodland browsing with grazing the grassy slopes, as there was little archaeological evidence of divisions within the landscape at this time, beyond the immediate settlement enclosures. However, the plant macrofossil and insect evidence from waterhole 430084 suggested that hedgerows were probably present, and these were being cut and/or browsed sufficiently short to reduce pollen production to a low level. Thorny hedgerow taxa such as hawthorn and sloe are insect-pollinated low pollen producers, so deliberately planted and maintained thorn hedges would not easily be detected in pollen diagrams.
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The valleys retained areas of alder fen carr on the wetter ground, judging from the pollen, worked wood and charcoal evidence. In areas of the valley bottom where the soils were less heavy than the plateau clays but not permanently wet, arable cultivation may have been possible. The pollen evidence suggested that cereal cultivation was taking place close to the settlement and close enough to all of the Middle Bronze Age features from which samples were taken to register in the pollen diagrams. Little information about the precise location of the arable fields was recovered from the small charred weed seed assemblages, but there was only a slight suggestion that heavy clays or damp soils were being cultivated (one sedge seed only). In addition, the absence of calcareous sediments in the barrow ditch suggested that there was no cultivation taking place upslope of the monument to cause erosion of the chalky till plateau (Macphail and Crowther). The presence of rubbing stones or quern stones in the settlement features, cereal and some arable weed pollen in all of the waterlogged features studied, and several charred emmer, spelt and barley remains in a few features suggested that cereals were probably being grown locally, rather than being brought into the area. In particular, the possible storage of emmer and spelt spikelets or ears in pit 423049 (M11) suggested that these may have been locally grown crops. Arable cultivation may not have been taking place on a large scale, however, since very few of the settlement features produced charred cereal processing waste or accidentally burnt grain (although, of course, it is dangerous to rely too heavily on negative evidence, as processing areas may simply have been missed). Thus, the settlement appears to have been located on the boundary between several different vegetation types, so that grazing, arable cultivation and sources of fuel and water would all have been in close proximity to the inhabitants.

Late Bronze Age/Early Iron Age

Features dated to this period were fewer in number and more scattered, suggesting a decline in settlement density during the Late Bronze Age. In addition, domestic waste such as bone and charred plant remains was scarce. Cattle and sheep/goat were identified from the seven identifiable bone fragments, and the only charred plant remains recovered were a few emmer/spelt wheat and barley grains, a trace of hulled wheat chaff, a few weed seeds and a hazelnut shell fragment from two Late Bronze Age and an Early Iron Age pits on the M11 site. When added to the increased evidence for scrub or woodland, as outlined below, this suggests that the balance between open grassland and woodland/scrub moved towards a more closed, scrubby or wooded landscape during this period in comparison with the Middle Bronze Age.

Unfortunately no pollen samples were examined from this period, so quantitative comparisons with the percentages of tree pollen in the Middle Bronze Age samples cannot be made. The charcoal evidence showed that a similar range of large trees and shrubs was being exploited for fuel during the Late Bronze Age/Early Iron Age as in the Middle Bronze Age, although the absence of alder charcoal from the Late Bronze Age onwards indicates that alder fen carr in the valley bottoms had by now been lost. The decline of alder and hazel pollen were observed in pollen diagrams such as the Middle Bronze Age barrow ditch (Wiltshire; Huckerby *et al*.).

The burnt mound samples from the LTCP site (BAACP01) produced primarily oak and hawthorn/*Sorbus* group charcoal, with blackthorn, ash, elm, hazel and willow/poplar. Most of these taxa were also present in five Late Bronze Age and Early Iron Age pits on the M11 site, except willow/poplar, but with the addition of frequent field maple fragments in two of the Early Iron Age pits. No significant differences were observed in the charcoal assemblages from pits with placed deposits, such as pit 423143 which contained a pot, so fuel does not appear to have been specifically selected for ritual purposes. The continued availability of a wide range of large wood (eg oak, ash, elm) and shrubby/hedgerow taxa (eg hawthorn group, blackthorn, hazel) into the Late Bronze Age and Early Iron Age suggests that sufficient woodland still existed nearby to provide ample fuel.

Middle Iron Age

As with the Late Bronze Age/Early Iron Age, the evidence for settlement during this period was scarce, consisting of small agricultural settlements with no evidence for divisions of the landscape. The only environmental remains recovered were charcoal fragments from a Mid/Late Iron Age hearth on the M11 site; feature 430042. The hearth, which was associated with the ring-gully of a roundhouse, produced no food remains, only a few small fragments of hawthorn/*Sorbus*-group and blackthorn charcoal.

Late Iron Age/Early Romano-British

Evidence for settlement was more substantial from this period, with the first clear evidence for use of the clay plateau. Other indications of a change in the scale of agricultural activities were the enclosure of large fields linked by droveways, and the greater frequency of quern stones. Soil micromorphological studies of enclosure ditch fills, droveway deposits and a ring-ditch (Macphail and Crowther) revealed some evidence of trampling, and the incorporation of phosphate, small charcoal and fine organic material (enclosure 113048, enclosure 109166, ring gully 129162, droveway 109189), but in most cases increases in these anthropogenic indicators were not great. Quantities of bone fragments and charred cereal remains, however, were notably greater, with over twice as many bones being recovered from the Iron Age to early Romano-British period samples as the Mid to Late Bronze Age samples, and with charred plant remains concentrations rising tenfold from the Middle Bronze Age to the Late Iron Age/early Romano-British (from around 3.6 fragments per litre (fpl) in the Middle Bronze Age samples to an average of 39.1 fpl for the Late Iron Age, Late Iron Age/early Romano-British and early Romano-British samples).

As in the Bronze Age, the main domesticates were cattle and sheep/goats (probably mostly sheep) with cattle making the greatest contribution of meat to the diet. Pigs, horses, goats and dogs were represented to a lesser extent. Most of the bone and charred plant material was recovered from ditch fills, rather than pits, gullies and postholes. Taking taphonomic biases into account, the pattern of bone distribution and age at death patterns pointed to the slaughtering and butchery of livestock on site, with cattle being used for meat and milk, sheep often being slaughtered early for meat but probably also being used for wool and milk, and pigs usually being slaughtered early for meat. Small numbers of deer bones indicated the continued hunting of wild species (Bates). The recovery of small quantities of marine shells (oyster, bivalve and cockle) from a ditch at BAAMP00 confirmed that foodstuffs were being traded and brought to the site from some distance (Wyles).

Midden material deposited in the ring-gully of a roundhouse (feature 430039) contained pot, bone and a large concentration of charred cereal remains. The cereal assemblage consisted mainly (>80%) of hulled wheat (emmer/spelt) and hulled barley grain, with a few weed or cultivated oat grains. Being a mixed midden deposit, the few fragments of chaff, frequent weed seeds and hazelnut shell fragments may not have been derived from the same charring events as the grain, so interpretations based on crop processing activities may be unreliable. As a whole, the assemblage probably represents a variety of household waste ranging from the accidental charring of grain being prepared for cooking, waste chaff and weed seeds picked out of the crop during piecemeal grain cleaning prior to cooking, and the waste from the consumption of other ‘snacks’ such as hazelnuts.

For the Late Iron Age and early Romano-British period as a whole the arable aspect of the economy appears to have been well-developed. Spelt wheat was probably the main cereal grown for human consumption, although emmer and hulled barley continued to be important. Bread-type wheat made its first appearance in these samples and increased in occurrence as the Romano-British period progressed. It is probably grossly under-represented in the charred plant record, since it is a free-threshing cereal and so is less likely to become charred than emmer and spelt. Oats may have started to replace barley as a fodder crop to some extent in the early Romano-British period.

A range of new weeds of cultivation occurred from the early Romano-British period, possibly having been introduced in imported spelt wheat (eg London, Straker, 1984), including corn cockle, small-flowered buttercup and *Lolium perenne/rigidum*. However, stinking chamomile, a weed of heavy, clay soils, did not occur prior to the mid Romano-British period. Perhaps enclosures on the plateau were primarily used for low-level livestock rearing in the Late Iron Age /early Romano-British, rather than for arable crops. Other damp ground weeds, such as spike-rush and sedges, were notably more frequent in the Late Iron Age/early Romano-British and early Romano-British samples than at any other time, indicating that most of the cultivation may still have been taking place on the lower lying ground near Stansted Brook at the LTCP site. Another significant category of weeds that was well-represented in the Mid/Late Iron Age sample discussed above and in all of the Late Iron Age, Late Iron Age/early Romano-British and early Romano-British samples was the small-seeded weed vetches (<2 mm diameter seeds of *Vicia/Lathyrus* sp.). These are characteristic of nutrient-depleted soils (Moss 2004), so their abundance suggests that, although arable cultivation appears to have been occurring at a greater scale, yields per unit area of land may have been dropping because manuring was not yet being practised or was insufficient to meet the needs of the cultivation regime. Using van der Veen's description of agricultural systems (2005,158), the Late Iron Age / early Romano-British economy was probably operating along the lines of an extensive agricultural system (low input, large area of land).

Unfortunately no pollen samples covering this period were available to determine the extent of woodland clearance, but charcoal from nine features, including four cremation burials, provided some useful evidence for the availability of woodland resources (Gale). Whilst oak and ash were the dominant woods used as fuel for the funeral pyres at LTCP, oak heartwood was scarce and most of the fragments comprised narrow roundwood. Gale suggests that this may indicate a scarcity of large timbers nearby, since largewood would have been the most suitable fuel to create a stable platform and long-lasting fire. The recovery of roundwood suggests that coppicing may have been practiced in order to manage valuable woodland resources in a sustainable way. Roundwood was also recovered from a ditch deposit containing household waste, indicating that domestic fuelwood was also derived from a managed resource. The range of other species used for the pyres and domestic fuel were shrubby species such as hazel, hawthorn/*Sorbus* group, willow/poplar, field maple and blackthorn. These could have come from the trimming of hedgerows, from woodland margins or areas of scrub.

Mid and late Romano-British

A well-developed agricultural system continued to be in operation through the Romano-British period, with some signs, from the creation of new enclosures and droveways, that the settlement was expanding, and perhaps becoming more intensive in the level of effort being expended. Settlement was still primarily taking place on the edges of the plateau and valley slopes, with most of the evidence coming from the LTCP and MTCP sites, but there was some evidence for use of the boulder clay plateau (see below). Industrial activities were also taking place, such as metal-working, and these would have required a steady supply of fuelwood to have been available in the locality.

The dominance of beef as a source of meat over sheep/goat became even greater during the Romano-British period, and there was evidence from the presence of primary butchery waste that animals were being slaughtered and prepared on site. Cattle were being used for meat, traction and milk. Small numbers of sheep/goat, pig, horse, deer, and domestic fowl bones indicated other sources of meat, wool and transport (Bates). The importation of marine shells to the site increased, although shellfish was still being consumed as a dietary supplement rather than a major component of the diet. The evidence suggested that the oysters had probably come from managed beds on the East coast (Wyles).

Evidence for the arable aspect of the economy came primarily from the MTCP and LTCP sites, with a single rich sample coming from the LBR site. Most of the rich, charred assemblages came from the enclosure ditch surrounding the late Romano-British corn-drying oven 338022, or from features associated with the oven. The oven had been used to dry spikelets of spelt wheat in order to remove the husks, and the evidence suggested that the crop had been remarkably pure and free of relict crops and weeds. Although no pure malting waste was recovered, the oven may have been used for malting from time to time. Spelt cultivation appears to have been occurring on a much larger and more closely regulated scale than before, perhaps in order to produce surpluses to trade. Other crops represented by small numbers of charred remains were bread-type wheat, emmer, oats, rye, possible peas and flax. Barley was much less frequent in this period than before, perhaps because oats and rye had replaced it as fodder crops. Wild foods including hazelnut shell, sloe, rose and hawthorn were recovered from several samples and no imported fruits, herbs or spices were recorded, suggesting that the diet may have been fairly rural and monotonous in character. However, pollen from a possible cess pit or waterhole, 347041, provided hints of the types of foods that may have been consumed, but for which the evidence is rarely found in charred assemblages. A single grape pollen grain probably indicated an occasional luxury food, and frequent Apiaceae (carrot, coriander, dill, etc.) pollen and a possible charred wild carrot seed could represent use of carrot seeds for flavouring and/or medicinal purposes (although admittedly the evidence is slim). Lust (1974) notes that an infusion of wild carrot seeds can be used as a diuretic or to cure flatulence. The roots were probably also eaten, but for the pollen to have been preserved in this feature seeds were likely to have been eaten.

The arable/disturbed ground weed, stinking chamomile (an indicator of heavy, damp, clay soils) was recorded for the first time in several samples, and small-seeded weed vetches were much less common than in the previous period. These differences suggest that arable crops were now being grown on the boulder clay plateau. Although difficult to plough initially, clay soils can be rich in nutrients. They would have been well-suited to the cultivation of spelt and bread-type wheat. Crops such as oats, rye and flax may have continued to have been grown on the damper, lighter soils of the valley bottom, as they are more tolerant of poor, acidic soils. An additional reason for the reduction in leguminous weeds may be the increased use of manuring during the mid to late Romano-British period, or perhaps the cultivation of peas in rotation with cereals. Peas were recovered from a mid Romano-British ditch 109214 on the LTCP site. Possible evidence for manuring was the fact that small, abraded pot sherds were more widely spread during this period. This increased input of effort, high level of output but limited evidence for the expansion in terms of area of land under cultivation, all suggest the intensification of effort being put into the existing farming system (van der Veen 2005).

Charcoal recovered from features, a hearth, the corn-drier and a pit near the smithy on the MTCP site indicated that the same range of taxa was being exploited for fuel as in the previous period, and that woodland management was still taking place. Fast-grown roundwood was present in charcoal from the feature near the smithy. However, pollen evidence from the late Romano-British enclosure ditch, feature 143007, at LTCP site to the north-west suggested that very little woodland remained in the catchment area. Of course, pollen production would have been affected by woodland management practices such as coppicing, pollarding and the regular cutting or layering of hedges. Grassland taxa, ruderal weeds, cereal pollen and arable weeds were all frequent in the ditch sequence, although meadows and grazed pastures were thought to be the dominant vegetation type in this area (Huckerby *et al.*). Soil thin sections from the enclosure ditch produced only slight evidence for the input of anthropogenic inclusions and a small amount of evidence for animal trampling (Macphail and Crowther). It is possible, then, that the focus of activity at the LTCP site was around animal husbandry on a fairly small scale, or for a short period of time. This contrasts with the results from MTCP site.

Moving towards the area that produced the most archaeological evidence for settlement (MTCP), a mid Romano-British ditch at the LBR site, 205018, produced a much larger quantity of cereal pollen. This may be associated with the abundant charred spelt remains from the nearby ditch 207013, since spikelets and processing waste can contain high levels of pollen (Robinson and Hubbard 1977). Both lines of evidence demonstrate that the evidence for arable cultivation and cereal processing was stronger on this site. The charred cereal results from Stansted were very similar to the findings from the A120 trunk road sites to the east of the airport, except that the large concentrations of spelt processing waste signifying arable intensification appear to occur slightly earlier on some of the A120 sites, in the early Romano-British period rather than mid to late Romano-British. In general, this production of pure spelt on a large scale seems to have been widespread from the early to mid Romano-British period onwards on the Essex boulder clay. Having been largely left uncultivated prior to this period, the fertile clay soils were obviously favoured for spelt cultivation once the technology had been developed to enable them to be ploughed. Other advances appear to have included manuring, the digging of ditches to improve drainage and the use of corn-driers to process grain on a large scale. Processed grain would have been less bulky to transport, but may not have survived so well in storage in the damp British climate. Sprouted grain was observed on all of the sites where bulk processing was taking place. The level of sprouting was too low to suggest that the main source of waste had been from the production of malt, but some malting waste may have been mixed with the dehusking waste from oven 338022. Sprouting in storage probably became more of a problem at this time because dehusking leaves the grain vulnerable to damp, as well as pests and diseases.

<u>Late Saxon and early medieval</u>

Very little archaeological evidence has been recovered for Saxon and early medieval settlement of the area, from either the 1986-91 Stansted excavations (Havis and Brooks 2004), the A120 sites (Timby *et al.* 2007) or the sites examined for this report (see Chapters 9 and 10). Villages became established in the river valleys and lower slopes during this period in Essex, rather than on the clay plateau. It is likely, therefore, that there was considerable woodland regeneration on the higher ground between the late

Romano-British period and the Late Saxon occupation on the MTCP and SG sites. Although no well-dated pollen evidence was obtained to confirm this suggestion, the Domesday book survey in 1086 shows the Stansted Airport area to have been one of the most densely wooded parts of Essex. The main manor at Stansted was listed as having arable land, meadows, a mill, probably a church and enough woodland to feed a thousand pigs (see Chapter 9). The documentary evidence suggests that woodland clearance, perhaps due to assarting by tenants, was occurring on all of the local manors in the 11th century, with most of the land probably being initially turned over to pasture. It shows that Stansted became a polyfocal village within large open fields and smaller demesne and tenant enclosures. Clearance continued into the 12th and 13th centuries as the population increased (see Chapter 9).

The Late Saxon archaeological evidence consisted of scattered features primarily in the MTCP and Southgate areas. A burnt building on the MTCP site, 302020, produced evidence that the building had been constructed of wattle panels with a chalky cob daub (Macphail and Crowther). Three of the four samples from the beamslots contained primarily oats. This probably indicates that it had been used to house livestock, although it could signify a change in the diet or simply represent the chance accidental burning of some stored oats. Since the few other charred waste deposits from pits produced primarily bread-type wheat, it is most likely that the building assemblage represented fodder. Stinking chamomile, an indicator of heavy, clay soils, was frequent in one pit sample, indicating that the wheat was probably being grown on the boulder clay plateau. Small quantities of rye were also recovered from the charred samples. Of particular note were eleven grains and a glume base of hulled wheat in a sample from the beamslot, since hulled wheats are rarely found in deposits later than the Romano-British period. For this reason, a well-preserved example was radiocarbon dated, producing a date of AD 960-1040 ±30 (NZA-23235). Therefore, it appears that some hulled wheat (most likely spelt) continued to be grown in the Stansted area into the Late Saxon period. Perhaps this is a reflection of how well the clay soils suited this crop. Spelt was probably grown for fodder, in which case the husks would not need to be removed and it was less likely to become charred. This could account for its scarcity in the Saxon and early medieval charred plant record.

One change to the crops being grown was the introduction of a second free-threshing cereal, rivet-type wheat. A number of medieval settlements across southern and central England have now been found to have been growing both bread-type and rivet-type wheat (Moffett 1991), perhaps because the grains have different culinary properties (one producing a well-risen loaf of bread, the other more suited to biscuit making), or maybe to 'hedge your bets' as they ripen at slightly different times and differ in their resistance to pests and diseases. A third possibility is the specific cultivation of rivet-type wheat for thatching, as it produces a superior, long straw. Rivet wheat is less frequent in Saxon deposits, although it has been AMS dated to the Late Saxon period at Higham Ferrers, Northamptonshire (Moffett 2007, 169).

A wider range of dietary evidence was recovered from a Late Saxon cess pit at Southgate (498020) and an early medieval cess pit north-east of this on the MTCP site (310136).

Mineralised plant remains helped to redress the charred preservation bias towards cereals, through the preservation of frequent ‘chewed’ fragments of legume seed coat. Amongst the numerous small unidentifiable fragments of legume seed coat, a few pea and Celtic bean fragments were identified. In the cess pit from the MTCP site, legume fragments were almost as numerous as cereal bran fragments, supporting the impression retrieved from over 20 cess pits at the Middle Saxon settlement of Hamwic, Southampton (Carruthers 2005) that legumes had been much more important in the Saxon and early medieval diet than the charred evidence suggests. Fruit remains were particularly frequent in the cess pit from the MTCP site, comprising mainly of native fruits such as blackberries and crab apple, but also some possible orchard fruits such as damson/bullace and cherry/sloe. The contents of the pit at the SG site were not so well preserved, and only a few blackberry and apple/pear seed embryos were recovered. Seasonal differences could have contributed to the differences between the pits, as well as the temporal and preservational differences, although many of the foods mentioned could have been stored for most of the year if they were dried or made into preserves. Other plants of economic importance represented in these two pits that may have been consumed for medicinal purposes or as flavourings included flax, opium poppy and cf. mustard. The presence of frequent mineralised straw or rush stems may have been due to the use of this type of material as toilet paper, or the deposition of waste flooring/bedding materials to dampen smells.

A posthole near to the cess pit on the SG site produced numerous charred flax seeds, suggesting that the processing of flax for fibre, or perhaps for oil, was taking place nearby. Very few bones were associated with the Late Saxon and early medieval features, so little can be said about this aspect of the economy except that bones from cattle, sheep/goat, pig and bantam were present in domestic waste contexts. One pit on the MTCP site (310136) produced evidence for the processing of cattle carcases (Bates).

Later medieval

By the later medieval period (*c* 13th to 15th century) a post-mill had been constructed on top of the hill, and a settlement built on the MTCP site. However, features of this date produced even fewer bone or seed-rich samples, so very little is known about agricultural practices during this period. From the very few bones recovered, the main domesticates present in the early medieval period were again represented.

Samples from the later medieval midden deposit 467008 demonstrated that oysters were being brought to the settlement to provide variety in the diet. Frequent drainage ditches running downslope from the plateau were dug close to the settlement at the MTCP site, suggesting that arable crops were being grown on the slopes. Thin sections from one of these (336090) showed that the ditch sometimes held standing water, and it was cleared out from time to time. Phosphate levels in the sediments were not greatly enhanced, so if manuring was carried out it was at a fairly low level (Macphail and Crowther). Normal practise at this time was to restore fertility by folding sheep on the arable land once the wheat had been harvested, and Dyer notes that, where sheep numbers were not sufficient, the effect on crop yields could be disastrous (Dyer 2005, 21). Unfortunately the scarcity of bone evidence from this period means that little is known about the rearing of livestock.

<u>The post-medieval hunting lodge</u>

The post-medieval hunting lodge and park on the LTCP site provided an interesting example of the management of land to suit a specific purpose. Although the bone assemblage clearly reflected the activities taking place at the lodge, the plant macrofossil assemblage produced only a few signs that the plant-based diet was a little more high-status and exotic than the earlier settlements.

Evidence for management of the parkland surrounding the lodge came from a pollen sample and plant macrofossils in post-medieval pit 464035. The pollen assemblages indicated that the landscape was predominantly open grassland, with sporadic trees (Huckerby *et al*.). Charcoal from enclosure ditch 466020 comprised frequent hornbeam roundwood, oak, field maple, ash, hawthorn/*Sorbus*-type, blackthorn, willow/poplar and cf. hazel (Gale). Small quantities of pollen from several of these species suggested the presence of hedgerows or scrub, and the recovery of a few rose/blackberry and sloe/hawthorn–type thorns indicated this vegetation type occurred near to the feature. Many of the above tree and shrub species can be coppiced and are particularly well-suited to being used for hedging. The documentary evidence suggests that parkland trees were often pollarded, and different vegetation areas such as coppiced woodland, hay meadows and open hunting lawns would have deliberately been created (see Chapter 10). A single hop seed could have originated from a wild vine growing in the hedgerow. Unfortunately, the evidence was too slight to suggest that hops were being cultivated.

Pollen from cereals and possible peas/beans was also present in pit 464035 (Huckerby *et al*.). Evidence of these crops was recovered from charred assemblages nearby (see below), although burnt domestic waste was not deposited in this particular feature. Aquatic, damp ground and marginal pollen and plant macrofossils showed that the feature had held water at the time the deposits were forming. Most of the waterlogged plant macrofossils consisted of grassland and damp grassland taxa, such as cinquefoil, buttercups and selfheal. The recovery of several seeds from thistles and plantain suggested grazed pasture in the immediate vicinity, though the presence of meadowsweet pollen indicates there may have been meadows on the wetter areas.

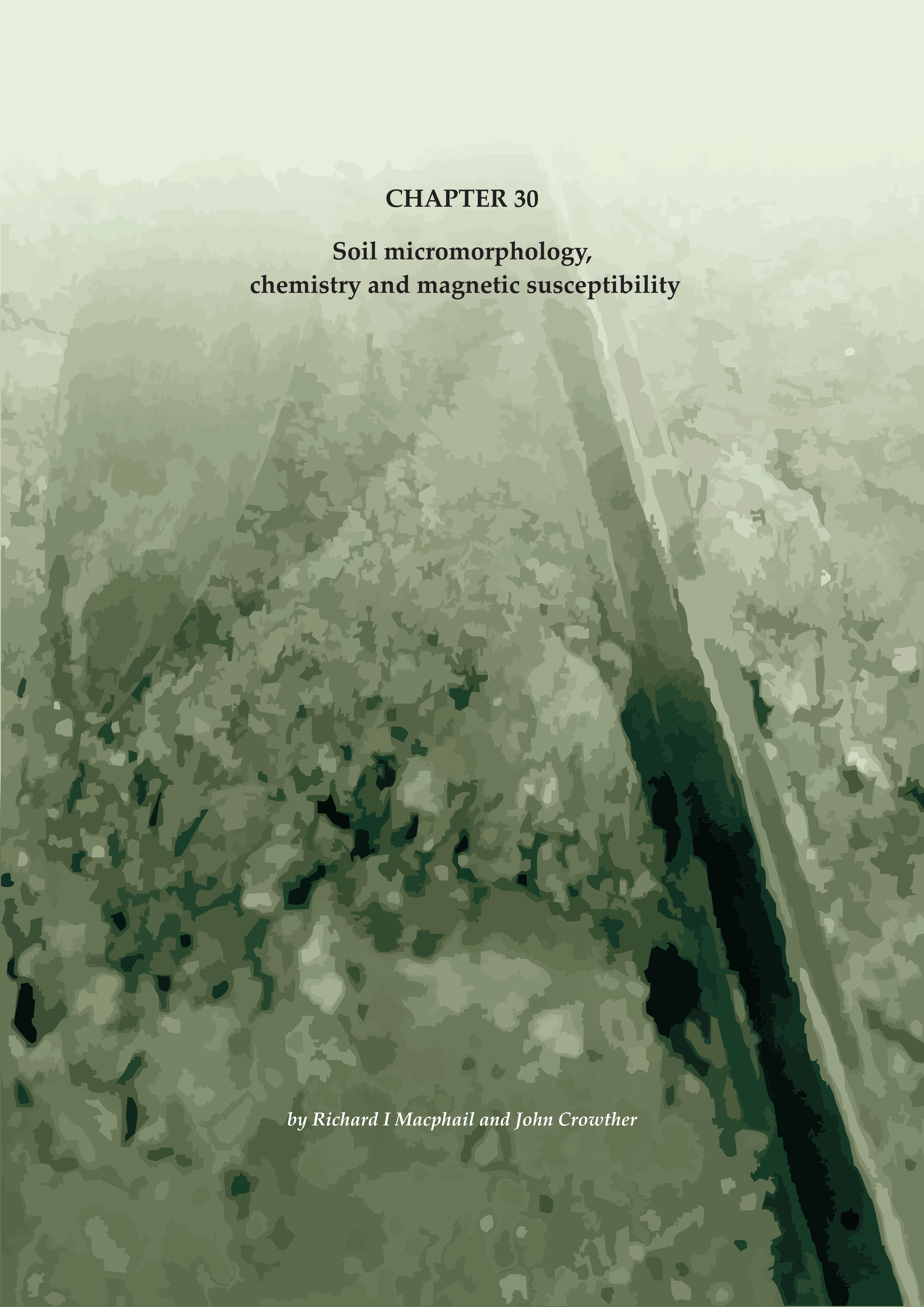
Waterlogged plant macrofossils from well 461038 provided slight clues that a formal garden and orchard may have existed at the Hunting lodge. A single possible box leaf and several bullace/damson fruit stones hint at the likelihood that this type of property would have had a garden. Clipped box hedges were popular during the 16th century, although hunting lodges were sometimes quite rustic in character so the garden may not have been formally laid out. The recovery of two grape pips could suggest the presence of a vine, but imported raisins may also have been purchased (Carruthers). Oysters were recovered from a ditch and occupation layer in the hunting lodge (Wyles), providing evidence that luxury foods were being brought onto the site.

The range of charred cereals recovered from two hearths in the hunting lodge and well 461038 was similar to the Late Saxon and early medieval pit assemblages on the MTCP site (bread-type and rivet-type wheat, a little rye and oats, peas, Celtic beans) but for the first time since the Late Iron Age hulled barley was fairly frequent. Although barley is not normally considered to be a high-status cereal, at least not for human consumption, the presence of barley could reflect the fact that the owners of the hunting lodge could afford to buy-in barley if it did not grow well locally. Alternatively, they could probably also afford the labour and manure to cultivate their fields to a level where a reasonable barley crop might grow. The presence of charred peas and beans in the two hearths suggests a fairly wholesome, rural diet, but these could be the remains from servants' meals or fodder. Peas were often used as pig food during the medieval period (Dyer 2005).

The bone assemblage demonstrated that the meat aspect of the diet was strongly influenced by the operation of the property as a hunting lodge. Although beef was still an important component of the diet and lamb/mutton and pork were being consumed, deer and birds, including game such as pheasant, made up significant proportions of the assemblage. Features such as the latrine, 447014, contained large numbers of bird bones including domestic fowl and pheasants. A pit (134059) some distance south-east of the lodge contained frequent fallow deer bones, possibly representing the disposal of waste from an episode of poaching. Roe deer and red deer bones were recovered in smaller numbers from other features. Other species, including the usual domesticates, horse, dog, cat and fox bones were only present at low levels. Additional game being hunted included rabbit and goose (Bates).

Conclusions

The sequence of changes in the landscape at Stansted Airport was very similar to those on the A120 sites (Timby *et al*. 2007) to the east and on the 1986-91 excavations (Havis and Brooks 2004). Results from these studies have helped to fill in some of the gaps in the sequence, particularly where waterlogged preservation has provided several lines of evidence, such as in the Middle Bronze Age barrow ditch. Mineralised preservation in two Late Saxon and early medieval faecal deposits provided valuable additional information about the non-cereal aspect of the diet. The most notable differences in this area were the continued cultivation of hulled wheat into the early medieval period, and the bone and other environmental evidence from the Hunting lodge, providing information about a specific type of land management. The local clay soils were likely to have been the main controlling factor throughout the centuries on aspects such as industrial activities (due to the availability of fuel wood), the introduction of new crop plants and the methods of crop husbandry being practised. They appear to have been deliberately selected during the Romano-British period for large scale cultivation of spelt wheat.



CHAPTER 30

Soil micromorphology, chemistry and magnetic susceptibility

by Richard I Macphail and John Crowther

30 Soil micromorphology, chemistry and magnetic susceptibility

Richard I. Macphail and John Crowther

Excavation of the LTCP and MTCP sites at Stansted Airport found multi-period occupation that included Middle Bronze Age to post-medieval archaeology. After two visits to the Stansted sites in 2000, 20 monoliths were assessed at Oxford Archaeology. No buried soils as such were found and soil studies focused upon Middle Bronze Age barrow ditch fills, Late Iron Age gully fills and droveway deposits, Romano-British ditch and trackway sediments and Medieval ditch and pit fills. Soil studies – soil micromorphology, chemistry and magnetic susceptibility – were employed to investigate 16 monoliths selected after the assessment process. These were processed and studied during Autumn 2004 and New Year 2005.

Samples and sub-sampling

The 16 long monoliths that had been selected were first sub-sampled for bulk analyses (by Drs Jill Cruise and Richard I Macphail), for each context under study – producing 33 bulk samples in all (see below; Tables 30.1 and 30.4). Parts of the monoliths were then cut up to produce 25 thin section block samples, according to the assessment (see below and Table 30.4).

Methods

Chemistry and Magnetic Susceptibility

Thirty-three bulk samples were analysed for phosphate (see reviews by Bethel and Máté 1989; Crowther 1997; Heron 2001) and magnetic susceptibility (Clark 1996; Scollar *et al.* 1990), both of which are widely used in the investigation of archaeological contexts; and for loss-on-ignition (LOI), which provides an estimate of the organic matter concentration. Analysis was undertaken on the fine earth fraction (ie <2 mm) of the samples. Phosphate-P_i (inorganic phosphate) and phosphate-P_o (organic phosphate) were determined using a two-stage adaptation of the procedure developed by Dick and Tabatabai (1977) in which the phosphate concentration of a sample is measured first without oxidation of organic matter, using H_2SO_4 as the extractant (P_i); and then on the residue following alkaline oxidation with NaOBr (P_o). These were summed to give total phosphate (phosphate-P), and the ratios phosphate-P_i:P and phosphate-P_o:P (expressed as percentages) were calculated. For eight of the samples (detailed in footnote of Table 30.1) it was not possible to determine the phosphate-P_i concentration because of chemical interference in the colorimetry, which is presumed to be attributable to the organic matter present. In five of these cases, it was possible to determine phosphate-P following alkaline oxidation, but for the remaining three samples, which had the highest organic matter concentration, analysis was undertaken on residual soil from the LOI analysis (see below).

In addition to χ (low frequency mass-specific magnetic susceptibility), determinations were made of χ_{max} (maximum potential magnetic susceptibility) by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. χ_{conv} (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, viz: (χ/ χ_{max}) x 100.0 (Tite 1972; Scollar *et al.* 1990)(Tite 1972). In many respects this is a better indicator of magnetic susceptibility enhancement than raw χ data, particularly in cases where soils have widely differing χ_{max} values (Crowther and Barker 1995; Crowther 2003). A Bartington MS1 meter was used for magnetic susceptibility measurements. χ_{max} was achieved by heating samples at 650°C in reducing, followed by oxidising conditions. The method used broadly follows that of Tite and Mullins (1971), except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment (after Graham and Scollar 1976; Crowther and Barker, 1995). LOI (loss-on-ignition) was determined by ignition at 375^{o}C for 16 hours (Ball 1964).

Pearson product moment correlation coefficients have been used to examine the relationships between the various properties analysed. In cases where the data for individual properties had a skewness value of ≥1.0, a $\log_{10}$ transformation has been applied in order to increase the parametricity. Statistical significance was assessed at $p = 0.05$ (ie 95% confidence level).

Soil micromorphology

Monolith samples were impregnated with a crystic resin mixture, cured and cut up into 75 x 50 mm size blocks, which were then sent to Quality Thin Sections, Tucson, Arizona for thin section manufacture (Murphy 1986). 25 thin sections were analysed both as scanned images and under the petrological microscope: under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were described (and counted) according to standard authorities and reference studies on soil micromorphology applied to archaeology (see Tables 30.4 and 30.6)(Bullock *et al*. 1985; Courty *et al*. 1989; Macphail and Cruise 2001; Stoops 2003). Soil micromorphological interpretations were based upon the identification of soil microfabric types (SMTs), included natural and anthropogenic materials, along with bulk and microprobe data, all of which were combined with the archaeological context information to produce microfacies types (MFTs)(Courty 2001; Macphail and Cruise 2001). Literature sources and reference materials utilised in these identifications are listed throughout the text. Microprobe analysis (M415 and M2252C) was carried out at the Institute of Archaeology, UCL, by Kevin Reeves and comprised the selective mapping of Al, Ca, Fe, Mg, P, Mn, Pb, K, Cu, Si, Zn, S and Na, with quantitative grid and line analyses (*c* 86-93 points; Table 30.5).

Results

Chemistry and magnetic susceptibility

The analytical data for individual samples, summary statistics and results of the correlation analysis are presented in Tables 30.1-3, respectively. The majority of the samples are largely minerogenic, with LOI values of <5.00%. Three of the samples (2608, 2719B and 2719C1 – highlighted in Table 30.1), all from the Middle Bronze Age barrow, have notably higher organic matter concentrations (range, 11.3-13.8%), which may be significant in the interpretation of these contexts – eg they may represent organic-rich infill material.

The phosphate data display considerable variability (0.186-3.77 mg g^{-1}). In view the range of values observed, it is reasonable to assume that samples with concentrations of ≥1.50 mg g^{-1} indicate likely enrichment, and that values ≥3.00 mg g^{-1} are strongly enriched (highlighted in Table 30.1). The two samples in the latter category are from Late Iron Age enclosure ditch 109166 (context 140028, intervention 140027 - sample 415A: 3.44 mg g^{-1}) and from Middle Bronze Age waterhole 309075 (context 309076 - sample 2268C: 3.77 mg g^{-1}). The phosphate-P present is predominantly in an inorganic form – the phosphate-P_i:P ratio averaging 73.0% (range, 48.6-90.1%). Whilst these figures are quite high, they are on the whole lower than is often encountered in archaeological contexts, and this may reflect inhibited organic decomposition as a result of the poorly-drained character of the site. There is a strong correlation (r = 0.812, p<0.001) between LOI and phosphate-P_o.

Magnetic susceptibility analysis is problematic in gleyed soils such as these because of the instability and mobility of Fe minerals under anaerobic conditions. This probably accounts for the very wide variability of χ_{max} (range, 313-5080 x 10^{-8} SI), and consequently for the rather weak, though statistically significant, relationship between χ and χ_{conv} (Table 30.3 and Fig. 30.1). In these circumstances, as noted above, χ_{conv} undoubtedly provides a much more reliable measure of susceptibility enhancement than the 'raw' χ data. As is commonly the case in gleyed soils (Crowther 2003), there is a significant inverse relationship between χ_{conv} and χ_{max}. Unfortunately, the results for all of the samples are disappointing, with none showing clear signs of enhancement either in terms of the χ values (range 3.5-26.0 x 10^{-8} SI) or, more importantly, the χ_{conv} values (range, 0.140-3.10%). Two samples have χ_{conv} values of ≥2.00% (2268C: 2.30% and 2668B: 3.10%; highlighted in Table 30.1), but even these must be regarded as only representing possible low levels of enhancement.

Soil micromorphology

25 thin sections were analysed. 36 microstratigraphic units (mainly corresponding to contexts) were identified, and counted and described separately. These were characterised according to their descriptions, including soil microfabric type (SMT), void space, structure and counts of inclusions (eg, gravel, soil fragments, charcoal, burned flint, roots, organic fragments, bone and dung residues), and pedofeatures (intercalations, excrements of mesofauna, secondary $CaCO_3$ and pyrite – depletion features and iron and manganese mottling were described but not counted because of its ubiquitous presence). These data were combined with other findings (bulk and microprobe analyses, archaeological information) to produce microfacies types (MFTs), which with variants numbered 16. There is clear consistency between the soil micromorphology, microprobe and bulk data. Counts, the results of the microprobe study and the descriptions and preliminary interpretations of MFTs, are given in Tables 30.4-6, respectively. Selected thin section scans, photomicrographs and microprobe images are presented in archive.

Local soils and modern land use

The sites are located on Chalky Till (Chalky Boulder Clay), an area of typical calcareous pelosols (Hanslope soil association; Jarvis *et al.* 1983). This soil association is commonly clayey, calcareous to non-calcareous and with flint gravel in places. It is only moderately permeable and liable to seasonal waterlogging, and after periods of heavy rainfall "disposal of excess water is by lateral flow" (Jarvis *et al.* 1984, 191). The authors also note that opportunities for spring cultivation are limited and autumn cultivation and winter crops are preferred, and that grassland is a significant landuse. These background soil conditions are reflected at the site, with both areas of non-calcareous and calcareous soils, extensive waterlogging (gleyic) features, and the deposition of calcareous deposits in some upper feature fills; the last a result of erosion.

Discussion

Unphased

Palaeochannel 327003

This palaeochannel lay on the eastern edge of the plateau, on the slopes of the MTCP site, and runs roughly parallel to the Pincey Brook (Nick Cooke and Fraser Brown, pers. comm.). Although not phased directly, it certainly predates the Late Iron Age, Romano-British and medieval features excavated on the site, and may be considerably earlier. It was examined at a section in its southern part, and sampled by monoliths 2537/2539 and above, 2537/2538, with 2535 as a lateral and lower sample (5 thin sections and 2 bulk analyses). The lowest lateral samples (2535A and 2535B) are very poorly sorted, compact calcareous deposits that show horizontal fissuring/layering (and evidence of structural collapse – intercalations and closed vughs)(context 327004). They also contain fragments of possible stabling refuse (and fungal material) and are heavily yellowish brown stained (Fe and P?). They appear to be likely stock trampled deposits (watering site?), possibly near a stabling area? – or where there has been spillage of manure.

Upwards (context 327006) the deposit becomes a well-sorted calcareous silt inwash deposit with likely rooting between a succeeding inwash phase. Here a focus of animal activity (droveway/waterhole?) became inundated with fine alluvium. This alluviation is also recorded in 2537/2539 as mainly fine silty clay sedimentation, intercalated with sandy deposits (context 327006). Sediments have been weakly burrowed and rooted between alluvial events. The palaeochannel fill continues upwards (context 327008) as a now mainly massive, but once poorly layered calcareous sediment of poorly sorted chalk gravel and coarse silt through to coarse sand. Overall, the sediment shows a broad (till-derived) mineralogy. The sediment was rooted and partially burrow-mixed and has a history of dusty to impure clay inwash (from alluviation?), and minor secondary calcium carbonate formation. This was succeeded by major hydromorphic iron impregnation, and probably associated calcium carbonate and iron depletion (mottling). The deposit continues upwards (contexts 327009 and 327010) as fine clayey to fine sandy and generally calcareous sediments, with included fine charcoal, and textural pedofeatures indicating ‘muddy’ and finely laminated deposition at times. Later inwash of chalky alluvium (above) and moderate iron mottling are also recorded. The alluvial deposits show small amounts of phosphate are present (0.351-0.562 mg g^{-1} phosphate-P).

This location clearly shows a probable early history of animal trampling (unfortunately there is no chemistry for this sample) – perhaps associated with drinking, and upwards the palaeochannel appears to have been episodically (seasonally?) active, with biological working of the sediment between alluvial events. It is possible that animals continued to occasional trample the site, as indicated by ‘muddy’ textural pedofeatures.

Trackway 324058

Sample 2668 found a generally homogeneous, moderately well-sorted coarse silt and sand infilling, induced by silting, with towards the base, gravels and a totally iron-depleted sediment indicative of a waterlogged (gleyed) conditions (context 324021). Whilst this appears inconsistent with the relatively high magnetic susceptibility signal (3.10% χ_{conv}), it should be noted that at most this represents only possible weak enhancement. Upwards the deposits are affected by fine rooting, weak iron staining, and later phases of silting produced some thin dusty clay coatings, which together with low levels of phosphate (0.186-0.224 mg g^{-1} phosphate-P), appear to be poor evidence of a trackway compared to other examples studied at Stansted.

In terms of the fills and droveway sediments examined for the Late Iron Age at Stansted, the samples analysed are clearly indicative of a stock (cattle dominated?) landuse. It is probably an accident of sampling that very little evidence of domestic activity (eg phytolith cereal processing waste, burned soil from hearths etc.) was found, in comparison to some other Iron Age sites (eg, Maiden Castle, Wiltshire and White Horse Stone, Kent; Macphail 1991; Macphail and Crowther, 2004). The soils and sediments at White Horse Stone produced good evidence of mixed farming, and Balksbury Camp, Hampshire also showed how important stock management was in the Iron Age (Macphail *et al*. 2001).

Middle Bronze Age (c 1500-1100 BC)

The Middle Bronze Age was investigated through thin sections and bulk samples of the barrow ditch (324078) fills (4 thin sections and 5 bulk samples), waterhole 302043 (1 thin section and 4 bulk samples) and waterhole 309075 (1 thin section and 3 bulk samples) sediments. The waterholes lay within the Middle Bronze Age settlement on the MTCP site.

<u>Middle Bronze Age barrow 324078</u>

This barrow (324078) lay on the north-east extremity of the MTCP site, on low ground within 50 m of the Pincey Brook. The ditch fill sequence (sample 2719) commences with a non-calcareous mineralogenic (0.921% LOI) primary gravel-rich fill that contains two bone fragments that are possibly relict of Pleistocene animal activity (scat). There is an upward fining sequence above that develops into a finely laminated silty mineralogenic peat rich in detrital monocotyledonous plant fragments (context 320139, intervention 320131). This highly organic (11.3-13.8% LOI) but mineral intercalated peat, shows increasing influence of fluctuating water tables (burrowing and burrowed-in silty soil/sediment) and episodes of moderately low impact anthropogenic activity; much coarse charcoal in places, with possible charring of peat surfaces, and the presence of flint concentrations and burned flint (contexts 320140 and 320142, interventions 320140). At the top of the sampled sequence context 320144 (intervention 320143, barrow recut 324080) is mineralogenic but contains a likely burned flint. Another sample of the barrow ditch fill (2608) found a similarly peaty (11.6% LOI) deposit (context 320115, intervention 320111), with evidence of occasional faunal working and possible woody plant rooting. There may also be a trace amount of dung here but as there is no phosphate evidence of a major dung input, such a suggestion needs confirmation from another data source.

Overall it seems that the Middle Bronze Age barrow was constructed in an area of high water tables that was little disturbed allowing mineralogenic peaty deposits to form. Small amounts of anthropogenic activity are recorded by the inclusion at times of charcoal, flint and burned, and probable local burning. Disturbance and more rapid inputs of mineral material are found at the top of the sequence. The barrow is located in non-calcareous sediments, presumably exposed through fluvial erosion of the till cover. The lack of calcareous sediments implies little disturbance and erosion of the chalky till plateau to the west at this time.

<u>Middle Bronze waterhole 302043</u>

At waterhole 302043, the base of sample 2012 is a homogeneous, compact calcareous and chalky sediment containing fine charcoal, some mainly fine pot fragments, rare examples of bone and burned flint, and numerous inclusions of organic fragments – possibly some of which are dung/stabling refuse (context 311002 and 302008). The sediment is iron mottled but some staining may come from animal slurries – trampling producing many textural features and a compact (but once-muddy) deposit; concentrations of phosphate, however, are low (0.459-0.470 mg g^{-1} phosphate-P). Upwards, the compact calcareous deposit with its included anthropogenic materials content (context 302006) has been affected by later earthworm burrowing and mixing with non-calcareous silty soil, and lastly by iron panning and mottling because the trampled deposit formed a hydraulic barrier (context 311002). Despite the presence of small amounts of trampled-in material/slurries, amounts of organic matter and phosphate remain low (1.58% LOI, 0.615 mg g^{-1} phosphate-P).

<u>Middle Bronze waterhole 309075</u>

In contrast the sediments at waterhole 309075 (sample 2268) are both more humic (3.16-3.47% LOI) and phosphate enriched (1.10-3.77 mg g^{-1} phosphate-P) especially at the base of the sampled sequence (context 309080). The thin section showed heterogeneous and mottled fine loamy fills, composed of fine charcoal-rich soil with many small soil inclusions of coprolitic material, including bone, and compact slaked soil and burned very humic soil. It is characterised by very abundant textural pedofeatures indicative of mixing and slaking, and contains examples of fine bone, burned flint and a fungal body. The soil micromorphology indicates occupation deposits that have been likely trampled under wet conditions – presumably by stock in the waterhole. The inclusion of burned material is reflected in an enhanced magnetic susceptibility here (2.30% χ_{conv}).

The waterhole deposits are clearly indicative of animal management (trampled slurries), with at Waterhole 3 the obvious inputs of anthropogenic materials clearly reflecting juxtaposition to the settlement (tracked-in materials/discard). It is also clear that occupation land use at the waterholes seems to have greatly differed from the low impact activities recorded at the barrow. The fills at the waterholes indicate a mosaic of (mainly) calcareous and non-calcareous soils, while towards the northwest, by the Pincey Brook, soils were non-calcareous and often wet. There is strong environmental evidence of a grassland dominated landscape around the barrow, logically grazing land use, as argued for the River Nene environs during the Early Neolithic and Early Bronze Ages at Raunds, Northamptonshire that was maintained after clearance (burned tree-throws)(Healy and Harding forthcoming).

Late Iron Age (c100 BC-AD 43) and Romano-British (c AD 43-410)

The Late Iron Age landscape was studied from a series of samples of droveway deposits (1 thin section and 1 bulk samples), enclosure ditchfills (4 thin sections and 5 bulk samples), and a ring ditch fill (1 thin section and 2 bulk samples).

<u>Late Iron Age enclosure ditch 113048</u>

The lower and middle fill was analysed from sample 121, with sample 120 examining the middle and upper fill junction. The lower fill is a heterogeneous and mainly calcareous, chalk-rich and land snail-rich deposit (context 107008). It is much burrowed and contains evidence of occasional slaking and mixing, but only contains small amounts of anthropogenic indicators, eg, of bone and mixed-in once-humic soil. This has resulted in a low phosphate (0.760 mg g^{-1} phosphate-P) and organic matter (2.47% LOI) contents. Upwards, both contexts 107007 and 107006 are massive, heterogeneous, and probable part-earthworm burrowed non-calcareous fills that have been slaked and likely trampled. These contain small amounts of fine charcoal with inclusions of once-humic soil clasts and clayey material that have probably been ultimately brought in by local stock. These activities have led to increased amounts of organic matter (3.46-4.11% LOI) and phosphate (1.42-1.56 mg g^{-1} phosphate-P) being present.

Late Iron Age enclosure ditch 109166

The lowest part of the enclosure ditch fill was sampled by 415. Towards the base of the fill pans and inwash features of moderately calcareous and charcoal-rich (and phytoliths) deposits – some phosphate-rich – occur, probably as ditch fill slurries. Upwards there is also the probability of *in situ* animal trampling producing moderately poorly sorted fine soil containing soil clasts and very abundant slaking features (pans and intercalations), with evidence of co-eval earthworm and other burrowing, and possible inwash of phosphate-rich fine soil that sometimes contain phytoliths. Anthropogenic inclusions occur as charcoal, but organic matter is not high (1.97-3.18% LOI). On the other hand, the sediment is phosphate enriched (2.09-3.44 mg g^{-1} phosphate-P). There are no obvious ash, bone or coprolitic inclusions to account for this, and microprobe analysis has shown that phosphate (mean 0.35% P, n=93; closely matching the bulk data) is in fact associated with iron staining and textural pedofeatures (clay inwash). Examples of the latter show combinations of Al, Si, Ca, Fe and P (maxima of 2.99-3.40% P). These chalky and iron-stained clay slurries that are phosphate-rich are likely the result of animal concentrations – possibly within this wide feature itself at times. Analyses included testing for the possibility that heavy metals (Cu, Pb and Zn) could be concentrated in these Late Iron Age animal slurries (as found in dung-rich organic deposits at early medieval Guildhall, London; (Macphail *et al*. forthcoming), but only very low trace amounts were found, the highest being lead (mean 0.035% Pb), and no concentrations were identified by elemental mapping.

Early Romano-British droveway ditch 109089

This has a fill (sample 479) composed of moderately heterogeneous non-calcareous fine loam with very abundant inclusions of slaked subsoil and probable humic/humic stained (now iron and manganese replaced) soil clasts. There are fragments of textural pedofeatures, set in a matrix dominated by textural pedofeatures of different phases/episodes – some possibly humic stained. Only rare obvious anthropogenic inclusions are present, however.

It seems probable that trampling by stock has produced a droveway soil with multiple phases of slaked mixing, and likely inputs of humic waste and humic soils and (traces of dung), even whilst the organic (3.14% LOI) and phosphate (0.803 mg g^{-1} phosphate-P) content is only moderate. Other indications of this are that mesofauna such as earthworms and/or dung beetles were present and their burrows have been partially infilled with slaked soil. Detailed analysis of an Iron Age droveway at Malmö, Sweden found the same moderately low amounts of organic matter (3.9-4.1% LOI), similarly numerous textural pedofeatures and burrows of mesofauna; dung traces were more concentrated, however, and this droveway contained 0.2% P compared to a background of 0.01% P (Johan Linderholm, pers. comm.)(Macphail 2003; Macphail in press).

Early Romano-British ring gully 129162

Sample (443) showed the presence of a heterogeneous and mottled fine loamy fill, with textural pedofeatures of mixing and structural collapse evidence of inputs of slurry and probable occasional *in situ* trampling. Upwards, the wet and occasionally trampled ditch fill that contains inclusions of charcoal and fine organic matter, was characterised by slaked burrow-mixed moderately calcareous soil. The deposit also showed an increase in organic matter (2.20-3.54% LOI) and phosphate (0.516-1.51 mg g^{-1} phosphate-P) upwards, possibly reflecting the use of the enclosure for stock.

Late Romano-British (c AD 270-410)

Late Romano-British Enclosure Ditch 143007

This feature comprises a large late Romano-British enclosure ditch. The fills examined in thin sections 360A and 360B (intervention 152001), are, from the lower levels (context 152007), moderately well sorted fine soil with much slaking and infilling, probable due to trampling of the muddy basal fill of this wide (*c* 10 m) feature. This lower part is also influenced by gleying and natural shrink and swell features. Upwards the deposit becomes moderately heterogeneous and moderately poorly sorted and contains soil clasts and very abundant slaking features, with evidence of shrink and swell features and gley mottling. There are, however, only trace amounts of anthropogenic inclusions such as once-humic, clay soil and burned humic topsoil clasts, the last possibly coming from occupation activities (context 152003). Also present (context 152006) are clay inwash pans containing 'chalky clay' clasts are further indications of animal trampling, which are also probably indicated by concentrations of organic matter (3.34-3.48% LOI) and phosphate (1.44-2.44 mg g^{-1} phosphate-P)(context 152007).

The samples studied, as for the Late Iron Age, again seem to reflect animal management activities, rather than the mixed farming that involved crop processing (corn dryers and grain processing; see Carruthers CD Chapter 34). Although some burned soil was found, burned daub and vitrified corn drier debris and associated enhanced magnetic susceptibility (as in other Romano-British rural sites; cf. Haynes Park, Bedfordshire; Cruise and Macphail 2000) were not present in the samples examined.

Late Saxon and Medieval (c AD 850 – 1066 and AD 1066-1499)

Samples were studied from a drainage ditch (3 thin sections and 3 bulk samples) and a pit fill (2 thin sections and 3 bulk samples).

Late Saxon pit 305011

This feature lay close to a burned beamslot of a late Saxon long house, where the remains of wattle panels and cob daub were identified. The lowermost deposits examined (305015 and 305021) are an iron stained calcareous fill containing gravel and occasional to many charcoal, and evidence of burrowed-in more humic and fine charcoal-rich soil. They contain generally small amounts of phosphate (up to 1.25 mg g^{-1} phosphate-P) and cob fragments. Upwards (context 305019) there is an increase in organic matter and slightly higher concentrations of phosphate and a possible rise in magnetic susceptibility (5.06% LOI, 1.57 mg g^{-1} phosphate-P, 1.89% χconv). Earthworm-mixed anthropogenic deposits are composed of fine charcoal-rich anthropogenic soil with likely included ash (burned debris), and very abundant daub materials including charcoal rich poorly burned calcareous material, alongside strongly burned clay loam and examples of chalky cob-like material. Burned chalk is also present.

These findings can be compared to other examples of the use of chalky till-based cob, such as at the 12th Century Templar Cressing Temple, Essex, where it was used for ground raising and constructing floors and lime mortar floors (Macphail 1995). It was also found employed at Medieval structures in Norwich (Macphail 2001; Shelley 2005), again possibly from an East Anglian till source. Chalky cob has also been used at the experimental site of middle Saxon West Stow, Suffolk and middle Saxon West Heslerton, North Yorkshire (Macphail *et al.* forthcoming; West 1985).

Early medieval ditch 336090

An early medieval field system comprising a parallel series of ditches was excavated on the MTCP site. Samples 2252A-C examined the fill. The lowermost sample is a poorly sorted gravel-rich fill, containing coarse mineral material, and shows an initial phase of probable earthworm working of the fine fill, that was succeeded by major clay inwash (ditch drainage episodes and fine settling). Slaking features may indicate trampling, possibly associated with cleaning activities. As the ditch sediments accrued post-depositional processes involved major iron impregnation and iron-depletion (ie, strong mottling). Microprobe measurements and elemental mapping confirmed that mottling involved iron, and gleyed (pale) zones were also strongly depleted of cations (Na, Ca, and Mg).

Similar fills were found upwards and these showed a slight increase in amounts of phosphate (0.194-0.475 mg g^{-1} phosphate-P), but this may reflect less strong leaching as well as a higher input of phosphate. The chief finding here is corroboration of the land drainage model for poorly drained soils on slopes where soils are only moderately permeable and liable to seasonal waterlogging and after periods of heavy rainfall "disposal of excess water is by lateral flow" (Jarvis *et al*. 1984, 191). The ditch must also have experienced periods of standing water/slow drainage – hence the need for cleaning – which led to *in situ* gleying and leaching.

Summary and conclusions

The site was studied employing 25 thin sections and 33 bulk analyses chosen after the assessment process. The geological substrate is generally dominated by the presence of chalky till (although a mosaic of both calcareous and non-calcareous soils is recorded across the site), which often produces waterlogged soils. The palaeochannel, which remains undated, shows evidence of both alluviation and animal use, possibly by stock. The Middle Bronze Age barrow, which is located some 450 m from the settlement, is situated in low ground by the Pincey Brook. Ditch fills are highly humic and show only low levels of human activity, and the fills remain non-calcareous indicating that little or no erosion of the chalky till plateau upslope was taking place at this time. In contrast, near the settlement's entrance, Waterhole 309075 has a marked soil micromorphological and phosphate signature that records animal trampling and inputs of anthropic materials, which with the other waterholes investigated, also signals the importance of stock management. There is also a rare record of a relatively enhanced magnetic susceptibility at waterhole 309075, which is significant given the overall deleterious waterlogging effects on magnetic susceptibility at this site. There is generally good evidence from both trackways and wide ditch fills during the Late Iron Age and Romano-British periods that stock were being managed. High phosphate concentrations in some of these features are not related to anthropic inclusions (bone, etc.). Micromorphology and microprobe studies have shown that this chemical enhancement is due to the deposition of slurries contaminated by animal waste. The character of the late Romano-British samples also reflects animal management. The burned and ash-rich debris from the razed Saxo-Norman long house was dumped in Pit 305011, and clearly show the use of a chalky till-based cob, as a building material. The poorly drained nature of the soils at Stansted is well documented in an early medieval ditch, the fills of which show that they sometimes held standing water and probably needed and underwent cleaning.

Table 30.1: Chemical and magnetic susceptibility data for the individual samples (n = 33)

Sample[a]	LOI[b] (%)	Phosphate-P_i (mg g^{-1})	Phosphate-P_o (mg g^{-1})	Phosphate-P^c (mg g^{-1})	Phosphate-P_i:P (%)	Phosphate-P_o:P (%)	χ (10^{-8} SI)	χ_{max} (10^{-8} SI)	χ_{conv}[d] (%)
Late Iron Age enclosure ditch 113048									
120A	4.11	1.048	0.516	**1.56***	67.0	33.0	11.6	1860	0.624
120B	3.46	1.088	0.327	1.42	76.9	23.1	9.1	1270	0.717
121	2.47	0.381	0.379	0.760	50.1	49.9	6.1	1820	0.335
Late Iron Age enclosure ditch 109166									
415A	3.18	3.083	0.355	**3.44****	89.7	10.3	7.7	733	1.05
415B	1.97	1.739	0.354	**2.09***	83.1	16.9	6.8	1580	0.430
Early Romano-British droveway ditch 109089									
479	3.14	0.399	0.404	0.803	49.7	50.3	10.9	1990	0.548
Early Romano-British ring gully 129162									
443A1	3.54	1.048	0.464	**1.51***	69.3	30.7	13.8	1980	0.697
443A2	2.20	0.334	0.182	0.516	64.7	35.3	12.2	1950	0.626
Late Romano-British enclosure ditch 143007									
360A1	3.40	1.170	0.272	1.44	81.1	18.9	6.2	397	1.56
360A2	3.48	2.076	0.362	**2.44***	85.2	14.9	12.8	1890	0.677
360B	3.34	1.854	0.277	**2.13***	87.0	13.0	8.6	1440	0.597
Middle Bronze Age waterhole 302043									
2012A1	1.58	0.420	0.195	0.615	68.3	31.7	4.0	1390	0.288
2012A2	1.39	0.351	0.110	0.461	76.1	23.9	5.6	1440	0.389
2012B1	1.57	0.379	0.091	0.470	80.6	19.4	6.9	1460	0.473
2012B2	1.65	0.365	0.094	0.459	79.5	20.5	7.0	1560	0.449
Middle Bronze Age waterhole 309075									
2268A	3.16	0.573	0.526	1.10	52.1	47.9	13.8	1800	0.767
2268B	3.47	1.370	0.386	1.76	78.0	22.0	22.9	1390	1.65
2268C	3.35	3.395	0.375	**3.77****	90.1	9.9	26.0	1130	**2.30***
Middle Bronze Age barrow 324078									
2608	**11.6****	n.d.[e]	n.d.[e]	0.325[f]	n.d.[e]	n.d.[e]	4.2	568	0.739
2719A	1.62	n.d.	n.d.	0.281	n.d.	n.d.	5.7	2970	0.192
2719B	**11.3****	n.d.	n.d.	0.401[f]	n.d.	n.d.	3.5	416	0.841
2719C1	**13.8****	n.d.	n.d.	0.410[f]	n.d.	n.d.	3.8	736	0.516
2719C2	0.921	0.477	0.154	0.631	75.6	24.4	5.2	1640	0.317
Unphased trackway 324058									
2668A	1.96	n.d.	n.d.	0.224	n.d.	n.d.	6.9	2260	0.305
2668B	2.10	n.d.	n.d.	0.186	n.d.	n.d.	9.7	313	**3.10***
Late Saxon pit 305011									

2106A	**5.06***	n.d.	n.d.	**1.57***	n.d.	n.d.	17.8	943	1.89
2106B1	2.59	n.d.	n.d.	1.25	n.d.	n.d.	8.3	1450	0.572
2106B2	1.33	n.d.	n.d.	0.420	n.d.	n.d.	5.4	1590	0.340
Unphased palaeochannel 327003									
2538A	1.32	0.450	0.112	0.562	80.1	19.9	6.9	2010	0.343
2538B	1.68	n.d.	n.d.	0.351	n.d.	n.d.	6.7	4900	0.137
Early Medieval ditch 336090									
2252A	2.01	n.d.	n.d.	0.475	n.d.	n.d.	6.6	1570	0.420
2252B	1.93	0.156	0.165	0.321	48.6	51.4	7.7	2170	0.355
2252C	2.06	n.d.	n.d.	0.194	n.d.	n.d.	9.2	5080	0.181

Notes:
[a] Samples highlighted in bold show signs of phosphate enrichment and/or magnetic susceptibility enhancement
[b] LOI: figures highlighted in bold have higher concentrations of organic matter:
* LOI = 5.00-9.99%, ** LOI = 10.0-14.9%
[c] Phosphate-P: figures highlighted in bold show likely signs of phosphate-P enrichment:
* = enriched, ** = strongly enriched
[d] Magnetic susceptibility: figures highlighted in bold show possible signs of magnetic susceptibility enhancement, as reflected in χ_{conv} values:
* = possible weak enhancement (none of the samples show clear signs of enhancement)
[e] Phosphate fractionation: n.d. = not determined (see text)
[f] Phosphate-P determination: analysis undertaken on ignited samples from the LOI determination (see text).

Table 30.2: Summary of analytical data for the 33 bulk samples

	n	**Mean**	**Minimum**	**Maximum**	**Standard deviation**
LOI (%)	33	3.39	0.921	13.8	3.01
Phosphate-P_i (mg g^{-1})	21	1.06	0.156	3.40	0.917
Phosphate-P_o (mg g^{-1})	21	0.290	0.091	0.526	0.139
Phosphate-P (mg g^{-1})	33	1.04	0.186	3.77	0.915
Phosphate-P_i:P (%)	21	73.0	48.6	90.1	13.3
Phosphate-P_o:P (%)	21	27.0	9.9	51.4	13.3
χ (10^{-8} SI)	33	9.08	3.5	26.0	5.15
χ_{max} (10^{-8} SI)	33	1690	313	5080	1034
χ_{conv} (%)	33	0.740	0.140	3.10	0.656

Table 30.3: Pearson product-moment correlation coefficients (r) for relationships between the various soil properties for all samples† (n = 33)

	P_i§	**P_o**	**P§**	**P_i:P**	**χ§¶**	**χ_{max}§¶**	**χ_{conv}§¶**
LOI§	0.609	0.812*	n.s.	n.s.	n.s.	-0.524	0.459
P_i§		0.531	0.979*	0.690	0.463	-0.459	0.697*
P_o			0.678*	n.s.	0.590	n.s.	0.476
P§				0.528	0.545	n.s.	0.486
P_i:P					n.s.	-0.499	n.s.
χ§						n.s.	0.526
χ_{max}§							-0.747*

† Statistical significance: n.s. = not significant (ie $p \geq 0.05$), * = significant at $p<0.001$.

§ Indicates $\log_{10}$ transformation applied to the data set.

¶ For the untransformed data (which are conventionally used in assessing the relative strength of the relationship between χ and χ_{max} and χ_{conv}) the r values are: χ and χ_{max} = n.s.; χ and χ_{conv} = 0.585 ($p<0.001$).

Table 30.4: Soil Micromorphology and bulk sub-samples

Sample Number	SG Number	Contexts	Thin Section	Relative Depth cm (from top of monolith)	Bulk analyses	Microfacies type	Voids	Gravel	Structure	Rooting/root traces	Intercalations	Intercalations	Broad textural infills	Microlaminated textural features	Soil inclusions	Secondary CaCO3	Charcoal	Burned flint	Pottery	Coprolite?	Dung/stabling refuse	Phytoliths	Plant fragments	Org. Matter	Bone	Pyrite'	Burrowing	Org-min excrements
120	113048	107006	**M120**	60-95 mm	x120A	8b	25%	*	Massive		aaaaa	aaaaa			aaaaa		aa					a	a*	a			aaaa	
120	113048	107007		95-145 mm	x120B	8b	40%	*	Massive/chambered		aaaaa	aaaaa			aaaaa		aa					a	a*	a			aaaaa	
121	113048	107008	**M121**	230-310 mm	x121	8a	25%	ff	Massive/burrowed		aaaa	aaaa			aaa		a*	a*?			a*?	a	a*	a			aaaa	
415	109166	140028	**M415**	10-40(60) mm	x415A	7c	25%		massive/burrowed		aaaaa	aaaaa		aaaaa	aaaaa		aaa					aa		aa			aaaaa	aa
415	109166	140029		40-45(70) mm	x415B	7b	30%		Massive/lamina		aaaaa	aaaaa		aaaaa	aaa		aaa					aa		aa				
479	109089	134078	**M479**	40-120 mm	x479	7a	30%	f	massive/prismatic		aaaaa	aaaaa		aa	aaaaa		a			a-1	a*	a*	a*	a	a-1		aaa	
443	129162	114053	**M443A**	40-110 mm	x443A1	5b	35%		Prismatic		aaaaa	aaaaa			aaa		aa				a?	a*	a*	a	a-1		aaa	
443	129162	114052	**M443A**	40-110 mm	x443A2	5b	35%		Prismatic		aaaaa	aaaaa			aaa		aa				a?	a*	a*	a	a-1		aaa	
360	143007	152003	**M360A**	160-240 mm	x360A1	7c	35%		Prismatic		aaaaa	aaaaa			aaa		a				a*	a*	a*	a			a	
360	143007	152006	**M360A**	160-240 mm	x360A2	7b	35%		Prismatic		aaaaa	aaaaa			aaa		a				a*	a*	a*	a			a	
360	143007	152007	**M360B**	360-440 mm	x360B	8b and 7c	40%		Prismatic		aaaaa	aaaaa			aa		a				a*	a*	a*	a			aaa	
2012	302043	302006	**M2012A**	110-145 mm	x2012A1	6b	25%	fff	Massive		aaa	aaa					aa	a*			a*?	a*	a*	a*			aaaa	aaaa
2012	302043	311002	**M2012A**	145-190 mm	x2012A2	6a	20%	fff	Massive		aaa	aaa			a		aa	a*	a*		a?	a*	a	a				
2012	302043	311002	**M2012B**	220-300 mm		6a	20%	ff	Massive		aaa	aaa					aa	a*	a	a-1	a?	a*	aa	aa	a-1			
2012	302043	302008	**M2012B**	220-300 mm	x2012B1	6a	20%	ff	Massive		aaa	aaa					aa	a*	a	a-1	a?	a*	aa	aa	a-1			
2012	302043	3002003	**M2012B**	220-300 mm	x2012B2																							
2268	309075	309078	**M2268**	240-320 mm	x2268A	5a	35%	*	Prismatic		aaaaa	aaaaa			aaa		aa	a				a		aa	a-2			
2268	309075	309079	**M2268**	240-320 mm	x2268B																							

Sample Number	SG Number	Contexts	Thin Section	Relative Depth cm	Bulk analyses	Microfacies type	Voids	Gravel	Structure	Rooting/root traces	Intercalations	Intercalations	Broad textural infills	Microlaminated textural features	Soil inclusions	Secondary CaCO3	Charcoal	Burned flint	Pottery	Coprolite?	Dung/stabling refuse	Phytoliths	Plant fragments	Org. Matter	Bone	Pyrite'	Burrowing		Org-min excrements	
2268	309075	309080			x2268C																									
2608	324078	320115?	**M2608**	0-80 mm	x2608	4b	30%	*	Massive/lamina		aa						a		aa	a*				a	aaaa	aaaaa		a*	aaa	aaa
2719	324078	320144	**M2719A**	30-110 mm	x2719A	3b	25%	ff	Massive		a						a		a	a-1				a*	a*	a*			aaaaa	
2719	324078	320142	**M2719B**	180-250 mm	x2719B	4c	30-40%	ff	Lamina		a						a		aa	a-1					aaaaa	aaaaa			aaaa	
2719	324078	320140	**M2719C**	370-400 mm	x2719C1	4b	30%		Massive/blocky		aaa			a*					aaa					a*	aaaaa	aaaaa		a*	aaaa	
2719	324078	320139		400-420 mm	x2719C2	4a	15-20%	*	Lamina		aa								a						aaaa	aaaa		a*	a	
2719	324078	320139		420-440 mm	x2719C2	3a	25-30%	ffff	Massive		a*							a*	a*						a*	a*	a-2	a*		
2668	324058	324021	**M2668**	170-200 mm	x2668A	9	25%	*	Planar/prismatic										a					a*		a*			aa	
2668	324058	324022	**M2668**	200-240 mm	x2668B	9	25%	ff	Planar/prismatic		a*								a					a*		a*			aa	
2106	305011	305019	**M2106A**	30-110 mm	x2106A	12	30%	f	Massive/burrowed		a*						aaaaa		aaaa					a		a			aaaaa	aaa
2106	305011	305015	**M2106B**	240-320 mm	x2106B1	11	45%	f	Prismatic		a*	aa	aa				a		aa				?	a*		a			aaaaa	
2106	305011	305021	**M2106B**	240-320 mm	x2106B2																									
2538	327003		**M2538A**	120-140 mm	x2538A	2	10-15%		Massive/Lamina		a							a*	aa											
2538	327003		**M2538A**	140-190 mm	x2538A	1	25%	ff	Massive/channel		aaa			a	aaaa			a*											aa	
2538	327003		**M2538B**	310-390 mm	x2538B	1	20%	fff	Massive		aa			aa	a			a*												
2252	336090	327002	**M2252A**	0-80 mm	x2252A	10	20-30%	ff	Massive/channel			aaa	aaa				aaa		a*					a*		a			aaaa	
2252	336090	327002	**M2252B**	150-225 mm	x2252B	10	25%	fff	Massive/prismatic			aaaa	aaaa		aa		a		a							a*			aa	
2252	336090	327002	**M2252C**	225-300 mm	x2252C	10	15-25%	ffff	Massive/prismatic			aaaa	aaaa		aaa		a									a*			aaa	aa

Sample Number	SG Number	Contexts	Thin Section	Relative Depth cm	Bulk analyses	Microfacies type	Voids	Gravel	Structure	Rooting/root traces	Intercalations	Intercalations	Broad textural infills	Microlaminated textural features	Soil inclusions	Secondary CaCO3	Charcoal	Burned flint	Pottery	Coprolite?	Dung/stabling refuse	Phytoliths	Plant fragments	Org. Matter	Bone	Pyrite'	Burrowing	Org-min excrements
2537/ 2539	327003	327006- 327004	**M2537/ 2539**	120-200 mm		4a	15-29%	*	Massive/bedded		aaa	aaa		a										a*			aa	
2535	327003	327006	**M2535A**	190-205 mm		13	10%		Massive/bedded		aa	aa			a*									a*				
2535	327003	327004	**M2535A**	205-280 mm		6c	15%		Massive/cracked		aaaaa	aaaaa			aa		a*	a*			a*	a	a	(a)			a	
2535	327003	327004	**M2535B**	380-460 mm		6c	20%	fff	Massive/cracked	a*	aaaaa	aaaaa			aa		a	a*			aa	a	aa	(aaa)				
			25 TS		33 bulk																							

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

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

aaaaa - very abundant >20%

Table 30.5: Microprobe analysis (%) of samples M415 (line analysis) and M2252C (grid analysis)

	Al	Ca	Fe	Mg	P	Mn	Pb	K	Cu	Si	Zn	S	Na
M415													
Mean	4.413	3.149	3.076	0.300	0.352	0.016	0.035	1.578	0.006	19.966	0.010	0.017	0.105
Standard Deviation	3.367	5.946	3.474	0.243	0.665	0.026	0.039	2.073	0.007	10.048	0.012	0.015	0.297
Range	12.143	45.028	17.259	0.929	3.410	0.174	0.171	12.530	0.024	40.600	0.076	0.069	2.065
Minimum	0.000	0.022	0.021	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000
Maximum	12.143	45.050	17.280	0.929	3.410	0.174	0.171	12.533	0.024	40.600	0.076	0.069	2.065
Sum	410.423	292.830	286.092	27.912	32.690	1.463	3.276	146.742	0.571	1856.833	0.961	1.610	9.789
Count	93	93	93	93	93	93	93	93	93	93	93	93	93
M2252C													
Mean	4.752	0.474	4.193	0.303	0.029	0.038	0.039	1.437	0.006	20.141	0.009	0.014	0.133
Standard Deviation	3.713	0.375	4.229	0.296	0.030	0.212	0.041	2.333	0.007	10.363	0.010	0.013	0.518
Range	11.628	1.199	23.275	1.531	0.125	1.969	0.150	11.759	0.032	37.721	0.042	0.057	3.732
Minimum	0.000	0.004	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	11.628	1.203	23.288	1.531	0.125	1.969	0.150	11.759	0.032	37.721	0.042	0.057	3.732
Sum	408.692	40.779	360.570	26.060	2.472	3.293	3.364	123.583	0.501	1732.144	0.774	1.184	11.402
Count	86	86	86	86	86	86	86	86	86	86	86	86	86

(Raw data supplied by Kevin Reeves, Institute of Archaeology, UCL)

Table 30.6: Soil Micromorphology and bulk sub-samples: Soil Micromorphology (Microfacies Types -soil microfabric types and associated micromorphological data)

Material	Sample Number	Sampling depth, soil micromorphology (SM), bulk data (BD) and microprobe (probe)	Phase, Interpretation and Comments
Microfacies type 2 (SMT 2a) Microfacies type 1 (SMT 1)	**M2538A**	120-190 mm SM: layered with finer bedded sediments between 120-140 mm. 120-140 mm: homogeneous; *Structure*: massive/lamina microstructure; 10-15% voids, fine channels and vughs; *Coarse Mineral*: C:F 25:75, moderately well sorted with coarse silt and fine sand-size quartz, chalk, and shell, with very few mica and rock fragments; very few medium to very coarse sand; 2 examples of horizontal oriented 3 mm long shell; *Organic/Anthropogenic*: rare to occasional fine charcoal (max. 2.5 mm); *Fine fabric*: SMT 2a – mainly finely speckled, cloudy greyish brown (PPL), moderate interference colours (close porphyric, speckled, unistrial and crystallitic b-fabric, XPL), mainly grey (OIL); thin humic staining, rare amorphous fine organic matter and fine charred OM; traces of phytoliths; *Pedofeatures*: *Textural*: many intercalations developing into thin (50-100 µm) dusty clay void coatings; rare chalky very fine void infills; *Crystallitic*: rare traces of micritic void infills; *Amorphous*: occasional ferruginous impregnations, often picking out 250 µm thick laminae; *Fabric*: occasional burrow mixing. BD (2538A): 1.32% LOI, 0.562 mg g^{-1} phosphate-P, 6.9 x 10^{-8} SI χ, 0.343% χ_{conv} 140-190 mm: very similar to M2538B (SMT 1), but fewer chalk gravel, and co-eval many fine (0.5 mm) to very fine (200 µm) rooting (channel formation) and burrowing (vughs); 25% voids; *Pedofeatures*: as below; *Textural*: abundant broad infills, intercalations and microlaminated dusty to impure void coatings.	**327003** 327010 Palaeochannel fill Fine clayey to fine sandy generally calcareous sediment, with included fine charcoal, and textural pedofeatures indicating 'muddy' and finely laminated deposition at times; later inwash of chalky alluvium (above) and moderate iron mottling. 327009 As below, but with marked co-eval biological activity and inwash.
Microfacies type 1 (SMT 1)	**M2538B**	310-390 mm SM: homogeneous; *Structure*: massive with traces of broad layering; 20% voids, very fine (<1 mm) channels and planar voids, with fine (<2 mm) chambers, very fine (200 µm) vughs; *Coarse Mineral*: Coarse:Fine (C:F limit at 10 µm) 60:40, very poorly sorted; dominant medium and coarse silt-size, fine to very coarse sand-size quartz (common chalk, very few shell, fossil, mica, and rock fragments – greensand, metamorphic, sedimentary and igneous material), with frequent gravel-size chalk (subangular to subrounded; max. 8 mm); *Organic/Anthropogenic*: occasional traces of rooting/root traces (now Fe replaced etc), some 250 µm and coarse; *Fine fabric*: SMT 1 - cloudy greyish, brownish and dark reddish (PPL), isotic to moderately high interference colours (close porphyric, undifferentiated to crystallitic b-fabric, XPL), pale yellow to dark orange (OIL); trace amounts of humic staining and amorphous fine organic material; *Pedofeatures*: *Textural*: abundant broad (500 µm) impure clay infills and associated intercalations and 150 µm thick microlaminated finely dusty void coatings; *Depletion*: probable rare depletion of calcium carbonate and iron; *Crystalline*: trace amounts of micritic and microsparitic void infills; *Amorphous*: very abundant ferruginous nodular impregnations and poorly pseudomorphic organic matter (eg, roots) replacement. BD (2538B): 1.68% LOI, 0.351 mg g^{-1} phosphate-P, 6.7 x 10^{-8} SI χ, 0.137% χ_{conv}	**327003** 327008 Palaeochannel fill A now massive, once poorly layered calcareous sediment of poorly sorted chalk gravel and coarse silt through to coarse sand, showing a broad mineralogy (till-derived); sediment was rooted and partially burrow-mixed and history of dusty to impure clay inwash (alluviation?) and minor secondary calcium carbonate formation, which was succeeded by major hydromorphic iron impregnation, and probably associated calcium carbonate and iron depletion (mottling).
Microfacies type 4a (SMT 3)	**M2537/ 2539**	120-200 mm SM: Homogeneous beds; *Structure*: massive with fine (2 mm), medium (5 mm) and coarse massive bedding; 15-20%, mainly fine closed vughs and partially collapsed chambers and channels; *Coarse Mineral*: well sorted very dominant beds of silt, silt with intercalated fine and medium sand, and fine sand beds; *Fine Fabric*: as SMT 3; *Pedofeatures*: *Textural*: very abundant dusty clay void infills and intercalations; *Depletion*: likely patchy iron depletion in lower half of the thin section; *Amorphous*: very abundant impregnative iron staining of upper thin section; many nodular iron and manganese impregnations in lower half; *Fabric*: occasional moderately thin (0.5 mm) to broad (2 mm) burrows – some associated with sand accumulations (earthworm aestivating burrows).	**327003** 327006 Palaeochannel? Mainly fine silty clay sedimentation, intercalated with sandy deposits. Deposits weakly burrowed and rooted between alluvial events.
Microfacies type 13 (SMT 12)	**M2535A**	190-205 mm SM: Homogeneous; *Structure*: massive with faint very fine bedding; 10% voids, fine channels; *Coarse Mineral*: well sorted very dominant silt-size quartz with 2 gravel size chalk; increase in very fine sand content upwards; *Fine Fabric*: SMT 12: cloudy grey (PPL), moderately high interference colours (close porphyric, crystallitic b-fabric, XPL), grey (OIL); rare traces of humic staining; *Pedofeatures*: rare dusty clay void coatings (80 µm); very abundant thin horizontal bedding/micropanning features.	**327003** 327006 Well sorted calcareous silt inwash with likely rooting between a succeeding inwash phase.

Microfacies type 6c (SMT 6)		205-280 mm SM: Similar to MFT 6c – below; with a poorly sorted flint and chalk gravel rich (frequent gravel) and Fe/P?-stained deposit (abundant intercalations and micropanning), which upwards contains very few gravel and has been affected by *Depletion* (Fe leaching); only very weak *Amorphous* Fe staining; examples of burned flint	327004 As below – animal trampling and deposition of animal slurry; burned flint present.
Microfacies type 6c (SMT 6)	**M2535B**	380-460 mm SM: Moderately heterogeneous; *Structure*: massive/cracked/layered; 20% voids, sloping medium (0.5 mm) planar voids (marking out approximately 20 mm thick 'layers') with fine closed vughs and vesicles; *Coarse Mineral*: as MFT 6a, very poorly sorted with frequent to common chalk gravel (in the 'layers') up to 18 mm in size (some heavily iron stained and rounded, with flint, chalk fossils and shell; ironstone; *Organic/Anthropogenic*: rare charcoal (max. 2 mm); rare to occasional sand size fragments of layered plant fragments (stabling crust waste?; fragments of finely layered organic material up to 0.5 mm); examples of burned mineral; trace of roots; many patches of iron replaced fine organic matter including pollen (eg, alder) and possible very high amounts of fungal material; *Fine Fabric*: As SMT 6; *Pedofeatures*: *Textural*: very abundant intercalations forming closed vughs and vesicles and 500 µm fills (collapsed burrows?) and 150 µm thick void coatings; major infilling along sloping fissures; *Amorphous*: very abundant iron staining in large areas and concentrated down vertical and along sloping fissures where it produces hypocoatings; colour: yellowish brown (PPL), yellowish orange (Fe/P?); iron replacement of fine organic matter – fungal material?; *Fabric*: occasional relict broad burrows.	**327003** 327004 Very poorly sorted, compact calcareous deposits that show horizontal fissuring/layering (and evidence of structural collapse – intercalations and closed vughs), and which contain fragments of possible stabling refuse (and fungal material) and are heavily stained yellowish brown (Fe and P?). Likely stock trampled deposit – near stabling area?.
Microfacies type 12 (SMT 11 and various daub inclusions)	**M2106A**	30-110 mm SM: Heterogeneous (SMT 11 and burned daub(s)); *Structure*: massive/burrowed; 30% voids; chambers and planar voids; *Coarse Mineral*: as MFT 8a, with a patch of few rounded chalk gravel (12 mm); rare traces of shell; *Organic/Anthropogenic*: common ash and charcoal-rich SMT 11; many coarse charcoal (8 mm); Daub 1: very abundant poorly burned/unburned poorly calcareous clay daub (dotted, slightly reddish yellowish brown [PPL], moderate interference colours [close porphyric, speckled and crystallitic b-fabric, XPL], yellowish brown with rare red specks [OIL]; occasional fine charred organic matter; slightly rubefied clay fragments and relict clay coatings; rare traces of burned chalk; example of root trace with examples of calcium oxalates; Daub 2: rare examples (4 mm size reddish iron stained chalky/calcareous matrix with quartz sand, chalk sand and chalk gravel temper – cob?); Daub 3: 2 examples 2 mm size dark reddish brown [isotic, dark reddish brown – OIL) clay with silt size quartz and included charcoal]; rare traces of biogenic calcite; *Fine Fabric*: SMT 11: dotted grey to pale yellowish brown (PPL), moderately high interference colours (close porphyric, crystallitic b-fabric, XPL), pale yellow to grey with black specks (OIL); very abundant fine charred organic matter/charcoal, abundant probable ash and rare phytoliths; *Pedofeatures*: *Fabric*: very abundant broad (3- 4 mm) burrows; *Excrements*: many broad mammilated organo-mineral excrements. BD (2106A): 5.06% LOI, 1.57 mg g^{-1} phosphate-P, 17.8 x 10^{-8} SI χ, 1.89 % χ_{conv}	**Late Saxon pit 305011** 305019 Earthworm mixed anthropogenic deposit composed of fine charcoal rich anthropogenic soil (SMT 11) with likely included ash, and very abundant daub materials including charcoal rich poorly burned calcareous material alongside, strongly burned clay loam and examples of chalky cob-like material; burned chalk also present. Anthropogenic character is partially paralleled by the bulk chemistry, compared to lower deposits (see below)
Microfacies type 11 (SMT 6 and 7)	**M2106B**	240-320 mm SM: Moderately heterogeneous (SMT 6 with burrowed-in SMT 7); *Structure*: prismatic; 45% voids, dominant coarse planar voids and chambers (7 mm), with fine and medium vughs and channels; *Coarse Mineral*: as MFT 8a, with few chalk gravel (13 mm); *Organic/Anthropogenic*: trace amounts of root fragments; occasional to many 2 mm size charcoal; rare occurrences of 3-4 mm size heavily iron stained chalky fine material (SMT 6-like) of possible but unknown anthropogenic origin (cob? – see above); occasional fine soil fragments and traces of organic inclusions; rare to occasional biogenic calcite – including earthworm; *Fine Fabric*: dominant SMT 6 with frequent SMT 7; *Pedofeatures*: *Textural*: occasional intercalations and associated closed vughs 120 µm thick impure chalky void coatings; *Amorphous*: very abundant iron and occasional iron and manganese staining/impregnations; *Fabric*: very abundant broad burrows; BD (2106B1): 2.59% LOI, 1.25 mg g^{-1} phosphate-P, 8.3 x 10^{-8} SI χ, 0.572 % χ_{conv} As above, but rather less included charcoal, more extant textural pedofeatures and fewer burrows (abundant). BD (2106B2): 1.33% LOI, 0.420 mg g^{-1} phosphate-P, 5.4 x 10^{-8} SI χ, 0.340 % χ_{conv}	**Late Saxon pit 305011** 305015 Iron stained calcareous fill containing gravel and occasional to many charcoal, and evidence of burrowed-in more humic and fine charcoal-rich soil. 305021 As above, but with less inclusion of anthropogenic materials and soil.

Microfacies type 10 (SMT 2b and 7)	**M2252A**	0-80 mm SM: Heterogeneous (SMT 2b with burrowed-in SMT 7); *Structure*: massive/channel/burrowed, 20-30% voids; as below but with dominant fine to medium channels; *Coarse Mineral*: as below; *Organic/Anthropogenic*: rare traces of charcoal; *Fine Fabric*: with dominant SMT 2b and frequent to common SMT 7; *Pedofeatures*: *Textural*: abundant intercalations and associated dusty void coatings on closed vughs/collapsed channels, especially associated with SMT 7; rare thin dusty void coatings; *Depletion*: probable very abundant depletion (iron depleted); *Amorphous*: occasional strong iron staining of fabric; *Fabric:* abundant broad burrows. BD (2252A): 2.01% LOI, 0.475 mg g^{-1} phosphate-P, 6.6 x 10^{-8} SI χ, 0.420% χ_{conv}	**Early Medieval ditch 336090** Moderately poorly sorted ditch fill, showing phases of iron staining followed by iron depletion (gleying) all predating burrow mixing-in of finer, possibly once more humic soil – later use of ditch?.
Microfacies type 10 (SMT 2b)	**M2252B**	150-225 mm SM: Homogeneous; *Structure*: massive/prismatic, with burrowing; 25% voids, coarse (3-8 mm) planar voids and fine closed vughs; *Coarse Mineral*: as MFT 3a, poorly sorted with dominant coarse gravel-size flint; *Organic/Anthropogenic*: rare charcoal (1-2 mm) – iron stained; traces of very fine rooting; *Fine Fabric*: as SMT 2b; *Pedofeatures*: *Textural*: abundant intercalations and associated dusty void coatings on closed vughs/collapsed channels; many microlaminated clay pans (in very broad burrow) – 50 µm size laminae forming 500 µm complex fills (now heavily iron impregnated); *Depletion*: probable many patchy depletion (iron depleted) with iron-stained flints showing 500 µm thick leached margins; *Amorphous*: very abundant moderate to strong iron staining of fabric and some textural pedofeatures; *Fabric:* occasional broad burrows. BD (2252B): 1.93% LOI, 0.321 mg g^{-1} phosphate-P, 7.7 x 10^{-8} SI χ, 0.355% χ_{conv}	**Early Medieval ditch 336090** Poorly sorted gravel-rich ditch fill, containing coarse mineral of substrate, and showing examples of probable earthworm burrowing and continuing fine filling (alluviation?, fine settling) and slaked mixed fill (trampling/cleaning?); all followed by iron impregnation/depletion.
Microfacies type 10 (SMT 2b)	**M2252C**	225-300 mm SM: Heterogeneous; *Structure*: massive/prismatic, 15-25% voids, medium (2-3 mm) planar voids and closed vughs; *Coarse Mineral*: as MFT 3a, poorly sorted with dominant coarse gravel-size flint (25 mm); *Fine Fabric*: as SMT 2b; *Pedofeatures*: *Textural*: very abundant intercalations and associated dusty void coatings on closed vughs/collapsed channels; many microlaminated clay pans (in very broad burrow) – 50 µm size laminae forming 500 µm complex fills (now heavily iron impregnated); *Depletion*: probable many patchy depletion (iron and other cation-depleted – see microprobe); *Amorphous*: very abundant moderate to strong iron staining of fabric and some textural pedofeatures; *Fabric and Excrements*: many broad burrows and occasional broad mammilated organo-mineral excrements. BD (2252C): 2.06% LOI, 0.194 mg g^{-1} phosphate-P, 9.2 x 10^{-8} SI χ, 0.181% χ_{conv} Probe: 4.75% Al, 0.47% Ca, 4.19% Fe, 0.30% Mg, 0.03% P, 0.04% Mn, 0.04% Pb, 1.44% K, 0.01% Cu, 20.14% Si, 0.01% Zn, 0.01% S, 0.13% Na. Elemental map: Flint (Si), and clay (Al-Si) dominated soil; iron (Fe)-stained clayey areas (Al), with around major void - depleted (leached) of cation and P, and Fe.	**Early Medieval ditch 336090** Poorly sorted gravel-rich lower ditch fill, containing coarse mineral of substrate, and showing initial probable earthworm working of the fine fill, major clay inwash (alluviation?, fine settling) and slaked mixed fill (trampling/cleaning?); all followed by iron impregnation and iron-depletion/cation-depletion.
Microfacies type 7c (SMT 7 and Soil Inclusion Type 1) Microfacies type 7b (SMT 7 and pans)	**M360A**	160-200 mm SM: Moderately heterogeneous; *Structure*: prismatic; fragmented sample – 35% voids; as MFT 7c, with SMT 7; less co-eval burrowing, but very abundant intercalations and uni-strial b-fabric formation; occasional soil inclusions of Types 1, 2 and 3). BD (360A1): 3.40% LOI, 1.44 mg g^{-1} phosphate-P, 6.2 x 10^{-8} SI χ, 1.56 % χ_{conv} 200-240 mm SM: As above, with very few ironstone and iron stained flint (max. 9 mm); as MFT 7b, with mainly non-calcareous SMT 7, but abundant pans of clay containing fine to coarse sand size ‘chalky clay’. BD (360A2): 3.48% LOI, 2.44 mg g^{-1} phosphate-P, 12.8 x 10^{-8} SI χ, 0.677% χ_{conv} BD (360B): 3.34% LOI, 2.13 mg g^{-1} phosphate-P, 8.6 x 10^{-8} SI χ, 0.597% χ_{conv}	**Late Romano-British Enclosure Ditch 143007** 152003 Moderately heterogeneous moderately poorly sorted fine soil containing soil clasts and very abundant slaking features, with evidence of shrink and swell features and gley mottling; only trace amounts of anthropogenic inclusions – once-humic, clay soil and burned humic topsoil clasts. 152006 As above, with clay inwash pans containing ‘chalky clay’ clasts; trampling. 152007 Phosphate enhancement.
7c (SMT 7 and Soil Inclusions Type 1 and 2)	**M360B**	360-380 mm SM: As MFT 7c – very abundant intercalations and pans; coarse burned topsoil fragment. 380-440 mm SM: As MFT 8b; 40% voids (planar voids and closed vughs); burrowing,	**Late Romano-British Enclosure Ditch 143007** 152007 Moderately well sorted fine soil with much slaking and infilling, probable due to

Microfacies type 8b (SMT 5a)		iron depletion and iron impregnation.	trampling of mud. Massive, heterogeneous, probable part earthworm burrowed non-calcareous fill, that has been slaked and trampled?, with inclusions of once-humic soil clasts and clayey material (from local stock activity); small amounts of included fine charcoal.
Microfacies type 9 (SMT 10)	**M2668**	170-200 mm SM: Homogeneous; *Structure*: massive/channel; 25% voids, fine to medium channels; *Coarse Mineral*: moderately well-sorted dominant coarse silt and fine sand with frequent medium sand, and very few flint gravel; *Organic/Anthropogenic*: rare charcoal; rare root traces; *Fine Fabric*: SMT 10 – dusty and speckled brown to dark brown (PPL), very low interference colours (close porphyric, speckled b-fabric, XPL), generally very pale yellow (OIL); rare amorphous and charred fine organic matter and traces of phytoliths; *Pedofeatures*: *Textural*: rare very thin (50 µm) dusty clay void coatings; *Depletion*: probable occasional iron depletion; *Amorphous*: abundant weak iron impregnation of matrix; *Fabric*: occasional thin burrowing. BD (2668A): 1.96% LOI, 0.224 mg g^{-1} phosphate-P, 6.9 x 10^{-8} SI χ, 0.305% χ_{conv} 200-240 mm SM: Homogeneous: *Structure*: massive/channel; 25% voids, fine to medium channels; *Coarse Mineral*: moderately poorly-sorted dominant coarse silt and fine sand with frequent medium sand, and frequent flint gravel (15 mm) and an example of ironstone; *Organic/Anthropogenic*: rare charcoal; rare root traces; *Fine Fabric*: SMT 9 – dusty and speckled brown to dark brown (PPL), very low interference colours (close porphyric, speckled b-fabric, XPL), generally very pale yellow (OIL); rare amorphous and charred fine organic matter and traces of phytoliths; *Pedofeatures*: *Textural*: rare very thin (50 µm) dusty clay void coatings; *Depletion*: probable very abundant iron depletion; *Fabric*: occasional thin burrowing. BD (2668B): 2.10% LOI, 0.186 mg g^{-1} phosphate-P, 9.7 x 10^{-8} SI χ, 3.10% χ_{conv}	**Unphased Trackway ditch 324058** 324021 Homogeneous, moderately well sorted coarse silt and sand infilling – silting; affected by fine rooting, weak iron staining, and later phases of silting produced some thin dusty clay coatings. 324022 As above, but with some gravel fill, and total iron depletion – gleyed zone.
Microfacies type 8b (SMT 5a)	**M120**	60-95 mm SM: Moderately heterogeneous; *Structure*: massive; 25% voids, mainly fine to medium closed vughs; *Coarse Mineral*: as MFT 5a, with very few chalk gravel (3 mm), but frequent fragments of Soil inclusion Types 1 and occasional Soil Type 3; *Organic/Anthropogenic*: example of biogenic calcite granule (Arionid?); occasional charcoal; occasional Fe and Mn replaced humic soil fragments/amorphous organic matter: *Fine Fabric*: as MFT 7a; *Pedofeatures*: *Textural*: very abundant intercalations forming dusty void coatings to closed vughs (50-150 µm); *Depletion*: many probable depletion of iron from matrix areas; *Amorphous*: abundant iron staining and matrix impregnation and occasional to many iron and manganese staining of probably once-humic soil/organic inclusions *Fabric*: very abundant burrowing – mixing in different soil clasts – broad (2-4 mm). BD (120A): 4.11% LOI, 1.56 mg g^{-1} phosphate-P, 11.6 x 10^{-8} SI χ, 0.624% χ_{conv} 95-145 mm SM: Moderately heterogeneous; *Structure*: massive and chambered; 40% voids, dominant coarse (5 mm) chambers, with fine to medium closed vughs; *Coarse Mineral*: as MFT 5a, with very few chalk gravel (3 mm), but frequent fragments of Soil inclusion Types 1 and occasional Soil Type 3; *Organic/Anthropogenic*: occasional charcoal; example of burned shell; occasional Fe and Mn replaced humic soil fragments/amorphous organic matter; *Pedofeatures*: *Textural*: very abundant intercalations forming dusty void coatings to closed vughs (50-150 µm); *Depletion*: many probable depletion of iron from matrix areas; *Amorphous*: abundant iron staining and matrix impregnation and occasional to many iron and manganese staining of probably once-humic soil/organic inclusions *Fabric*: very abundant burrowing – mixing in different soil clasts – broad (2-4 mm) BD (120B): 3.46% LOI, 1.42 mg g^{-1} phosphate-P, 9.1 x 10^{-8} SI χ, 0.717% χ_{conv}	**Late Iron Age enclosure ditch 113048** 107006 Massive, heterogeneous, probable part earthworm burrowed non-calcareous fill, that has been slaked and trampled?, with inclusions of once-humic soil clasts and clayey material (from local stock activity); small amounts of included fine charcoal. 107007 As above, but presently more open structured.
Microfacies type 8a (SMT 8 and Soil Type 3)	**M121**	230-310 mm SM: Heterogeneous: *Structure*: massive and burrowed; 25% voids, fine channels and vughs and very fine vughs; *Coarse Mineral*: very poorly sorted with MFT 1 and 2 components (clay to coarse silt-fine sand), with few fragments of soil Type 3 (Fe-Mn stained once-humic soil clasts); frequent chalk gravel (up to 7 mm, with one example of a 1 mm iron-depleted edge)	**Late Iron Age enclosure ditch 113048** 107008 Heterogeneous, mainly calcareous, chalk-rich and land snail-rich much burrowed deposits, containing evidence of occasional slaking and mixing; only small amounts of

		and very few flint; *Organic/Anthropogenic*: example of 7 mm long bone; rare traces of fungal bodies, charcoal and flint flakes/burned flint?; many land snails (max. 5 mm); possible examples of rare amorphous organic matter/dung residues? – Fe-Mn replaced; *Fine Fabric*: mainly SMT 6 (but heterogeneous with SMT 8 and soil inclusions); *Pedofeatures*: *Textural*: many intercalations and rare dusty clay void coatings; *Depletion*: many probable depletion of iron from matrix areas and from once-iron stained chalk; *Amorphous*: abundant iron staining and matrix impregnation and occasional to many iron and manganese staining of probably once-humic soil/organic inclusions; *Fabric*: very abundant burrows – broad to very broad (2-7 mm). BD (121): 2.47% LOI, 0.760 mg g^{-1} phosphate-P, 6.1 x 10^{-8} SI χ, 0.335% χ_{conv}	anthropogenic indicators, eg, of bone and mixed-in once-humic soil.
Microfacies type 7c (SMT 8 with soil inclusions Types 1 and 3)) Microfacies type 7b (SMT 9)	**M415**	10-40(60) mm SM: heterogeneous (including burrowed-in dark humic/phosphate-stained moderately charcoal rich soil); *Structure*: massive/burrowed; 25% voids, fine and medium (200-400 µm) vughs and closed vughs formed in previous chambers (burrows); *Coarse Mineral*: as MFT 5a, moderately poorly sorted with silt to coarse sand (no gravel); *Organic/Anthropogenic*: rare traces of coarse charcoal, but occasional to abundant very fine charcoal; examples of earthworm granules – possibly leached; very abundant soil inclusions – as MFT 7a; Fine Fabric: as SMT 8; *Pedofeatures*: *Textural*: as MFT 7a, but with 2 mm thick laminated very dusty clay/impure soil pans; rare thin (100 µm) dark – humic-phosphate-rich dusty clay void coatings; *Amorphous*: as MFT 7a; *Fabric*: very abundant broad (2-4 mm) relict burrows; *Excrements*: occasional preserved broad (1-2 mm) mammilated organo-mineral excrements. BD (415A): 3.18% LOI, 3.44 mg g^{-1} phosphate-P, 7.7 x 10^{-8} SI χ, 1.05% χ_{conv} 40-45(70) mm SM: heterogeneous with many soil inclusions (eg, soil Type 1); as MFT 6a – moderately calcitic with rare fragments of biogenic calcite – some examples of likely fragmented earthworm granules?; totally dominated by textural pedofeatures – pans (see below); *Organic/Anthropogenic*: very abundant very fine charcoal; examples of coarse charcoal; *Fine Fabric*: SMT 9 (similar to SMT 6): finely speckled and dotted very dark cloudy grey (PPL), generally low birefringence (open porphyric, crystallitic b-fabric, XPL), pale grey with very many fine black and rare red dots (OIL); very abundant dark staining (??phosphate), many to abundant fine charred and amorphous organic matter; rare to occasional phytoliths; *Pedofeatures*: *Textural*: very abundant (dominated by) 2 mm thick and horizontally extensive pans/sedimentary laminae (full extent of deposit lost through previous sampling for pollen). BD (415B): 1.97% LOI, 2.09 mg g^{-1} phosphate-P, 6.8 x 10^{-8} SI χ, 0.430% χ_{conv} Probe (Line analysis down length of thin section): 4.41% Al, 3.15% Ca, 3.08% Fe, 0.30% Mg, 0.35% P, 0.02% Mn, 0.03% Pb, 1.58% K, 0.01% Cu, 20.0% Si, 0.01% Zn, 0.02% S, 0.10% Na. Elemental map: areas of 0.35% P, and 16.0% of P associated with Al and Si – textural pedofeatures mainly; or with Fe.	**Late Iron Age enclosure ditch 109166** 140028 Heterogeneous moderately poorly sorted fine soil containing soil clasts and very abundant slaking features (pans and intercalations), with evidence of co-eval earthworm and other burrowing, and possible inwash of phosphate-rich fine soil – sometimes with phytoliths (ditch slurry), over: Pans and inwash features of moderately calcareous and charcoal-rich (and phytoliths) deposits – some possibly phosphate-rich enclosure sediments; probability of *in situ* animal trampling.
Microfacies type 7a (SMT 8 with soil inclusions Types 1 and 3)	**M479**	40-120 mm SM: moderately heterogeneous; *Structure*: massive with medium prisms; 30% voids, dominant poorly accommodated planar voids (max. 6 mm), with partially collapsed channels and chambers forming fine (0.5 mm) closed and partially closed vughs; *Coarse Mineral*: as MFT 5a, with few flint gravel (max. 15 mm); *Organic/Anthropogenic*: two flint gravel horizontally aligned – also associated with horizontal fissure across the thin section; very abundant soil inclusions (eg, Type 1 [SMT 5a], and Type 3 – similar to Type 1, with very abundant iron and manganese staining – some possibly relict of organic matter/biological fabric) 2-4 mm in size; also occasional 'papules' – fine to medium sand-size fragments of textural pedofeatures clay; rare fine charcoal; example of fine sand-size burned bone and coprolite; possible fine sand size iron replaced dung fragment; *Fine Fabric*: SMT 8 - speckled yellowish brown to darkish reddish brown (PPL), low interference colours (close porphyric, speckled b-fabric, XPL), yellow to pale and dark orange (OIL); thin relict humic staining, rare to occasional amorphous and charred fine organic matter; rare traces of phytoliths; *Pedofeatures*: *Textural*: very abundant intercalations and associated dusty clay/impure clay coatings and infills; several phases – early phase infilling collapsed burrows/channels, with dark dusty clay eg, 400 µm thick, with planar voids exhibiting later	**Early Romano-British droveway ditch 109189** 134078 Moderately heterogeneous non-calcareous fine loam with very abundant inclusions of slaked subsoil and probable humic/humic stained (now iron and manganese replaced) soil clasts, and fragments of textural pedofeatures, set in a matrix dominated by textural pedofeatures of different phases – some possibly humic stained; only rare obvious anthropogenic inclusions present; all affected by mottling. Trampling by stock have produced a soil with multiple phases of slaked mixing, and likely inputs of humic waste and humic soils and (traces of dung); mesofauna such as earthworms and/or dung beetles were present and their burrows have been partially infilled with slaked soil.

		phases of laminated silty clay 300 µm thick; *Depletion*: probable many areas of moderate iron depletion; *Amorphous*: very abundant iron, and iron and manganese moderately strongly formed impregnative nodules – some concentric; *Fabric*: many broad (4 mm) burrows often associated with textural pedofeatures. BD (479): 3.14% LOI, 0.803 mg g^{-1} phosphate-P, 10.9 x 10^{-8} SI χ, 0.548% χ_{conv}	
Microfacies type 5a and 6b (SMT 5 mainly)	**M443A**	40-110 mm SM: Very similar to MFT 5a (SMT 5), with very abundant inclusions of soil Type 1 (slaked loamy clay), rare Type 2 (burned humic soil, including strongly rubefied variants – as 3-4 mm rounded clasts; prismatic structure, 35% voids (planar voids); stone-free; occasional charcoal (max 1-2 mm); example of very fine sand-size bone in soil inclusion Type 1; *Pedofeatures*: *Textural*: very abundant intercalations and dusty clay void (closed vugh) coatings; upwards, very abundant partially calcitic (chalky – chalk clasts present) intercalations, and infills associated with '*Fabric'* burrowing/collapsed burrows; *Amorphous*: very abundant iron (and manganese) impregnative mottling – often associated with soil inclusions (Type 1). BD (443A1): 3.54% LOI, 1.51 mg g^{-1} phosphate-P, 13.8 x 10^{-8} SI χ, 0.697% χ_{conv} BD (443A2): 2.20% LOI, 0.516 mg g^{-1} phosphate-P, 12.2 x 10^{-8} SI χ, 0.626% χ_{conv}	**Early Romano-British ring gully 129162** Ring gully 114053 A heterogeneous and mottled fine loamy fill, with textural pedofeatures of mixing and structural collapse – trampling, with – upwards- slaked burrow-mixed moderately calcareous soil; inclusions of charcoal and fine organic matter; wet and occasionally trampled ditchfill?
Microfacies type 6b (SMT 6 and 7) Microfacies type 6a (SMT 6)	**M2012A**	110-190 mm 110-145 mm SM: Similar to MFT 6a, but with very coarse chalk stones (25 mm) and very strongly impregnative discontinuous 1-2 mm thick ironpan at the base; heterogeneous with SMT 6 very abundant burrow-mixed SMT 7 (fine dusty darkish yellow brown [PPL], moderately low interference colours [close porphyric, speckled b-fabric/unistrial b-fabric, XPL], pale yellowish brown [OIL]; occasional fine charcoal; abundant intercalations and closed vughs with impure dusty clay coatings); anthropogenic inclusions and pedofeatures as below, with abundant broad (2 mm) burrowing and mammilated organo-mineral excrements. BD (2012A1): 1.58% LOI, 0.615 mg g^{-1} phosphate-P, 4.0 x 10^{-8} SI χ, 0.288% χ_{conv} 145-190 mm SM: As M2012B, but with fewer anthropogenic inclusions (charcoal, pottery and plant fragments/stabling residues), and more coarse flint (25 mm) and chalk (>15 mm). BD (2012A2): 1.39% LOI, 0.461 mg g^{-1} phosphate-P, 5.6 x 10^{-8} SI χ, 0.389% χ_{conv}	**Middle Bronze Age Waterhole 302043** 302006 Once compact, calcareous trampled waterhole deposit, affected by later earthworm burrowing and mixing with non-calcareous silty soil (and ironpanning – hydraulic barrier/ and mottling) 311002 As below, compact calcareous deposit with included anthropogenic materials – likely trampled and 'stained' through animal trampling.
Microfacies type 6a (SMT 6)	**M2012B**	220-300 mm SM: Homogeneous; *Structure*: massive; 20% voids, fine (0.5 mm) poorly accommodated planar voids; *Coarse Mineral*: C:F 30:70, moderately poorly sorted with dominant fine silt to sand-size quartz, shell, calcite, mica, examples of glauconite and rock fragments, with frequent gravel size (max 15 mm) rounded chalk and shell fragment (7 mm); *Organic/Anthropogenic*: rare fine sand-size rounded pottery fragments – up to 4 mm; occasional fine charcoal (<0.5 mm), possible example of rounded sand-size coprolite??; examples of bone, burned shell and flint; occasional sand-size fragments of layered plant tissues and amorphous organic matter (stabling refuse?); relict 0.5 mm size fungal? body; *Fine Fabric*: SMT 6 (similar to SMT 1): speckled and cloudy and brownish cloudy grey (PPL), moderately high to moderately low interference colours (close porphyric, crystallitic b-fabric, XPL), greyish yellow to yellowish orange (OIL); very low to moderate humic (?) staining with occasional charred and amorphous organic matter; *Pedofeatures*: *Textural*: many intercalations with associated impure clay and calcitic void coatings (100-150 µm); *Amorphous*: very abundant weak to moderate impregnative mottling and staining. BD (2012B1): 1.57% LOI, 0.470 mg g^{-1} phosphate-P, 6.9 x 10^{-8} SI χ, 0.473% χ_{conv} BD (2012B2): 1.65% LOI, 0.459 mg g^{-1} phosphate-P, 7.0 x 10^{-8} SI χ, 0.449% χ_{conv}	**Middle Bronze Age Waterhole 302043** 311002 and 302008 Homogeneous, compact calcareous and chalky sediment containing fine charcoal, some mainly fine pot fragments, examples of bone and burned flint, and numerous inclusions of organic fragments – possibly some of which is dung/stabling refuse; sediment is iron mottled but some staining may come from animal slurries – trampling producing many textural features and a compact (once-muddy) deposit.
Microfacies type 5a (SMT 5)	**M2268**	240-320 mm SM: Heterogeneous (different soil materials); *Structure*: planar void/prismatic microstructure; 35% voids, dominant inter aggregate medium (2-4 mm) moderately well accommodated planar voids (cracks), and fine intra-aggregate planar voids, channels and vughs/closed vughs; *Coarse Mineral*: C:F 40:60, moderately well sorted dominant silt and fine sand-size	**Middle Bronze Age Waterhole 309075** 309078 A heterogeneous and mottled fine loamy fill, composed of fine charcoal-rich soil with many small soil inclusions of compact slaked soil (Type 1) and burned very

		quart (and mica), with few medium, coarse and gravel size (max. 6 mm) quartz, flint, ironstone and pisolite (and soil inclusions – see below); *Organic/Anthropogenic*: examples of stained/coprolitic bone (2 mm) and leached bone, occasional fine charcoal (0.5 mm) and rare burned flint; example of 200 µm wide fungal body; many soil inclusions – commonly 2-5 mm in size – C:F as main fabric, Type 1: dark reddish brown (PPL), low interference colours (close porphyric, speckled and grano-striate b-fabric, XPL), orange to reddish (OIL); many fine charcoal and amorphous organic matter traces; very abundant intercalations and dusty void/vughs coatings and infills; Type 2: black (PPL), isotic (XPL), black (OIL); very abundant blackened organic matter and fine fungal material; *Fine Fabric*: SMT 5: speckled and dotted dark yellowish brown (PPL), moderate interference colours (close porphyric, speckled b-fabric, XPL), pale yellowish brown (OIL); abundant fine charred and amorphous organic matter; rare phytoliths; *Pedofeatures*: *Textural*: very abundant intercalations and very dusty void coatings and infills (eg, 50-150 µm); *Depletion*: probable very abundant patchy weak iron depletion; *Amorphous*: very abundant fine to medium (1-4 mm) iron (and manganese) impregnative mottling. BD (2268A): 3.16% LOI, 1.10 mg g^{-1} phosphate-P, 13.8 x 10^{-8} SI χ, 0.288% χ_{conv} BD (2268B): 3.47% LOI, 1.76 mg g^{-1} phosphate-P, 22.9 x 10^{-8} SI χ, 1.65% χ_{conv} BD (2268C): 3.35% LOI, 3.77 mg g^{-1} phosphate-P, 26.0 x 10^{-8} SI χ, 2.30% χ_{conv}	humic soil (Type 2) etc.; with very abundant textural pedofeatures indicative of mixing and slaking; examples of fine bone, burned flint and a fungal body – along with general character – indicate occupation deposits that have been likely trampled under wet conditions – presumably by stock in the waterhole. 309079 309080
Microfacies type 4b (SMT 3 and 4)	**M2608**	0-80 mm SM: Generally homogeneous; *Structure*: massive with traces of fine laminae (interdigitating plant fragments and silt for example); 30% voids, fine to medium (1-4 mm) root channels; *Coarse Mineral*: as MFT 4b, but only very few gravel-size flint, and medium sand-size soil/sediment clasts (SMT 2a); *Organic/Anthropogenic*: example of 4 mm size woody root, rare to occasional fine 'fleshy' roots (250-500 µm); very abundant plant fragments (monocotyledonous eg, 3 mm long), often horizontally oriented, some showing humification and some associated with iron staining; occasional charred and charcoal fragments throughout – possible rare charred layers?; *Fine fabric*: as SMT 3 and 4; *Pedofeatures*: *Amorphous*: many generally weak patches of iron impregnation of organic matter; examples of ferruginised pyrite framboids; *Fabric*: moderate biological mixing, abundant broad (3-4 mm) burrowing in lower half of thin section; *Excrements*: many broad (3-4 mm) organo-mineral excrements in lower half. BD (2608): 11.6% LOI, 0.325 mg g^{-1} phosphate-P, 4.2 x 10^{-8} SI χ, 0.739% χ_{conv}	**Middle Bronze Age barrow 324078** 320115? Peaty and mineralogenic peaty deposit(s) with high amounts of monocotyledonous material – likely some growing *in situ* (fleshy roots), with occasional 'drying out' allowing faunal mixing, eg, by earthworms, and later woody? rooting and weak secondary iron mottling; fine charcoal inputs. (Presence of humified organic materials also possibly implies inputs of humified organics – dung?? – needs some independent evidence)
Microfacies type 3b (SMT 2b and 3)	**M2719A**	30-110 mm SM: Homogeneous; *Structure*: massive; 25% voids, very fine channels; *Coarse Mineral*: as MFT 3b with few flint gravel; *Organic/Anthropogenic*: example of burned flint and very few angular flints; occasional fine charcoal (max. 1.5 mm); *Fine fabric*: as SMT 2b and 3; with patches of humic or very poorly humic staining; rare fine charcoal and rare traces of phytoliths; *Pedofeatures*: *Amorphous*: very abundant mainly weak iron impregnation; *Fabric*: total homogenisation by biological mixing. BD (2719A): 1.62% LOI, 0.281 mg g^{-1} phosphate-P, 5.7 x 10^{-8} SI χ, 0.192% χ_{conv}	**Middle Bronze Age barrow recut 324080** 320144 mainly coarse silty mineralogenic sediment, with flint gravel – including a burned example; fine scatter of charcoal.
Microfacies type 4b (SMT 3 and 4)	**M2719B**	180-250 mm SM: moderately heterogeneous; *Structure*: relict broad laminated, 30-40%; medium channels (1-2 mm) and broad (3-4 mm) chambers; *Coarse Mineral*: as MFT 4b, with frequent coarse (max. 18 mm) and angular flint; *Organic/Anthropogenic*: occasional fine charcoal and possible charred very thin (200 µm) amorphous peat layers; example of burned flint and possible angular flint lithics; abundant plant fragments including possible wood and bark fragments; *Fine fabric*: as SMT 3 (lower slide) and 4 (upper slide); *Pedofeatures*: as below. BD (2719B): 11.3% LOI, 0.401 mg g^{-1} phosphate-P, 3.5 x 10^{-8} SI χ, 0.841% χ_{conv}	**Middle Bronze Age barrow 324078** 320142 Once well laminated peat and mineralogenic peats, showing minor mixing by burrowing fauna and rooting (local wood peat?); anomalous inclusion of coarse flint and angular flint and burned flint.
Microfacies type 4b (SMT 4 [SMT 2a, 2b and 3])	**M2719C**	370-400 mm SM: moderately homogeneous; *Structure*: massive with poorly developed fine subangular blocky; 30% voids, fine (<1mm) root channels, chambers and planar (1-3 mm) voids; *Coarse Mineral*: C:F, 30:70, very dominant well sorted coarse silt, with very few coarse (humic and silty) soil/sediment inclusions up to 5 mm in size; *Organic/Anthropogenic*: occasional coarse charcoal (2-3 mm), occasional to many in places, fine (500-1,000 µm) fleshy and woody roots; abundant plant organs and tissues; *Fine fabric*: very	**Middle Bronze Age barrow 324078** 320140 Highly organic but mineral intercalated peat, containing burrowed-in silty soil/sediment; contains much coarse charcoal; only a small amount of iron staining.

Microfacies type 4a (SMT 3) Microfacies type 3a (SMT 2b)		dominant SMT 4 with thin laminae and burrow fills of SMT 2b and 2b; SMT 4 – dark reddish brown (PPL), mainly isotic with some very low interference colours (close to open porphyric, mainly undifferentiated b-fabric, XPL), mainly dark reddish brown (OIL); very abundant amorphous and tissue fragments of organic matter; rare traces of phytoliths, probable diatoms and pollen; *Pedofeatures*: *Textural*: occasional humic clay inwash/pans/intercalations; *Amorphous*: rare patches of iron impregnation around partially ferruginised roots; *Fabric*: abundant very broad (4-10 mm) burrowing; *Excrements*: occasional very fine (c. 50 µm) mite? Excrements, especially in root traces. BD (2719C1): 13.8% LOI, 0.410 mg g^{-1} phosphate-P, 3.8 x 10^{-8} SI χ, 0.516% χ_{conv} 400-420 mm SM: As below, but C:F, 80:20, moderately well sorted dominant silt-size quartz; very few gravel; *Organic/Anthropogenic*: many to abundant – upwards – fine detrital thin plant fragments; rare charcoal; (monocotyledonous); occasional roots and root traces (200-1,000 µm); *Fine fabric*: SMT 3 – dusty, dotted brown to reddish brown (PPL), low to moderate interference colours (close porphyric, speckled and granostriate b-fabric, XPL), pale brown to brown (OIL); very abundant amorphous organic matter with many plant tissues and organs; *Pedofeatures*: *Fabric*: fabric mixing by roots? 420-400 mm SM: Generally homogeneous; *Structure*: massive; 25-30% voids; complex packing voids, channels, vughs, and chambers; *Coarse Mineral*: at base of thin section - C:F 85:15, very poorly sorted dominant gravel-size (max. 8 mm) flint, siltstone, chalk and ironstone, etc., with frequent coarse silt to coarse sand-size quartz mainly; *Organic/Anthropogenic*: rare browned plant remains and fragments of amorphous organic matter ('peat'); two 800 µm size bone (pale and leached); *Fine fabric*: SMT 2b – as SMT 2a, with very thin humic traces and trace amounts of charcoal; and with patches of crystallitic b-fabric; *Pedofeatures*: *Crystalline*: rare traces of micritic void coatings and infills; *Depletion*: probable iron and calcium carbonate depletion affecting bone and matrix and gravel; *Amorphous*: trace amounts of pyrite framboids now iron replaced. BD (2719C2): 0.921% LOI, 0.631 mg g^{-1} phosphate-P, 5.2 x 10^{-8} SI χ, 0.317% χ_{conv}	320139 Upward fining sequence from iron depleted poorly sorted gravel that contains two fine bone fragments, becoming a finely laminated silty mineralogenic peat rich in detrital monocotyledonous plant fragments.
Microfacies type 2 (SMT 2a) Microfacies type 1 (SMT 1)	**M2538A**	120-190 mm SM: layered with finer bedded sediments between 120-140 mm. 120-140 mm: homogeneous; *Structure*: massive/lamina microstructure; 10-15% voids, fine channels and vughs; *Coarse Mineral*: C:F 25:75, moderately well sorted with coarse silt and fine sand-size quartz, chalk, and shell, with very few mica and rock fragments; very few medium to very coarse sand; 2 examples of horizontal oriented 3 mm long shell; *Organic/Anthropogenic*: rare to occasional fine charcoal (max. 2.5 mm); *Fine fabric*: SMT 2a – mainly finely speckled, cloudy greyish brown (PPL), moderate interference colours (close porphyric, speckled, unistrial and crystallitic b-fabric, XPL), mainly grey (OIL); thin humic staining, rare amorphous fine organic matter and fine charred OM; traces of phytoliths; *Pedofeatures*: *Textural*: many intercalations developing into thin (50-100 µm) dusty clay void coatings; rare chalky very fine void infills; *Crystallitic*: rare traces of micritic void infills; *Amorphous*: occasional ferruginous impregnations, often picking out 250 µm thick laminae; *Fabric*: occasional burrow mixing. BD (2538A): 1.32% LOI, 0.562 mg g^{-1} phosphate-P, 6.9 x 10^{-8} SI χ, 0.343% χ_{conv} 140-190 mm: very similar to M2538B (SMT 1), but fewer chalk gravel, and co-eval many fine (0.5 mm) to very fine (200 µm) rooting (channel formation) and burrowing (vughs); 25% voids; *Pedofeatures*: as below; *Textural*: abundant broad infills, intercalations and microlaminated dusty to impure void coatings.	**Unphased Palaeochannel 327003** Fine clayey to fine sandy generally calcareous sediment, with included fine charcoal, and textural pedofeatures indicating 'muddy' and finely laminated deposition at times; later inwash of chalky alluvium (above) and moderate iron mottling. As below, but with marked co-eval biological activity and inwash.
Microfacies type 1 (SMT 1)	**M2538B**	310-390 mm SM: homogeneous; *Structure*: massive with traces of broad layering; 20% voids, very fine (<1 mm) channels and planar voids, with fine (<2 mm) chambers, very fine (200 µm) vughs; *Coarse Mineral*: Coarse:Fine (C:F limit at 10 µm) 60:40, very poorly sorted; dominant medium and coarse silt-size, fine to very coarse sand-size quartz (common chalk, very few shell,	**Unphased Palaeochannel 327003** A now massive, once poorly layered calcareous sediment of poorly sorted chalk gravel and coarse silt through to coarse sand, showing a broad mineralogy (till-derived); sediment was rooted and partially

		fossil, mica, and rock fragments – greensand, metamorphic, sedimentary and igneous material), with frequent gravel-size chalk (subangular to subrounded; max. 8 mm); *Organic/Anthropogenic*: occasional traces of rooting/root traces (now Fe replaced etc), some 250 µm and coarse; *Fine fabric*: SMT 1 - cloudy greyish, brownish and dark reddish (PPL), isotic to moderately high interference colours (close porphyric, undifferentiated to crystallitic b-fabric, XPL), pale yellow to dark orange (OIL); trace amounts of humic staining and amorphous fine organic material; *Pedofeatures*: *Textural*: abundant broad (500 µm) impure clay infills and associated intercalations and 150 µm thick microlaminated finely dusty void coatings; *Depletion*: probable rare depletion of calcium carbonate and iron; *Crystalline*: trace amounts of micritic and microsparitic void infills; *Amorphous*: very abundant ferruginous nodular impregnations and poorly pseudomorphic organic matter (eg, roots) replacement. BD (2538B): 1.68% LOI, 0.351 mg g^{-1} phosphate-P, 6.7 x 10^{-8} SI χ, 0.137% χ_{conv}	burrow-mixed and history of dusty to impure clay inwash (alluviation?) and minor secondary calcium carbonate formation, which was succeeded by major hydromorphic iron impregnation, and probably associated calcium carbonate and iron depletion (mottling).

NB * - very few 0-5%, f - few 5-15%, ff - frequent 15-30%, fff - common 30-50%, ffff - dominant 50-70%, fffff - very dominant >70%
a - rare <2% (a*1%; a-1, single occurrence), aa - occasional 2-5%, aaa - many 5-10%, aaaa - abundant 10-20%,
aaaaa - very abundant >20%

MFT 1: Chalk gravel-rich poorly sorted alluvium that was rooted, affected by sediment inwash, secondary calcium carbonate formation and – lastly – strong iron impregnation. Apparently sterile.

MFT 2: Fine silty clay alluvium, with traces of laminae and including fine charcoal – reflecting low energy flow and human impact on the landscape.

MFT 3a: Generally non-calcareous gravel rich alluvium, with trace amounts of fine bone.

MFT 3b: Weakly humic and iron stained mineralogenic coarse silt with gravel-size flint including rare burned flint and fine charcoal.

MFT 4: Humic to highly humic peats and mineralogenic silty peats, containing occasional to many charcoal – and possible charred laminae, much rooting and showing the effects of mesofaunal activity; occasional iron mottling. Low energy organic and mineralogenic sedimentation in an environment experiencing human impact; with periodic low water tables encouraging faunal activity.

MFT 5: A heterogeneous and mottled fine loamy fill, composed of fine charcoal-rich soil with many small soil inclusions of compact slaked soil (Type 1) and burned very humic soil (Type 2) etc.; with very abundant textural pedofeatures indicative of mixing and slaking; examples of fine bone, burned flint and a fungal body – along with general character – indicate occupation deposits that have been likely trampled under wet conditions – presumably by stock in the waterhole.

MFT 6: (6a) Homogeneous, compact calcareous and chalky sediment containing fine charcoal, some mainly fine pot fragments, examples of bone and burned flint, and numerous inclusions of organic fragments – possibly some of which is dung/stabling refuse; sediment is iron mottled but some staining may come from animal slurries – trampling producing many textural features and a compact (once-muddy) deposit. (6b) includes burrowed-in non-calcareous but 'trampled' silty soil.

MFT 6c: Very poorly sorted, compact calcareous deposits that show horizontal fissuring/layering (and evidence of structural collapse – intercalations and closed vughs), and which contain fragments of possible stabling refuse (and fungal material) and are heavily stained yellowish brown (Fe and P?). Likely stock trampled deposit – near stabling area?.

MFT 7: Moderately heterogeneous non-calcareous fine loam with very abundant inclusions of slaked subsoil and probable humic/humic stained (now iron and manganese replaced) soil clasts, and fragments of textural pedofeatures, set in a matrix dominated by textural pedofeatures of different phases – some possibly humic stained; only rare obvious anthropogenic inclusions present; all affected by mottling.

Trampling by stock have produced a soil with multiple phases of slaked mixing, and likely inputs of humic waste and humic soils and (traces of dung); mesofauna such as earthworms and/or dung beetles were present and their burrows have been partially infilled with slaked soil.

MFT 8a: Heterogeneous, mainly calcareous, chalk-rich and land snail-rich much burrowed deposits, containing evidence of occasional slaking and mixing; only small amounts of anthropogenic indicators, eg, of bone and mixed-in once-humic soil.

MFT 8b: Massive, heterogeneous, probable part earthworm burrowed non-calcareous fill, that has been slaked and trampled?, with inclusions of once-humic soil clasts and clayey material (from local stock activity); small amounts of included fine charcoal.

MFT 9: Homogeneous, moderately well sorted coarse silt and sand infilling – silting; affected by fine rooting, weak iron staining, and later phases of silting produced some thin dusty clay coatings; or total iron depletion.

MFT 10: Poorly sorted gravel-rich lower ditch fill, containing coarse mineral of substrate, and showing initial probable earthworm working of the fine fill, major clay inwash (alluviation?, fine settling) and slaked mixed fill (trampling/cleaning?); all followed by iron impregnation and possible phosphate enrichment phase?

MFT 11: Iron stained calcareous fill containing gravel and occasional to many charcoal, and evidence of burrowed-in more humic and fine charcoal-rich soil.

MFT 12: Earthworm mixed anthropogenic deposit composed of fine charcoal rich anthropogenic soil (SMT 11) with likely included ash, and very abundant daub materials including charcoal rich poorly burned calcareous material alongside, strongly burned clay loam and examples of chalky cob-like material; burned chalk also present. Anthropogenic character is partially paralleled by the bulk chemistry, compared to lower pit deposits (see MFT 11)

MFT 13: Well sorted calcareous silt inwash with likely rooting between a succeeding inwash phase.

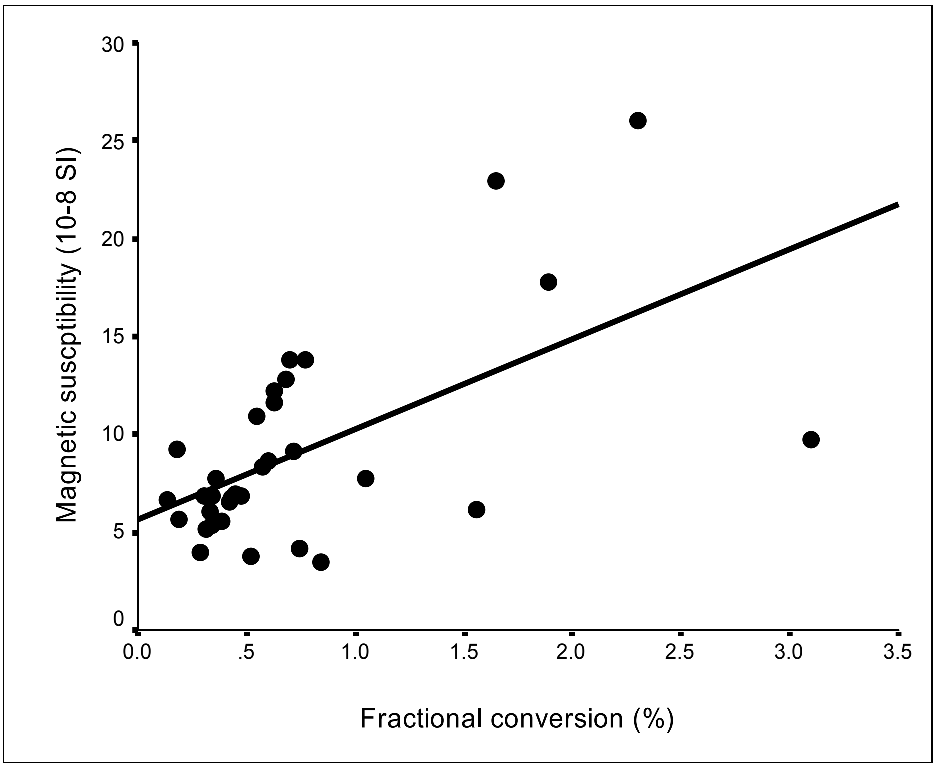
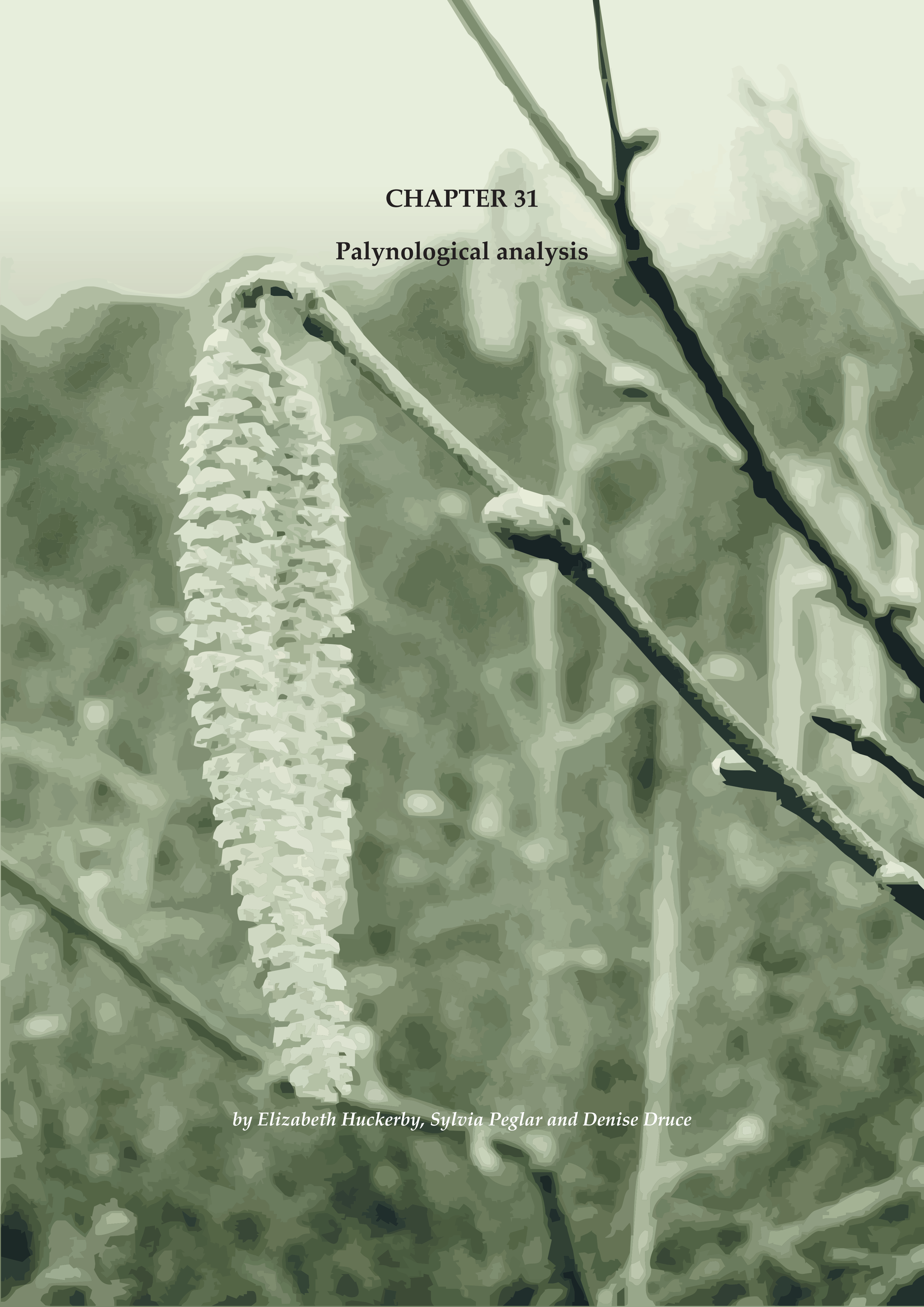


Figure 30.1: Plot of relationship between χ and χ_{conv} (r = 0.585; p<0.001)



CHAPTER 31

Palynological analysis

by Elizabeth Huckerby, Sylvia Peglar and Denise Druce

31 Palynological analysis

Elizabeth Huckerby, Sylvia Peglar and Denise Druce

An intensive programme of sampling was undertaken during excavation to retrieve monolith samples for palynological analysis. Deposits dating from the middle Bronze Age to the post medieval were sampled from a number of different feature types including the ditch of a round barrow, waterholes, pits and boundary ditches. The only natural deposits identified during the excavations were those from the fills of the palaeochannel (327004): pollen was very sparse in these deposits and Patricia Wiltshire assessed them as having none or a very low potential for further analysis (site archive assessment report).

Thirty of these monolith samples, representative of the spatial distribution of the features, chronology and feature type, were selected for assessment. Twelve samples were selected for further analysis (Table 31.1). Six samples analysed were from Middle Bronze Age features, two from a 2nd-3rd century AD ditch and single samples from a late Romano-British pit, a late Romano-British enclosure ditch, a late medieval waterhole and a post-medieval pit.

Pollen analysis of the samples was problematic and lengthy because preservation was poor throughout the features and often pollen frequencies were very low. The paucity of the pollen record is in part a result of the highly calcareous nature of the tills together with the low number of waterlogged fills, which are not conducive to the preservation of pollen and other palynomorphs. Patricia Wiltshire, in her assessment report, considered that the sparse nature of the pollen record was also partly the result of periodic wetting and drying of the sediments as the water-table fluctuated. Pollen and other palynomorphs are best preserved in acidic, anaerobic, and permanently waterlogged conditions, for example mires/peat bogs. However, further analysis of the samples was judged to be a priority to provide a dataset, albeit a limited one, of the vegetation within the environs of the Stansted settlements.

The earlier assessments demonstrated that the basal fills from the majority of the features often included high frequencies of pollen and spores from either pre-Quaternary or pre-Devensian deposits. In fact some of the upper fills exhibited a similar feature which was interpreted by the excavators as either slippage from the sides or deliberate back-filling of the features, and this was confirmed by the palynomorph assemblages.

Methods

Subsamples of a standard size (1ml in volume) were prepared for pollen analysis using the standard techniques of sodium or potassium hydroxide, acetolysis and either hot hydrofluoric acid or zinc chloride treatment (Faegri and Iversen 1989). Tablets of *Lycopodium* spores were added at the start of the preparation so that pollen concentration values could be calculated if required (Stockmarr 1971). The residues were mounted in silicone oil and examined with a high powered binocular microscope using x400 magnification routinely and x1000 for critical grains. The size of the pollen sum was variable because of the sparse nature of the assemblages in most samples. Pollen identification was carried out using the standard keys of Faegri and Iversen (1989), Moore *et al.* (1991), and limited reference collections held at Oxford Archaeology North and by Sylvia Peglar. Cereal-type grains were defined using the criteria of Andersen (1979); indeterminate grains were recorded using groups based on those of Birks (1973). Charcoal particles >5µm were also recorded following the procedures of Peglar (1993). Plant nomenclature follows Stace (1991).

Analysis of data

Analysis and storage of the data was accomplished using the TILIA and TILIA-Graph software package (Grimm 1990), to categorise data and aid its interpretation. Pollen count sheets, microscope slides, and the residues of prepared samples are stored at Oxford Archaeology North.

Presentation of results

Pollen data has been presented as percentage diagrams using the computer programs TILIA and TILIA-GRAPH (Grimm 1990). The percentage values are based on a pollen sum of all land pollen and fern spores but excludes aquatic taxa and indeterminate grains. All palynomorphs excluded from the pollen sum are expressed as a percentage of the pollen sum plus the group sum in which they belong, and charcoal values are expressed as a percentage of the pollen sum plus the charcoal counts. The diagrams have not been divided into pollen zones as it was thought to be more informative when the pollen data was related to the actual contexts.

Results

Middle Bronze Age

Barrow 324078 (MTCP) (Figs 31.1-31.2)

Undoubtedly one of the most important features from the excavation was that of the round barrow with its surrounding ditch. The complex sequence of fills from this ditch included a highly organic layer described as a peat in the field. Sample 2667 was taken through the fills on the drier side of the barrow away from the watercourse, whereas sample 2719/2720 was taken through the lower fills of the ditch on the opposite side where it is likely that the proximity of the watercourse resulted in a higher water table and hence more waterlogged conditions while the feature was extant and as it fell into disuse.

Sample 2719/2720 (Fig. 31.1)

There was insufficient pollen from SG 324070 (the “peat” like layer, context 320135) except at the lower boundary with SG 324074 (context 320134) and 324076 (context

320133), that is the fills above and below SG 324074 (context 320134), to give viable pollen counts. Dinoflagellate cysts and spruce (*Picea*) grains together with large numbers of poorly preserved pollen were recorded in both these layers suggesting that there was some reworking of earlier sediments into these fills. However, pollen was abundant and well preserved in SG 324074 (context 320134), which is immediately beneath the "peat" like layer. The summary pollen diagram (see Fig. 31.2) shows that tree and shrub pollen was less than 20% in this fill and fell to 5%, with alder and hazel (*Alnus glutinosa* and *Corylus avellana*) pollen recorded in the greater numbers but with other tree and shrub taxa recorded more sporadically suggesting areas of scrubby woodland but with no substantial tree cover. Tree and shrub pollen rises to its highest values at 0.38 m from the top of the sample (2719/2720) when it is associated with a peak in bracken and fern spores.

Cereal pollen was recorded in all but two of the subsamples in which sufficient pollen was preserved to give a valid pollen sum. The size of the pollen grains and the diameter of the annulae, which are used as criteria in the identification of grass and cereal pollen (Andersen 1981), are such that these cereal-type pollen grains can confidently be identified as being from cereals and not from wild grasses such as Sweet grasses (*Glyceria)*. This suggests that there may have been some cereal cultivation in close proximity to the barrow. Cereal pollen is poorly dispersed, and research in Northern Germany has shown that very little pollen is preserved in the pollen record within 1700 metres of a known medieval field system, and that by a distance of 3 kilometres it is under-represented (Behre and Kŭcan 1986).

The presence of cereal pollen in the fills SG 324074 (context 320134), SG 324070 (320135) and SG 324067 (3200137) from the side of the ditch nearest to the water course, contrasts with the insect fauna analysis in which very few beetles characteristic of arable or disturbed ground were recorded (see Robinson, CD Chapter 36). However, the pollen data suggest that although some cereal cultivation was taking place when the lower fills of the round barrow ditch were accumulating in the Middle Bronze Age, grassland or open ground dominated the landscape with occasional stands of alder and hazel. The records of goosefoot family (Chenopodiaceae), mugwort (*Artemisia*) and greater/hoary plantain (*Plantago major/media*) pollen are also indicative of arable cultivation or open disturbed ground. However, the relatively high percentages of grass (Poaceae) and ribwort plantain (*Plantago lanceolata*) pollen suggest that grassland predominated with some waste ground and arable cultivation. Furthermore, open grassland taxa were rare in the waterlogged plant remains and no ribwort plantain (*Plantago lanceolata)* seeds were recorded (see Carruthers, CD Chapter 34) although both the pollen and insect remains records suggest that it was present (see Robinson and Carruthers, CD Chapters 36 and 34). Carruthers suggests that this may be due to heavy grazing preventing the plants from setting seed. The increasing values of pollen from pondweed (*Potamogeton*), sedges (Cyperaceae), meadowsweet (*Filipendula*) and bulrush/bur-reed (*Typha angustifolia*/*Sparganium*-type) complement the evidence from the waterlogged plant remains (see Carruthers, CD Chapter 34) of an aquatic or marginal community around the feature. However meadowsweet grows in both wet and dry places.

Sample 2667 (Fig. 31.2)
Pollen was less abundant and more poorly preserved in the second sequence (sample 2667) taken through the ditch fills on the drier side of the barrow away from the water course. There was insufficient pollen in SG 324067 (context 316134) and in the lower part of SG 324075 (context 316132) to reach a statistically valid pollen sum. However pollen was recorded in sufficient numbers in the upper part of SG 324075 (context 316132), likely to be contemporaneous with SG 324074 (context 320134) of sample 2719/2720 (Fraser Brown pers. comm.) and in SG 354070 (context 316133) in what was described as the "peat deposit". This more polliniferous section of the sequence is in marked contrast to sample 2719/2720 where little or no pollen was recorded in what was described as the "peat deposit".

The upper three samples in the pollen diagram from sample 2667 represents the pollen record from the ditch fills, which accumulated above those in sample 2719/2720 discussed above. The values of tree and shrub pollen (see summary pollen diagram Fig. 31.1) are considerably higher than from the opposite side of the ring ditch with a minimum of 25% total land pollen and spores and a maximum of 60%. High values of lime (*Tilia*) and indeterminate pollen grains (more than 50%) were recorded at depths of 0.30, 0.32, 0.44 and 0.46m (not shown in the diagram) from the top of the samples, which together with the records of spruce (*Picea*), high numbers of indeterminate spores and the presence of dinoflagellate cysts in some of the depths analysed suggest that the lower part of SG 324075 (context 316132) and the upper part of SG 324070 (context 316133) are disturbed and include palynomorphs from older deposits that predate the barrow. Taxa that are more resistant to degradation and crumpling, or are so distinctive that they can be identified even when preservation is poor, for example, alder (*Alnus*), lime (*Tilia*) and dandelion-type (*Taraxacum*-type), are also well represented in all the samples, suggesting a skewed dataset as a result of differential preservation as the feature became drier and less anaerobic inhibiting the preservation of less resistant pollen types. However the higher percentages of arboreal pollen in this sample may be indicative of the regeneration of woodland/scrub around the barrow and Carruthers (CD Chapter 34) also records the remains of woodland plants in the macrofossil record. Scaife (1988) notes that at Mar Dyke, along the Crags By-pass, lime (*Tilia*) and oak (*Quercus*) woodlands remained well into the Iron Age in South East Essex and the Lower Thames Region The results of these analyses from sample 2667 support the assessment by Patricia Wiltshire of this sample, although there are some differences, probably reflecting the extreme variability in the quality of the pollen record.

The inclusion of reworked material and the nature of the pollen record suggest that perhaps little credence should be placed on the analysis of the pollen sequence recorded in sample 2667.

The complex nature of the depositional sequence of the barrow ditch and the validity in the pollen record between and within the samples has made the interpretation of the pollen data extremely difficult. The authors have attempted to relate the two samples (2667 and 2719/2720). A picture is emerging that the barrow may have been constructed in an essentially cleared grassland landscape with some stands of woodland and areas of cultivation. The ditch itself remained wet and was possibly bordered by wet grassland with sedges and meadowsweet. If the pollen record (sample 2667) from the drier side of the ditch is more recent than that from the side nearer the watercourse, it suggests that, as the barrow fell into disuse, the landscape became more wooded again although some areas of waste ground probably remained.

Pit 316118 (MTCP)

Sample 2705/2706 (Fig. 31.3)
Sample 2706 was from a Middle Bronze Age pit 316118 close to the round barrow (324078). The sample was taken through the fills and into the natural deposit in which the feature had been cut. The feature is described as a waterhole. The fills were interpreted in the field as following the same depositional sequence as those from the ring ditch of the round barrow. Nine subsamples were taken from 316114, 316116, 316117 and 316118 but only four of these, three from the primary fill (316117) and one from near the top of fill 316116, contained significant numbers of pollen grains. Fill 316116 was described in the field as a "peat" deposit and in the laboratory it was thought to be a very organic deposit. This more organic fill 316115 is shown on the section plans as domed. Pollen was sparse in the lower part of this context (although described in the field and laboratory as highly organic) and in the natural (316118). However significant numbers of well preserved grains were recorded in the upper part of fill 316116 (at a depth of 0.10m from the top of the sample), this fill (316116) thought to have been laid in water and fill 316117, which appears to have accumulated rapidly at the base of the feature.

The summary pollen diagram shown in Figure 31.3 shows that tree and shrub pollen was recorded at low values in the lower part of fill 316117 (at depths of 0.42 and 0.37 m from the top of sample 2705/2706), but rose slightly towards the top of the primary fill (at a depth of 0.32 m). Grass and ribwort plantain (*Plantago lanceolata*) pollen were the major components of the pollen assemblage with other taxa indicative of grassland and open ground also recorded: for example, fairy flax (*Linum catharticum*), cowslip (*Primula veris*-type), buttercup (*Ranunculus*) and dandelion-type. Cereal-type pollen, with the characteristics of size and annulus diameter (Anderson 1981) was also identified suggesting some possible cereal cultivation. Bracken and undifferentiated fern spores were quite frequent.

No obligate aquatic taxa, except the colonial alga *Botryococcus*, were recorded, but taxa, which may grow on wet ground such as sedges (Cyperaceae), water mint (*Mentha*-type) and meadowsweet (*Filipendula)* were present although not abundant.

The pollen record from the primary fill (basal three levels) suggests that grassland or open ground dominated the landscape around the feature with some cereal cultivation when the fills were accumulating in the Middle Bronze Age. There is some evidence of wet ground in the area but, as no pollen from obligate aquatics was recorded, it suggests that if indeed the pit was water filled, there was no floating vegetation. The increase in the pollen of alder, field maple (*Acer campestre*-type) and hazel towards the top of the fill suggests that there may have been some increase in hedgerows, although this is unlikely as no grains of Rosaceae pollen other than a single hawthorn (*Crataegus)* grain was recorded, or scrub/areas of woodland. There is an increase in the number of indeterminate grains at this level. The preservation of pollen was good in the primary fill although the number of different taxa recorded is limited, but it does not appear to represent a pollen flora that has been differentially preserved but rather an impoverished plant community of open ground with dandelions, bracken and ferns with some hazel copses/scrub. Charcoal particles were abundant throughout.

The pollen spectrum from the single sample (0.10 m depth) in the organic fill (316116) in which there was a statistically viable pollen sum is significantly different from those in the primary fill (316117). The pollen assemblage suggests that, although the proportion of woodland remained similar, the more open ground probably became more impoverished with bracken and dandelions dominating. These changes may be indicative of a decline in cultivation and grazing resulting from the abandonment of the immediate area. Although the high values of bracken and dandelions could be indicative of differential preservation of the palynomorphs and thus a skewed data set, it is unlikely in this instance as the pollen and spores were well preserved.

The sparsity of pollen in this highly organic deposit (316116) is unexpected, although in the ring ditch, where a layer described as "peat" is thought to have been laid down under similar circumstances to this layer in pit 316118, pollen frequency was also very low. Whether the conditions in the feature were unfavourable for pollen preservation, or some other factor was responsible for this absence of pollen, is unknown. However, pollen grains are better preserved in acidic rather than alkaline conditions and the alkaline nature of the tills may have governed the alkalinity of the water. Alternatively, conditions may also have been aerobic, again inhibiting pollen preservation, although this seems unlikely as the organic matrix of the deposit would also not have survived. Thirdly the organic material may have been deliberately placed in the barrow ring ditch, and this material may only have contained low numbers of pollen grains. If this third hypothesis is correct, it may help to explain why the "peat" was not a uniform layer all round the ring ditch of the barrow, although the greater proximity of the Stansted Brook on the one side is thought to have influenced this. The domed nature of this similar organic layer in the feature, with more minerogenic sediments towards the edges of the pit, suggests to the authors that it was deliberately placed in the feature.

Waterhole 426015 (M11)

Sample 6171 (Fig. 31.4)
A pollen sequence (sample 6171) through the fills (426005 and 426004) of a Middle Bronze Age waterhole 426015 was analysed. Six subsamples were analysed from this feature. The pollen frequency was patchy with only sufficient numbers of pollen grains to give a statistically valid pollen sum in the lower parts of both fills, but absent from the top of fill 426005. Pollen preservation was variable but this did not preclude a viable pollen sum being reached.

The summary pollen diagram (Fig. 31.4) shows that the values of tree and shrub pollen were less than 10% of the sum of terrestrial pollen and spores, and herbaceous pollen dominated the assemblages. The pollen assemblages from the basal two samples of fill 426005, when the deposits of the waterhole started to accumulate, suggest a cleared landscape with open ground around the feature, with grasses, ribwort plantain, the greater/hoary plantains (*Plantago major/media*) and buttercups (*Ranunculus acris*-type) the most abundant pollen types. Cereal-type pollen was recorded and grains provisionally identified as cf wheat (*Triticum*-type) were recorded in the lower fill of the feature together with arable weeds, for example, goosefoots (Chenopodiaceae), stitchwort/chickweed family (Caryophyllaceae), mustard-type (*Sinapis*-type) and chamomile/yarrow-type (*Anthemis*-type), and suggest some arable cultivation in the Middle Bronze Age. In subsample 0.44 m, grass pollen increases at this time, but there is a reduction in the values of ribwort and other plantains. The lower part of fill 426004 (0.47 m depth) saw a substantial reduction in grass pollen with a concomitant increase in pollen from buttercups, ribwort and other plantains, nettles (*Urtica*) and trilete spores. It is possible this is indicative of the ground becoming more open with less grassland, although grass appears to recover at 0.24 m. Pollen preservation is worse at this time with many more indeterminable and dandelion-type grains recorded, together with an increase in fern spores, suggesting that conditions were less favourable for pollen preservation. Although the feature is described as a waterhole, obligate aquatics were only recorded sporadically except at the base of fill 426004 when large numbers of the colonial alga, *Botrycoccus*, were recorded. Similarly, plants associated with wet ground such as sedges and meadowsweet are infrequent but an increase in the representation of nettle pollen together with a peak in *Botrycoccus* suggests that nettles were growing on the damp banks, and is perhaps related to increasing nitrogen levels where animals may have come down to drink and defaecated. Charcoal particles were abundant throughout the profile.

The sporadic nature of the pollen record at some levels may have been caused by changes in the waterhole. Seasonal variations in the water levels may have inhibited pollen preservation when conditions were drier. Alternatively, the water quality may have fluctuated with increasing alkalinity, again inhibiting pollen preservation. Finally the sporadic nature of the pollen record may be indicative of deliberate backfilling of the feature.

<u>Pit 408013 (FLB)</u>

Sample 5019 (Fig. 31.5)
Eight subsamples were analysed, six from the primary fill 408016 and two from fill 408015. The summary pollen diagram in Figure 31.5 shows relatively low values of tree and shrub pollen, less than 25%, throughout the sequence, suggesting that the landscape was predominantly cleared of woodland when the fills of pit 408013 started to accumulate in the Middle Bronze Age. Minor fluctuations are recorded in the relative frequencies of pollen from trees and shrubs, herbs, and fern spores, with slightly higher values of tree pollen recorded in fill 408015, but even these are not indicative of any substantial woodland presence at Stansted. There was possibly some open/pasture woodland or copses with oak (*Quercus*), hazel (*Corylus*-type) and alder (*Alnus*).

Some cereal-type pollen was recorded in the sequence and both *Triticum* and *Hordeum* -type were recorded suggesting that some cultivation was taking place near pit 408013 in the Middle Bronze Age. Pollen from arable weeds and open ground taxa were also recorded, for example, *Anthemis*-type, which includes taxa such as chamomile (*Matricaria*) and corn marigold (*Chrysanthemum segetum*), and goosefoots (Chenopodiaceae).

The pollen assemblage is dominated by grasses (Poaceae), dandelion-type (Lactucoideae-type in the Asteracea), daisy-type (*Aster*-type in Asteraceae), ribwort plantain (*Plantago lanceolata*) and bracken (*Pteridium*). This assemblage is indicative of grassland, pasture and open ground plant communities in the Middle Bronze Age. Bracken may be growing in the grassland as the result of grazing or within the stands of woodland. The presence of sedge (Cyperaceae) pollen suggests that there were some areas of damp ground around this pit.

Pollen and spores were poorly preserved with many crumpled and degraded grains indicating a dataset skewed in favour of taxa with more resistant or easily identifiable pollen, for example, dandelion-type (Asteraceae (Lactucoideae)), goosefoot (Chenopodiaceae) and daisy-type (*Aster*-type).

Waterhole 302043 (MTCP)

Sample 2010/3
Samples from this context had been assessed earlier and found to have sparse but enough Holocene pollen to warrant further analyses. Eight samples were prepared and assessed by Denise Druce at OA North and no Holocene pollen was found in them. Two samples were then submitted to Sylvia Peglar, who re-prepared them for pollen analysis. No Holocene pollen was found in either of the re-prepared samples, but both had abundant pre-Quaternary pollen and spore types and acid-resistant dinoflagellate cysts. Such assemblages suggest that the samples submitted were derived from the boulder clay on which Stansted lies, and do not represent the Middle Bronze Age period

Romano-British

2nd-3rd century AD ditch 205018 (LBR)

Sample 4001/4002 (Fig. 31.6)
Three fills were recorded in this ditch and two monolith samples (4001 and 4002) were taken through two of these (202003 and 202002). Sample 4002 from the side of the ditch towards the edge of the feature was taken through the primary fill (202002) and the natural till. Sample 4001 was situated more centrally and cut through 202002 and 202003.

Three subsamples were analysed from sample 4002 (not illustrated) but only one sample at a depth of 0.12m from the top of the sample contained significant numbers of pollen grains associated with a high percentage of indeterminate pollen grains. Tree and shrub pollen was low (8%) but included rare grains of hornbeam (*Carpinus*) and field maple (*Acer campestre*). Grass (Poaceae) pollen was the major herbaceous pollen type recorded but there were high values of cereal-type pollen (8%) indicating that cereal cultivation was taking place nearby. However arable weeds were not well represented with the exception of goosefoot (Chenopodiceae) and mustard-type (*Sinapis*) pollen. Pollen from other taxa are from plants that can grow either in grassland or on open ground. The presence of high values of cereal-type pollen in archaeological features can become incorporated in the fills when they are released from the ears of corn during processing (Robinson and Hubbard 1977).

Six subsamples were analysed from sample 4001, which was placed more centrally in the ditch, and all but one (at a depth of 0.13m from the top of the sample) provided sufficient pollen to give a viable count. Pollen from the feature was, in general, poorly preserved. The summary diagram (Fig. 31.6) shows that tree and shrub pollen was not abundant although 15% of ash (*Fraxinus*-type) pollen was recorded in fill 202003 (at a depth of 0.23 m from the top of the sample) but this identification is somewhat uncertain due to the poor level of preservation of the pollen and the presence of high numbers of grains of bulrush/bur-reed (*Typha angustifolia*/*Sparganium*-type) pollen with which pollen of *Fraxinus* could be confused when badly preserved, and should perhaps be disregarded because of the uncertain identification. However, sporadic grains of field maple (*Acer campsetre*), aspen (*Populus*), hornbeam and sloe/cherry (*Prunus*) pollen were identified throughout the polliniferous levels of the sequence from the fills of the ditch.

Cereal-type pollen was recorded in all the subsamples although the values were lower towards the edge in sample 4002. Evidence of cereal cultivation was further supported by pollen of arable weeds such as goosefoots, black bindweed (*Fallopia convolvulus*), knotgrass (*Polygonum aviculare*) and corn spurrey (*Spergula*-type).

High values of grass pollen, and a similar assemblage of herbaceous taxa as in the fills of the Late Romano-British enclosure ditch 143007 (sample 359, see below), are indicative of widespread pasture and grassland.

This ditch (205018) contained standing water with pollen from obligate aquatics such as duckweed (*Lemna*), and pondweed (*Potamogeton*) recorded. In the shallower water towards the ditch sides and on the banks bulrushes and/or bur-reeds were very frequent. The occurrence of occasional grains of spruce (*Picea*) pollen throughout the sequence suggests that there was some erosion of the ditch sides.

<u>Late Romano-British pit 347041 (MTCP)</u>

Sample 2517 (Fig. 31.7)
Sample 2517 was taken through the fills of the Romano-British pit 347041, which was described in the field as containing cess. Richard Macphail (pers. comm.) suggests that this is likely. Seven subsamples were analysed from this feature. As in other samples, pollen preservation was sporadic perhaps reflecting seasonal drying out of the feature,

increased alkalinity, or aeration inhibiting pollen preservation. Charcoal particles were exceptionally abundant preventing any accurate recording.

The summary pollen diagram shown in Figure 31.7 illustrates that tree and shrub pollen was only recorded in low numbers, although between 0.27 m and 0.54 m there was a diverse assemblage of tree and shrub pollen including hazel, oak, ash, field maple and beech (*Fagus*) associated with charcoal from all these taxa except *Fagus* (see Gale, CD Section 35l). Carruthers (CD Chapter 34) recorded very large numbers of charred spelt/emmer cereal grains with considerable quantities of crop processing waste which she interpreted as deliberate dumping. Richard Macphail (pers. comm.) and Gale (CD Chapter 35) describe this layer as containing abundant fine and coarse fragments of charcoal, possibly put into the pit to absorb the smells of the cess.

Cereal-type pollen, including wheat (*Triticum*) was recorded throughout the sequence and was at its highest values towards the base of fills 347044 and 347050. It was recorded with some pollen from arable weeds, for example, cornflower (*Centaurea cyanus*), chamomile, goosefoots, knotweed, mustards and plantain (*Plantago major/media*). Only a single grain of *Vicia* (vetches, peas and beans) pollen was recorded at the base suggesting that beans and peas were not being cultivated. A single grain of *Vitis* (grape) pollen was identified from the fill of 347050, but Carruthers (*ibid*) did not record any exotic food taxa in the plant macrofossils.

The pollen assemblage in this sample is similar to that in sample 359, from the late Romano-British enclosure ditch 143007 (see below) with grassland and open ground taxa recorded. However, there is one very striking difference to that from the enclosure ditch (143007) and that is the very high numbers of Apiaceae pollen in the fills 347048 and 347046 (layer 2 Macphail), thought to have accumulated when the feature was being used as a cess pit. Indeterminate Apiaceae pollen is a group of taxa which includes, among others, fennel (*Foeniculum)*, carrot (*Daucus*), hare's ear (*Bunium*), pignut (*Conopodium*), ground elder (*Aegopodium*) and burnt saxifrages (*Pimpinella*). Unfortunately it is difficult to distinguish the taxa in this broad pollen type. Such high values of Apiaceae pollen are very unusual and perhaps suggest that either the flowering plants were deliberately placed in the pit when the pit was indeed used as a cess pit or perhaps open ground surrounded the feature and was covered by plants such as cow parsley (*Anthriscus sylvestris*) or ground elder. The Apiaceae family is large and diverse and includes a number of plants that are known for their culinary uses, for example, coriander, fennel and parsley, or cultivated as vegetables such as carrots and parsnips. It also includes hemlock (*Conium maculatum*) used as a poison and medicinal plant by the Greeks and the Romans (Grieve 1982, 392). The primary fill (347044) (layer 3 Richard Macphail) and fills 347046, 347045 and 347050 were described in the laboratory as one layer (layer 2) by Richard Macphail and staff at OA North. Pollen from damp ground plants such as sedges, meadowsweet and common reed (*Phragmites*) was recorded but only in low numbers.

Spruce and pine pollen, pre-Quaternary spores and dinoflagellate cysts were recorded in the basal pollen sample, suggesting some slumping of the sides of the feature had taken place. Poorly preserved pollen and indeterminate pollen rose to 80% towards the top of the sequence in the secondary fill (347048), which Richard Macphail (pers. comm.) describes as a typical chalk soil/sediment pit fill with some yellowish staining possibly influenced by a high water table. The pollen assemblage from this fill is dominated by dandelion-type, grass, Apiaceae and ribwort plantain. Pollen preservation was poor and the taxa recorded suggest that only those types that are very resistant to decay and are easily identified have been preserved.

Late Romano-British enclosure ditch 143007 (LTCP)

Sample 359 (Fig. 31.8)
Eight samples were prepared from sample 359, a single sample from context 152007, at a depth of 0.50 m, and the other 7 from context 152008. All samples contained sparse but countable pollen and spores, although they were generally not very well-preserved, sometimes limiting their specific identification. The results are shown as percentages of total terrestrial pollen and spores (Fig. 31.8). The percentages of indeterminables were quite high averaging 10% of the total terrestrial pollen plus spores and indeterminables. The summary diagram on the left of Figure 31.8 shows that the sequence of samples is dominated by herbaceous pollen types, particularly grasses (Poaceae undiff.) with very low percentages of tree and shrub pollen, and fern (Pteropsida) spores, suggesting that there was very little woodland in the catchment at the time of deposition, with a very open local environment recorded. All samples contain high amounts of microscopic charcoal particles (> 5 microns), and large particles (> 170 microns) were observed in the material sieved off during pollen preparation, indicative of local fires. These could be natural fires in the vicinity, but, given the herb-dominated assemblages and lack of tree and shrub pollen, suggest that these are local man-made fires.

Cereal pollen types, including barley (*Hordeum*-type) and wheat and/or oats (*Avena/Triticum*-type), are present throughout the feature together with the pollen of many herb types indicative of arable fields, including goosefoot family (Chenopodiaceae), cornflower (*Centaurea cyanus*), *Anthemis*-type possibly representing chamomile (*Anthemis*), corn marigold (*Chrysanthemum segetum*), and/or mayweeds (*Matricaria*), shepherd's purse-type (*Capsella*-type), mustard-type (*Sinapis*-type), mouse-ears and chickweeds (*Cerastium*-type), plantains (*Plantago major/P.media*), knotgrasses (*Polygonum aviculare*-type), bedstraws and field madder (Rubiaceae), docks (*Rumex crispus*-type), and speedwells (*Veronica*-type). Although no plant remains were analysed from this context, analysis of other late Romano-British contexts (Carruthers, CD Chapter 34) showed that emmer and spelt (*Triticum dicoccum* and *T.* spelta) were the dominant cereals being grown around Stansted at this time. The higher pollen values of barley-type (*Hordeum*-type) may include some pollen grains of wild species including sweetgrasses (*Glyceria*), telmatic species growing in shallow water or mud. They are characterized by having large pore annuli and small overall grain size compared with other taxa in the *Hordeum*-type, but the condition of the grains in these samples did not allow further investigation. There is little evidence of any leguminous crops. A couple of vetch (*Vicia*-type) pollen grains were present, but, based on size and pattern, are probably of weed species rather than cultivated types such as peas (*Pisum*) or beans *(Vicia*).

The high grass pollen values (Poaceae undiff.), together with many herb pollen taxa such as oxeye daisy (*Leucanthemum*) and yarrow (*Achillea*) both within the *Anthemis*-type, daisies (*Bellis)* and ragworts (*Senecio*) within *Aster*-type, knapweed (*Centaurea nigra),* thistles (*Cirsium*), Asteraceae (Lactucoideae) including dandelions (*Taraxacum*) and hawkweeds (*Hieracium*), bird's-foot trefoil (*Lotus*), clovers and medicks (*Trifoium/Medicago*), ribwort plantain (*Plantago lanceolata*), cinquefoils (*Potentilla*-type), buttercups (*Ranunculus acris*-type), bedstraws (Rubiaceae), sorrels (*Rumex acetosa*-type), and speedwells (*Veronica*-type), are indicative of widespread grassland and pastures. Bracken (*Pteridium*) may have grown in the grassland, either as a remnant of the former forest, or as a result of grazing.

Many other herbaceous pollen types found are characteristic of waste ground and waysides, eg mugwort (*Artemisia*), ragworts (*Senecio* within *Aster*-type), thistles (*Cirsium*), many taxa within Asteraceae (Lactucoideae), *Capsella*-type and *Sinapis*-type, mouse-ears and chickweeds (*Cerastium*-type), goosefoots (Chenopodiaceae), bird's-foot trefoil (*Lotus*), clovers and medicks (*Trifolium/Medicago*), docks (*Rumex crispus*-type), and nettles (*Urtica*), suggesting that there was quite a lot of waste and bare rough ground around the site.

The little tree and shrub pollen that is present is mainly of oak (*Quercus*), ash (*Fraxinus*), and hazel (*Corylus*). Other taxa include maple (*Acer*), willow (*Salix*), poplar (*Populus*), dogwood (*Cornus sanguinea*), hawthorn (*Crataegus*-type), brambles (*Rubus fruticosus*-type), and Rosaceae-type which may include blackthorn (*Prunus spinosa*) and other rosaceous shrubs. Such a pollen assemblage could be indicative of local hedgerows, or scrub.

The presence of pollen of obligate aquatic taxa suggests that there was standing water in the ditch – duckweed (*Lemna*), pondweed (*Potamogeton*), and aquatic buttercups (*Ranunculus trichophyllus*-type) floating on the water, and telmatic plants such as water plantain (*Alisma*-type), bulrushes and/or bur-reed (*Typha angustifolia*-type) growing in the shallow water and mud around the edges. Other taxa, such as sedges (Cyperaceae), meadowsweet (*Filipendula*), and umbellifers (including marshworts (*Apium*-type)), are indicative of damp grassland and were probably growing around the ditch.

The presence of pre-Quaternary pollen and spores in the basal samples, probably derived from the boulder clay, suggests some erosion of the sides of the ditch.

These analyses therefore suggest a very open environment around the site during late Romano-British times, most of the forest having been cleared. Fields were present in which cereals were being grown, possibly surrounded by hedgerows, but with extensive areas of meadows and grazed grassland, and areas of bare rough ground.

The report on the soils (Macphail and Crowther, CD Chapter 30), suggests that (at least in context 152007) the samples reflect animal management rather than mixed farming, with some small-scale industrial activity on the site with the use of corn driers (some burnt soil was found in context 152007). The pollen results concur with these conclusions, and with those of earlier pollen assessments.

Late medieval
Waterhole 134059 (LTCP)

Sample 446 (Fig. 31.9)
Six samples were prepared and analysed from sample 446 through the fills of a probable waterhole 134059. The results are presented as percentages of the total terrestrial pollen and spores (Fig. 31.9).

The pollen was sparse and not very well preserved, particularly towards the top of the feature, indeterminables averaging 10% of total terrestrial pollen and indeterminables. At the base of the section, tree and shrub pollen is approximately equal to that of herb pollen, but in the upper half of the section total tree and shrub pollen values decrease and there is a concomitant increase in herb pollen and also in fern (Pteropsida) spores, particularly those of bracken (*Pteridium*). Tree and shrub pollen is mainly of oak (*Quercus*), maple (*Acer*) and, particularly towards the base, ash (*Fraxinus*) and hornbeam (*Carpinus*). This suggests that there was some woodland within the catchment, but, as trees generally produce much larger quantities of pollen than herbs, the high herb values here imply that the local environment must have been quite open throughout the time of deposition of these sediments. Towards the top of the section there is evidence for increased grassland with increases in the pollen of grasses (Poaceae) and other herb taxa associated with meadows and grazing, particularly Asteraceae (Lactucoideae) which can include dandelions (*Taraxacum*), hawkweeds (*Hieracium*), Hawk's-beards (*Crepis*) and Cat's-ears (*Hypochoeris*) among others. As the area seems to have been cleared during Romano-British times (see above), there may have been some secondary woodland development. However, the high grass (Poaceae) and oak (*Quercus*) pollen values suggest that the area may have been parkland, grassland within which large standard trees (particularly oaks) grew. There is also evidence for hedgerows, particularly in the basal samples, with the occurrence not only of oak, maple, ash, and hazel (*Corylus*), but also of dogwood (*Cornus*), hawthorn (*Crataegus*-type), holly (*Ilex*), poplar (*Populus*), and willow (*Salix*). Charcoal particle values are quite high throughout the section, evidencing local man-made fires.

Cereal pollen - barley (*Hordeum*-type) and oats (*Avena*) and/or wheat (*Triticum*) - attain quite high values at the base of the section together with weeds characteristic of arable fields, but decrease towards the top as grasses and taxa indicative of grasslands and grazing increase. It is interesting to note that not a single pollen grain of crops usually associated with medieval farming, such as rye (*Secale*), beans and peas (*Vicia/Pisum*), hemp (*Cannabis*) or flax (*Linum*) were identified, although Carruthers, in other medieval contexts at Stansted, had plant remains of rye, peas, and beans. Even if this area was unsuitable for growing these crops, their cultivation was widespread during medieval times, probably in river valleys, and odd wind-dispersed grains should have been encountered. The pollen assemblages found here are therefore not typical of medieval or post-medieval times.

The occurrence of the pollen of obligate aquatics (duckweed (*Lemna*), pondweed (*Potamogeton*) and aquatic buttercups (*Ranunculus trichophyllus*-type), and green algal spores of the family Zygnemataceae (*Mougeotia* and *Spirogyra*) throughout the section, is evidence of standing water within the feature, which was surrounded by damp muddy ground on which grew telmatic species of bulrushes and/or bur-reeds (*Sparganium erectum* and *Typha angustifolia*-type). Ascospores of the fungus *Chaetomium*, indicators of human impact in the past, were also found throughout the section.

This section therefore appears to show that the local environment was quite open with cereal cultivation, possibly with hedgerows, and perhaps parkland or some scrub at the base. Towards the top of the section, the grasslands or parklands appear to increase at the expense of the arable fields.

Post-medieval

Pit 464035 (LTCP)

Sample 908 (Fig. 31.10)
Four subsamples were analysed for pollen, two from fill 464039 and one each from 464040 and 464038. Fills 464040 and 464039 are thought to have accumulated after the feature went out of use and fill 464038 is thought to be post-medieval but possibly earlier and contemporary with the latest phase of the hunting lodge. The summary pollen diagram shows that low values of tree and shrub pollen were recorded throughout the sequence suggesting a landscape with occasional trees and sporadic grains of field maple, sloe/cherry and elder (*Sambucus*) suggesting that some hedgerows were present in the post-medieval period. The pollen assemblage is dominated by herbaceous taxa. Although grass and ribwort plantain are the major pollen taxa, the pollen spectra from the four samples record a large variety of different pollen types. Cereal pollen is present throughout, together with arable or cultivated ground weeds such as chamomile, goosefoots, bistort (*Persicaria bistorta*), redshank (*Persicaria maculosa*) and mustards. *Vicia*-type pollen was identified and may be associated with the growing of peas and beans.

The presence of pollen from pondweed, bulrush or bur-reed, *Apium*-type and meadowsweet in all the samples, suggests that the pit/ditch continued to hold some water with damp margins during the later phase after the lodge had gone out of use, and the fills were accumulating.

Discussion and conclusions

Regional background
The background vegetation of Stansted and north-west Essex is poorly recorded because of the paucity of suitable natural deposits. However a palaeochannel sequence from an earlier phase of excavation from 1986-1991 was studied by Patricia Wiltshire (Wiltshire

and Murphy 2004a). These deposits started forming in the Early Bronze Age 2560-2030 cal BC but there is no record from Stansted of the vegetation in the Mesolithic and Neolithic, although two pollen diagrams from a palaeochannel sequence near to the medieval farm at Stebbingford, Felsted to the east of Stansted (Murphy and Wiltshire 1996) and a peat deposit at Mar Dyke along the Grays By-pass, Essex, record the more regional vegetation of the Mesolithic. At Stansted, Wiltshire and Murphy (2004a) describe the vegetation in the Early Bronze Age, on the drier ground away from the palaeochannel, as a lime/oak and hazel (*Tilia*/*Quercus* and *Corylus*) woodland. The values of lime pollen recorded suggest that lime was probably the major component in this woodland with hazel and occasional scrubby oak trees. Lime produces low numbers of poorly dispersed pollen grains (Andersen 1970; 1973; Huntley and Birks 1983) and therefore values of up to 15% suggest that lime woods were growing quite close to the palaeochannel in the early Bronze Age. An alder fen carr probably grew on the wetter ground.

The presence of poorly preserved pollen grains higher up in the sequence led Wiltshire to suggest that an hiatus may have taken place in the deposition of the palaeochannel. Because of this and the lack of scientific dating she was unable to relate changes in the upper part of the pollen diagram to the archaeology, but she did suggest that a dark upper band in the sequence represented the Anglo-Saxon period.

Regionally a palaeochannel sequence was assessed for pollen sequence near to the medieval farm at Stebbingford, Felsted to the east of Stansted (Murphy and Wiltshire 1996) and the pollen assemblages from this very limited data suggest that the sequence started forming in the early Holocene, but with no absolute dating and the very low values of pollen in the deposits it is not possible to be certain. However the data do suggest an open landscape with some birch and pine and herbs of open ground, typical of the early Holocene or Late Devensian, which followed the retreat of the ice after the last glaciation (Pennington 1977). Murphy and Wiltshire (1996) interpreted the pollen data to suggest that most of the channel sequence accumulated in the Mesolithic and it is interesting to note that high frequencies of charcoal fragments were recorded throughout. Similar charcoal values have been recorded in other Mesolithic deposits.

A peat deposit at Mar Dyke, along the Grays By-pass, Essex, although not dated scientifically, is thought to have started forming when alder expanded. Scaife (1988) cites that this expansion has been dated to 6015-5676 cal BC (6970±90BP; Q1281) at Tilbury (Worlds End) Stone Marsh and at Broadness Marsh 5965-5606 cal BC (6822±90BP; Q1283). Scaife describes a woodland dominated by lime, oak and hazel in the Mesolithic and thought it likely that almost pure stands of lime were growing on the slightly higher, drier ground close to the Mar Dyke wetland around this date in the Mesolithic. A little before 3909-3374 cal BC (4850±90BP) Scaife (1988) recorded an elm decline associated with the first occurrence of cereal-type and ribwort plantain (*Plantago lanceolata*) pollen and he cites a similar date at Stone Marsh of 3968-3516 cal BC (4930±110BP; Q1336). At Mar Dyke, following this elm decline, secondary woodland developed and there is no further evidence of anthropogenic activity until c 1630BC in the early Bronze Age. After this date evidence of anthropogenic activity increases with a further reduction in elm pollen and the appearance of beech (*Fagus*) and pine (*Pinus*) pollen. Pollen from the first taxon is poorly dispersed due to its large size and weight, suggesting that it was growing quite close by, whereas pine pollen is very widely dispersed and therefore probably the result of long distance transport. Scaife considers that birch (*Betula*) scrub recolonised the cleared areas and a woodland dominated by lime with some oak remained close to the site. Scaife (1988), interpreting his pollen data from Mars Dyke, considers that lime remained an important tree in the woodland into the Iron Age. The pollen from herbaceous plants, including cereal-type and ribwort plantain, continues to rise till c 400 AD when archaeologically there is a decline in cultivation.

The Middle Bronze Age

The pollen diagrams from the fills of the ring ditch of the round barrow 324078 (samples 2719/2720 and 2667), the pit 316118 (sample 2706) from near the barrow, the waterhole 426015 (sample 6171) from the middle of the settlement and the pit 408013 (sample 5019) provide us with some evidence as to the environment of the settlement in the Middle Bronze Age. The pollen data from these features suggest that there was no substantial tree cover in the environs of the settlement in contrast to the Early Bronze Age when a lime/oak and hazel (*Tilia*/*Quercus* and *Corylus*) woodland was growing on the drier ground, and alder carr (*Alnus*) on the wetter areas near the palaeochannel (Murphy and Wiltshire 2004a).

The pollen data from the Middle Bronze Age features studied suggest that arable cultivation was being practised close to the settlement. However, the pollen data also suggest that grassland and/or open ground was likely to have been frequent and supports the plant macrofossil and insect records for pasture and open ground (Carruthers, CD Chapter 34 and Robinson, CD Chapter 36). Rises in tree pollen recorded towards the top of the pollen samples suggest that there was some increase in small stands of scrub/woodland as arable cultivation declined and the features went out of use. This corroborates the plant macrofossil record (Carruthers, CD Chapter 34).

There are few sites with which to compare the Middle Bronze Age pollen records from Stansted, although Murphy and Wiltshire (1998, 173-81) analysed the fills from two archaeological features in the Blackwater Valley, North East of Stansted and South West of Chelmsford. The fills were from a Middle Bronze Age well at Chigborough Farm and a Late Bronze Age well/waterhole at Slough House Farm. As at Stansted, the ground around the well at Chigborough Farm was dominated by open weedy grassland and waste ground (Murphy and Wiltshire 1998, 178-81). The pollen evidence from this site suggests the growth of a little diverse woodland, with oak as the major taxon, but its proximity to the settlement is uncertain. Cereal pollen was recorded throughout the fills suggesting that, as at Stansted, there was arable cultivation nearby or there was extensive crop processing.

In the Late Bronze Age at Slough House Farm, in the Blackwater Valley, the pollen data from the lower fill of a waterhole/well suggested that the surrounding area was dominated by a weedy grazed grassland and cereals were being grown and/or processed nearby (Murphy and Wiltshire, 1998, 173-178). Murphy and Wiltshire (1998, 178) thought that the waterhole/well contained rather stagnant water and was surrounded by wet, waterlogged soils. After abandonment, in the middle and upper sections of the pollen diagram oak pollen was well represented together with acorns and leaves, suggesting either the growth of oak trees nearby, or deliberate deposition of oak debris. Towards the top of the sequence there are possible indications of a renewed phase of clearance above this possible phase of woodland (Murphy and Wiltshire, 1998).

Romano-British

In the Romano-British period the fills from only three features were assessed as suitable for further analysis. These were a 2nd- to 3rd-century ditch 205018 (samples 4001/4002), a late Romano-British pit 347041 (sample 2517) and a late Romano-British enclosure ditch 143007 (sample 359). The pollen analyses from the Romano-British features at Stansted suggest a very open environment around Stansted during this time, most of the woodland having been cleared. Fields were present in which cereals were being grown, possibly surrounded by hedgerows, but with extensive areas of meadows and grazed grassland, and areas of bare rough ground.

The report on the soils from Stansted (Macphail and Crowther, CD Chapter 30), suggests that (at least in context 152007) the samples reflect animal management rather than mixed farming, with some small-scale industrial activity on the site with the use of corn driers (some burnt soil was found in context 152007). The pollen results concur with these conclusions, and with those of earlier pollen assessments by Wiltshire.

In the 2nd to 3rd century, analyses from a ditch on the LBR site suggest both arable and pastoral farming were being practised. There was no evidence of crops other than cereals being grown. The pollen evidence from a late Romano-British pit (347041) is likely to be a somewhat skewed dataset as it probably represents the pollen from plants either deliberately placed in the pit to prevent the odours associated with a cess pit or from rubbish disposal. It is perhaps interesting to note that although Carruthers (CD Chapter 34) identified no exotic plant macrofossils, although a single grain of grape pollen was recorded in pit 347041 (Fig. 31.7) suggesting that either grapes (fresh or dried) were being consumed or even grown at Stansted in the post-medieval period.

The unstable nature of the sides of all three Romano-British features is suggested by the presence in the basal samples of spruce and pine pollen, dinoflagellate cysts and Pre-Quaternary spores, probably derived from the surrounding boulder clay into which the features were dug. There are no comparably dated sites from the Blackwater Valley (Murphy and Wiltshire 1998) or the earlier phase of the Stansted excavations (Murphy and Wiltshire 1998) with which to compare the results of this phase of excavation.

Late medieval and post-medieval

During this phase of pollen analysis from Stansted only two features were assessed as being suitable for pollen analysis. They were the fills from a waterhole 134059 (sample

446) dated to the late medieval and those from a post-medieval ditch 464035 (sample 908).

The pollen data from the late medieval waterhole 134059 is enigmatic, with not a single pollen grain of crops usually associated with medieval farming, such as rye (*Secale*), beans and peas (*Vicia/Pisum*), hemp (*Cannabis*) or flax (*Linum*) being identified, although Carruthers, in other medieval contexts at Stansted, had plant remains of rye, peas, and beans. Even if this area was unsuitable for growing these crops, their cultivation was widespread during medieval times, and odd grains would have been expected in the analyses. Therefore the pollen assemblages found here are not typical of medieval or post-medieval times. The feature is well dated, however, by the articulated bones of a fallow deer, radiocarbon dated to 1330-1450 cal AD (497±30BP, NZA-23750). It is possible that the weight of the articulated bones may have caused it to sink into the somewhat ‘sloppy’ deposits suggesting that the deer may not be contemporary with the deposits. However it was the view of the excavator that the articulated deer and the waterhole are contemporary.

The pollen assemblages from this late medieval feature suggest that arable cultivation was important. Cereal pollen, barley (*Hordeum*-type) and oats (*Avena*) and/or wheat (*Triticum*), attain quite high values at the base of the section together with weeds characteristic of arable fields, but decrease towards the top as grasses and taxa indicative of grasslands and grazing increase. However, the high grass (Poaceae) and oak (*Quercus*) pollen values suggest that the area may have been parkland, grassland within which large standard trees (particularly oaks) grew. There is also evidence for hedgerows, particularly in the basal samples, with the occurrence not only of oak, maple, ash, and hazel (*Corylus*), but also of dogwood (*Cornus*), hawthorn (*Crataegus*-type), holly (*Ilex*), poplar (*Populus*), and willow (*Salix*). Charcoal particle values are quite high throughout the section, evidencing local man-made fires.

There are few medieval pollen studies from natural deposits or archaeological features in the Stansted region with which to compare this data except for a palynological assessment of cultivation plots, latrine and cess pit fills from the medieval farm at Stebbingford, Felsted to the east of Stansted (Murphy and Wiltshire 1996). There was no palynological evidence from the cultivation plots or the putative latrine but some from the possible cess pit. The pollen assemblage recorded from this latter feature suggests an open habitat, perhaps damp grassland (Murphy and Wiltshire 1996). Cereal-type pollen, an egg from a nematode worm (*Ascaris*), which parasitises large mammals and humans, and a single possible “grape” pollen grain were recorded in this feature at Stebbingford suggesting a “waterlogged” cess pit.

In the post-medieval the pollen diagram from the fills of pit 464035 (Fig. 31.10) suggests a landscape with occasional trees and some hedgerows, but the vegetation was largely one of open grassland with a little evidence for cereal cultivation. As in the late medieval feature there is no evidence for the growth of such crops as rye, hemp of peas/beans in this pit, which is associated with the later phases of the hunting lodge.

Conclusions

The problems associated with the interpretation of the pollen data from the earlier (Murphy and Wiltshire 2004a-b) and this phase of the excavations at Stansted has highlighted the very sporadic nature of the palynological record. In general, pollen preservation was very poor, making pollen analysis extremely time consuming, which is reflected in the very low resolution of some of the pollen diagrams. In several cases the pollen assemblages were very similar throughout a sample, with few changes, and therefore did not justify closer resolution. The quality of the pollen preservation at Stansted may be associated with the nature of the soil, depth of the ground water-table or the alternate wetting and drying of the fills. These conditions are probably not conducive for the optimum preservation of pollen grains, which ideally require waterlogged and anaerobic conditions. However the pollen from more robust pollen types, such as dandelion-type, alder and lime, can be preserved in more adverse conditions. These more robust types, which often produce very distinctive grains, can be identified even if pollen preservation is poor thus giving a skewed dataset. Other taxa, such as grass pollen, because of the presence of a single pore, surrounded by an annular thickening, can also be identified in conditions of poor preservation.

The unstable nature of many of the features is reflected in the records of pine and spruce pollen, Pre-Quaternary spores and dinoflagellate cysts in the fills, derived from the boulder clay underlying the site. This was highlighted by Patricia Wiltshire in her assessment report for this phase of excavation and was also recorded by the present authors.

Deliberate deposition into archaeological features also makes the interpretation of the pollen assemblages complicated, as it is extremely difficult to distinguish the pollen source of the assemblage. This may come from the deposited material and/or the local and regional environments, making it difficult to interpret whether the fills have recorded the local/regional vegetation or what was being incorporated into the features either accidentally or deliberately (Faegri and Iversen 1989). This is where the multidisciplinary approach is invaluable, as the study of the soil micromorphology, presence or absence of plant macrofossils, insects and molluscs, together with the palynological data, can help the palynologist to better interpret their data.

The interpretation of the pollen data from the ditch of the Middle Bronze Age round barrow was particularly problematic. The pollen record and the state of pollen preservation from what was described as a "peat deposit" in the field, and thought to be contemporary throughout the ditch, was very different from the side of the ditch nearer to the watercourse to that from the drier side. The pollen record from the wetter side was considerably more polleniferous than the drier one where the pollen record was sparse and the values of tree pollen low. These were considerably higher from the wetter side perhaps representing the nearby growth of scrubby woodland as the feature went out of use, which is suggested by the charcoal and plant macrofossil records (Gale, CD Chapter 35; Carruthers, CD Chapter 34). Palynologically it is difficult to definitively say that what was described in the field as one "peat deposit" is in fact contemporary throughout the ditch, and the authors suggest that this may not be the case.

However, despite the problems associated with the interpretations of the pollen data at Stansted, the pollen data from the Middle Bronze Age, the 2nd- to 3rd-century ditch 205018 (samples 4001 and 4002), a late Romano-British pit 347041 (sample 2517) and a late Romano-British ditch (sample 359) do provide us with a picture of what the local vegetation and farming practices may have been like around the settlement in these periods. An insight into the vegetation of the Early Bronze Age and Anglo-Saxon periods has already been obtained from the palaeochannel sequence analysed by Patricia Wiltshire (Murphy and Wiltshire 2004a-b) and this later research has enabled the record to be extended for the Middle Bronze Age and for the Romano-British period. From the Middle Bronze Age onwards the landscape around the settlements at Stansted was largely cleared, with some small areas of woodland, hedgerows and parkland with stands of trees. Arable cultivation was recorded from the Middle Bronze Age through the Romano-British and Romano-British to the late and post-medieval. However the pollen data is indicative of grassland, suggesting pastoral farming, and waste ground were probably the dominant plant communities at Stansted in all periods studied.

Table 31.1: Samples assessed as to their suitability for palynological analysis

Sample No	**Feature no**	**Feature description**	**Feature date**
2667	324078	Barrow	Middle Bronze Age
2719/2702	324078	Barrow	Middle Bronze Age
2706	316118	Pit	Middle Bronze Age
6171	426015	Waterhole	Middle Bronze Age
5019	408014	Pit	Middle Bronze Age
2010/3	302043	Waterhole	Middle Bronze Age
4001	205018	Ditch	2nd-3rd century AD
4002	205018	Ditch	2nd-3rd century AD
2517	347041	Pit	Late Romano-British
359	143007	Enclosure ditch	Late Romano British
446	134059	Waterhole	Late medieval
908	464035	Pit	Post-medieval

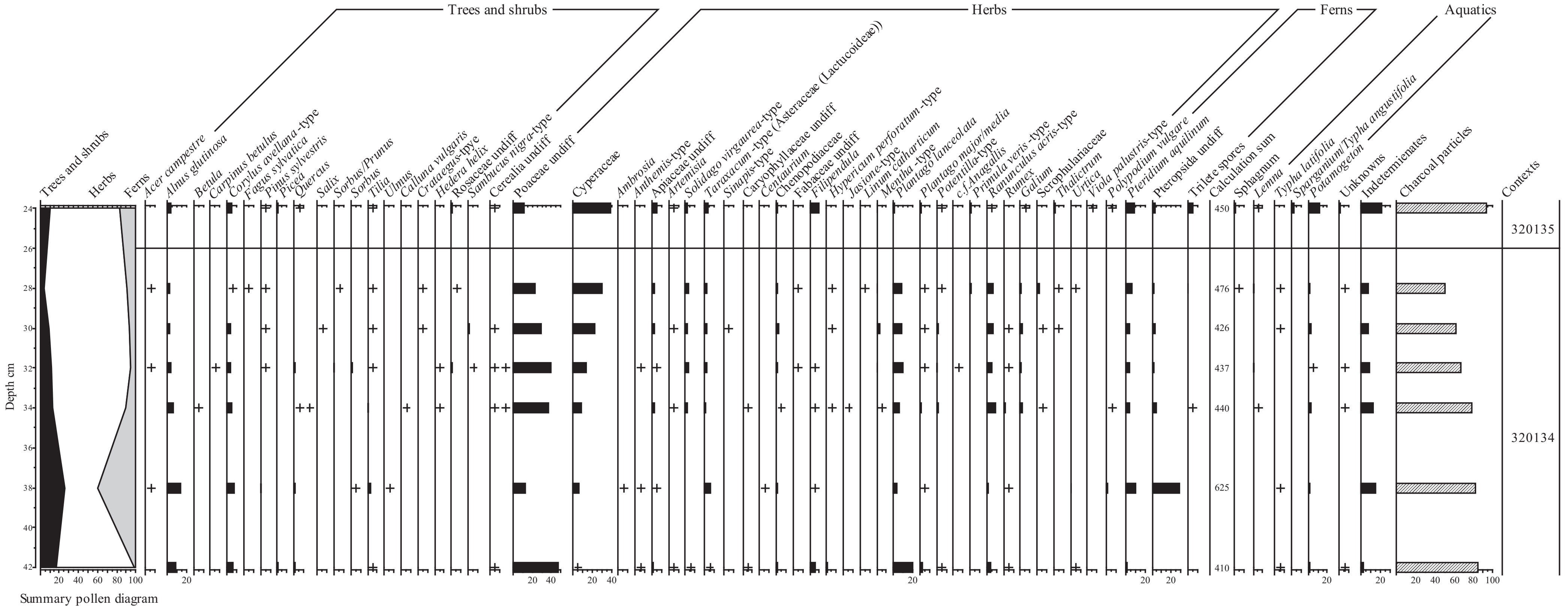


Figure 31.1: Middle Bronze Age Sample 2719/2720, ditch fill of Barrow 324078
Percentage pollen diagram

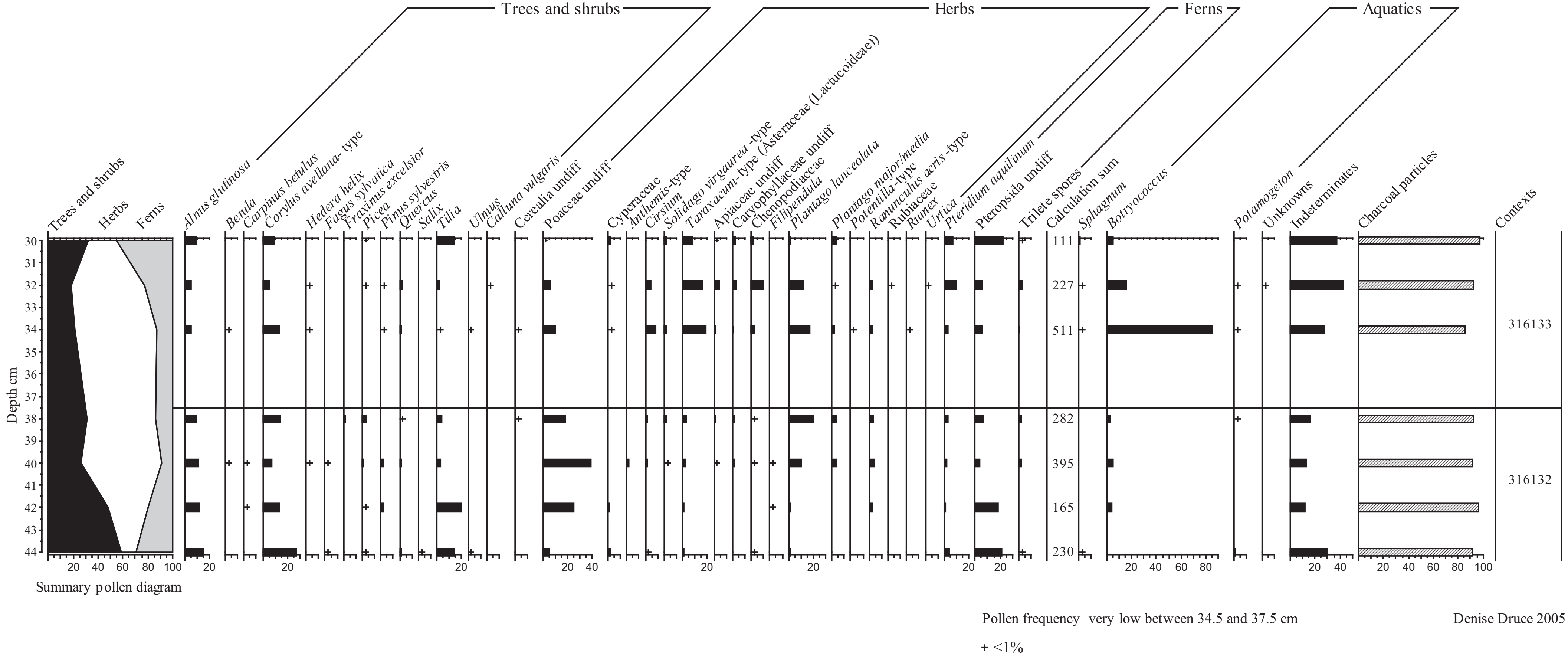


Figure 31.2: Middle Bronze Age Sample 2667, ditch fill of Barrow 324078
Percentage pollen diagram

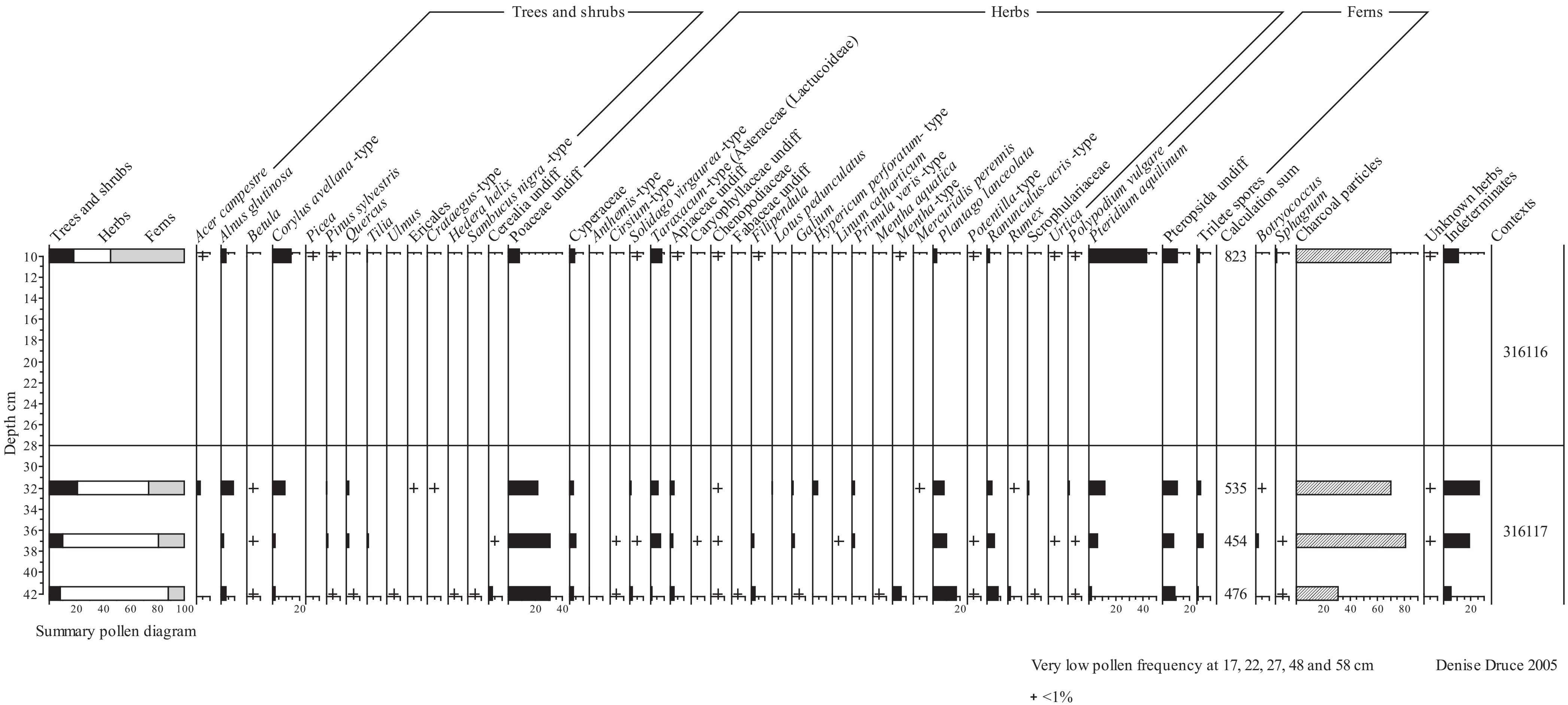


Figure 31.3: Middle Bronze Age Sample 2706, the fill of pit 316118
Percentage pollen diagram

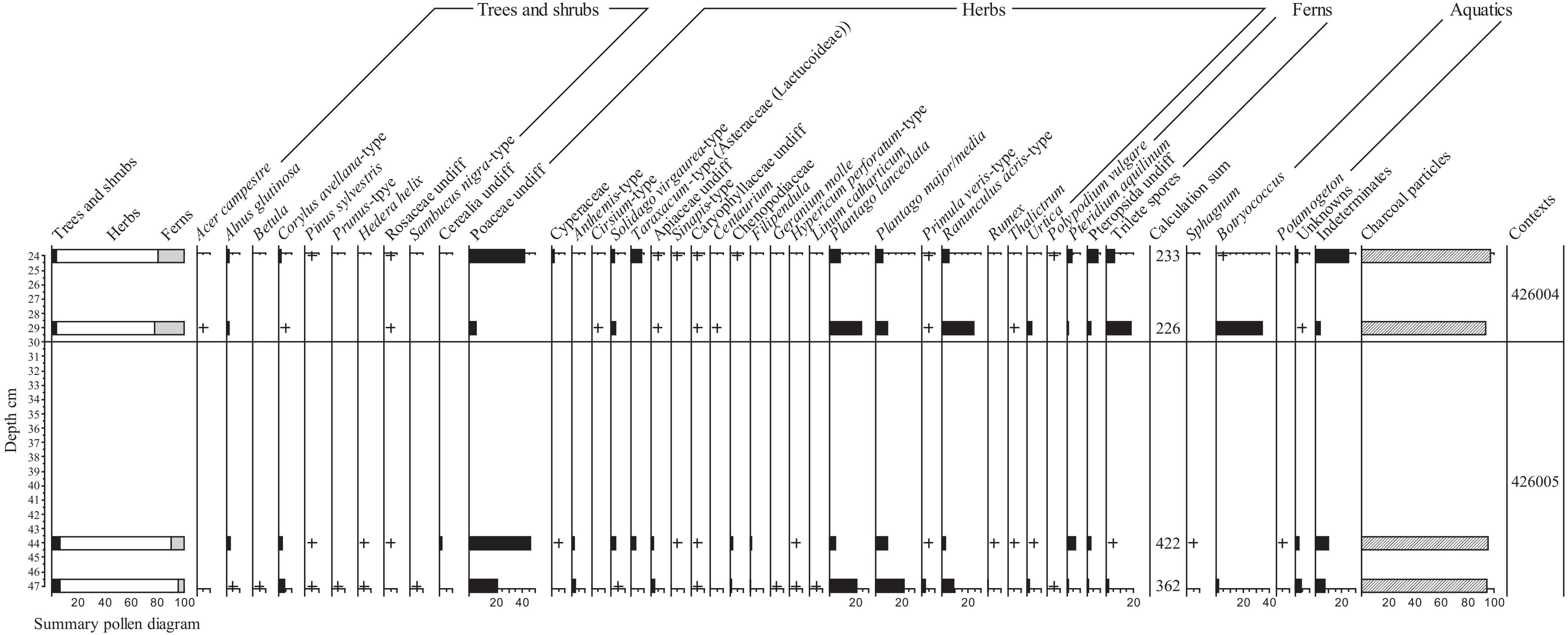


Figure 31.4: Middle Bronze Age Sample 6171, lower fill of waterhole 426015 (Contexts 426005 and 426004)
Percentage pollen diagram

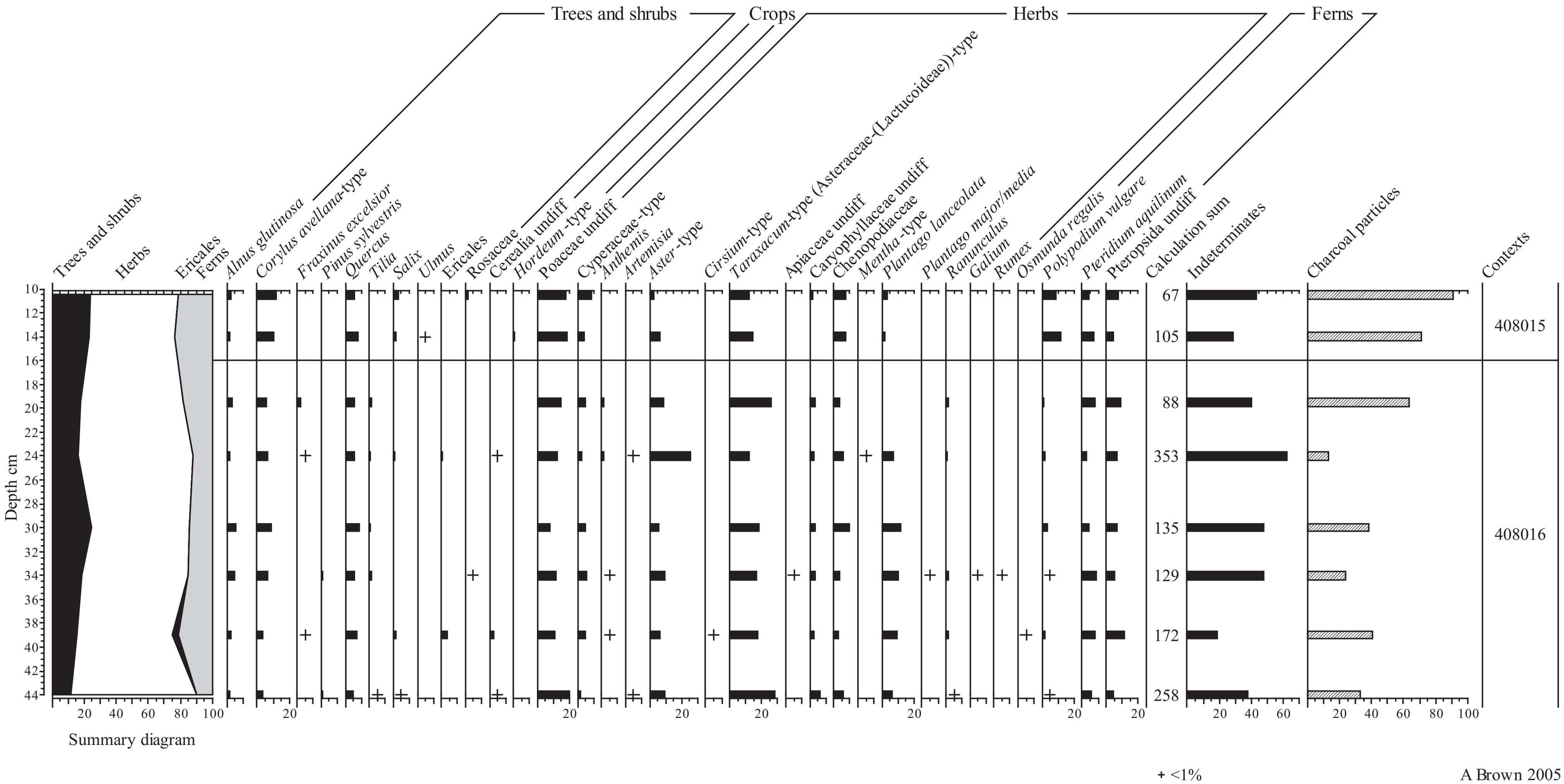


Figure 31.5: Middle Bronze Age Sample 5019, the fill of pit 408013
Percentage pollen diagram

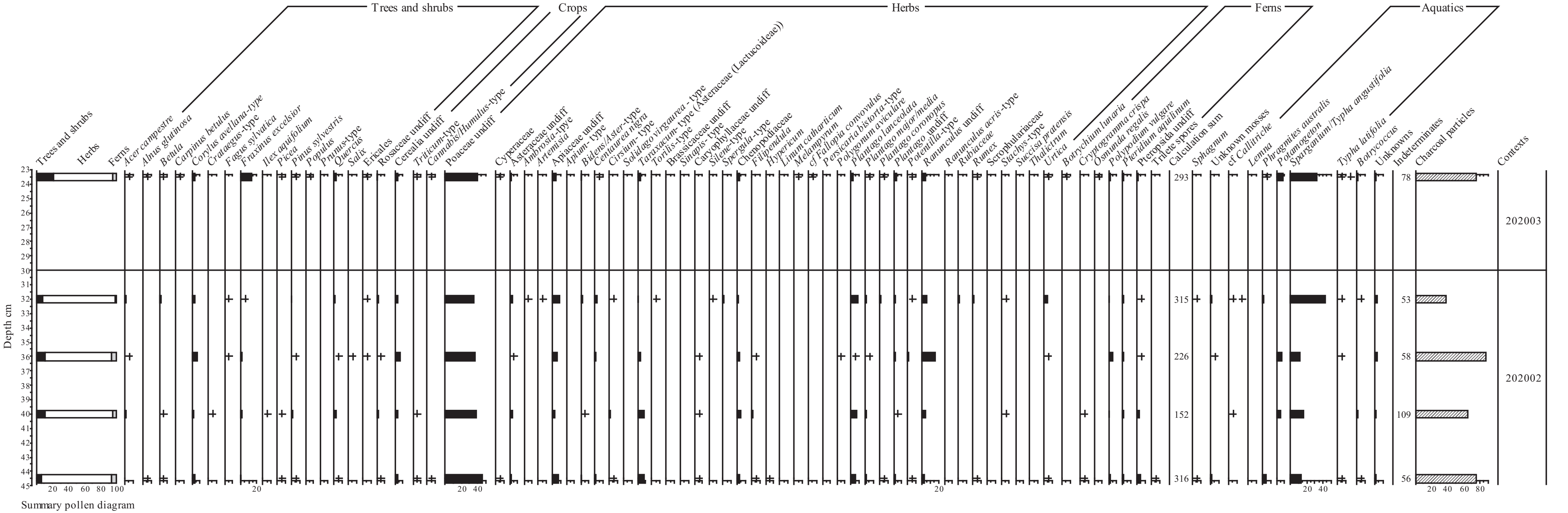


Figure 31.6: 2nd - 3rd century Sample 4001, the fill of ditch 205018
Percentage pollen diagram

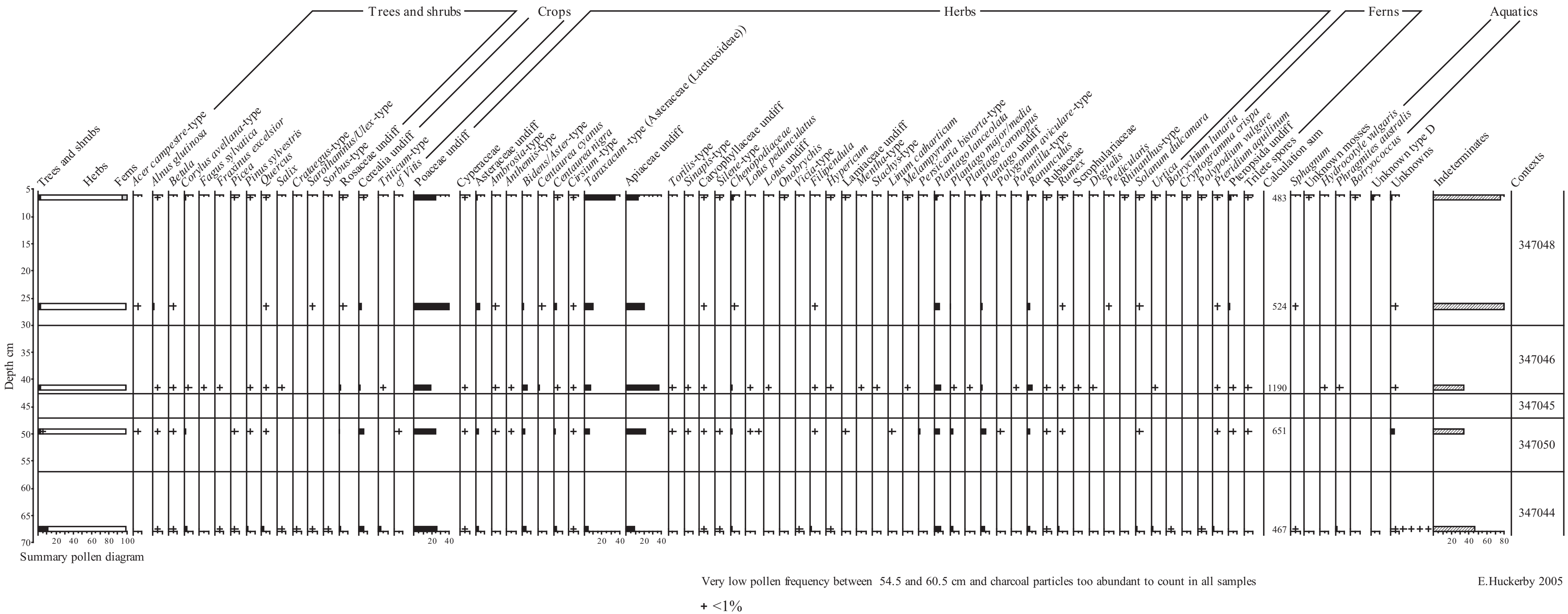


Figure 31.7: Late Romano-British Sample 2517, the fill of pit 347041
Percentage pollen diagram

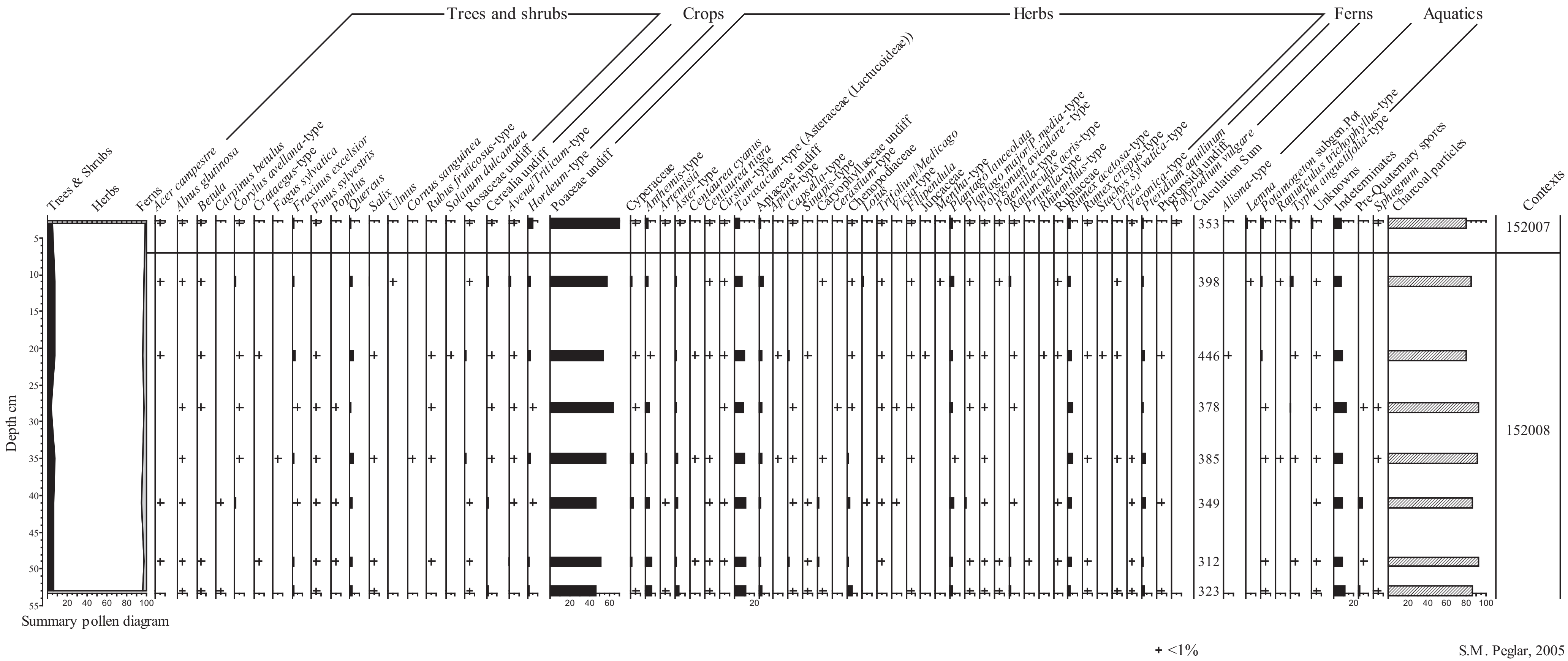


Figure 31.8: Late Romano-British Sample 359, the fill of enclosure ditch 143007
Percentage pollen diagram

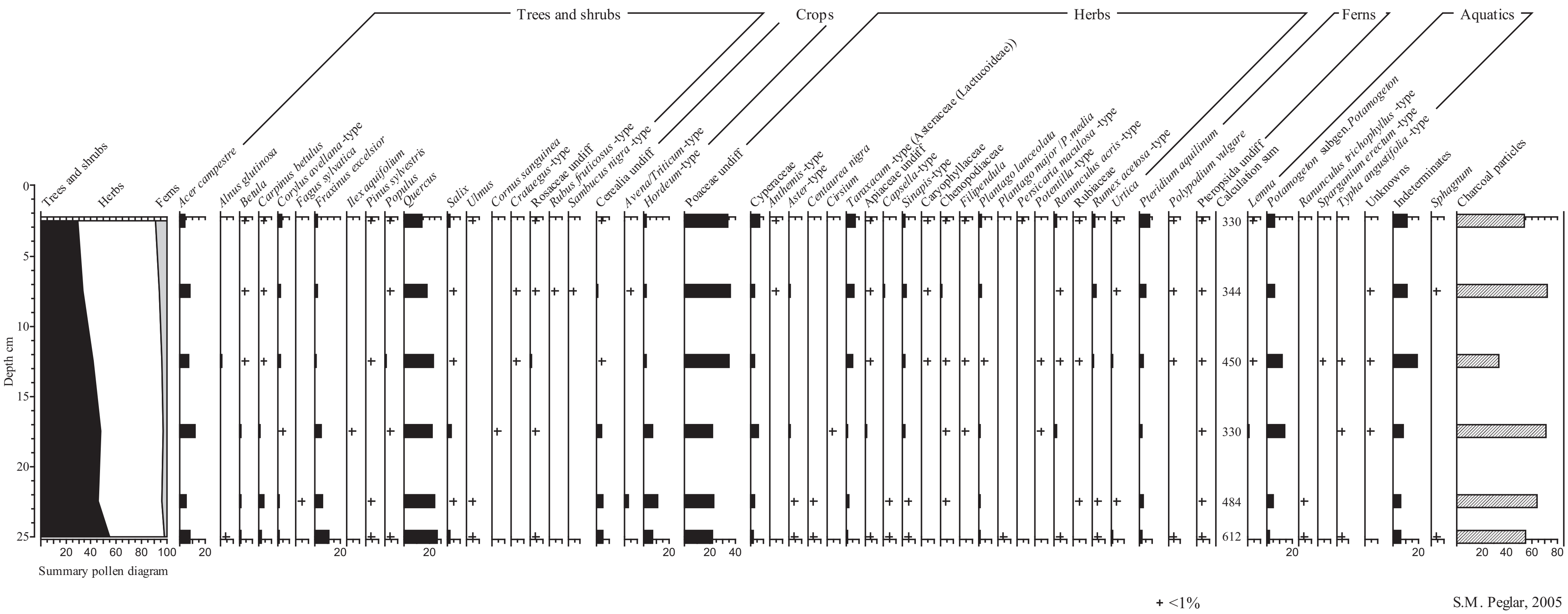


Figure 31.9: Late Medieval Sample 446, the fill of probable waterhole 134059 (Context 134063)
Percentage pollen diagram

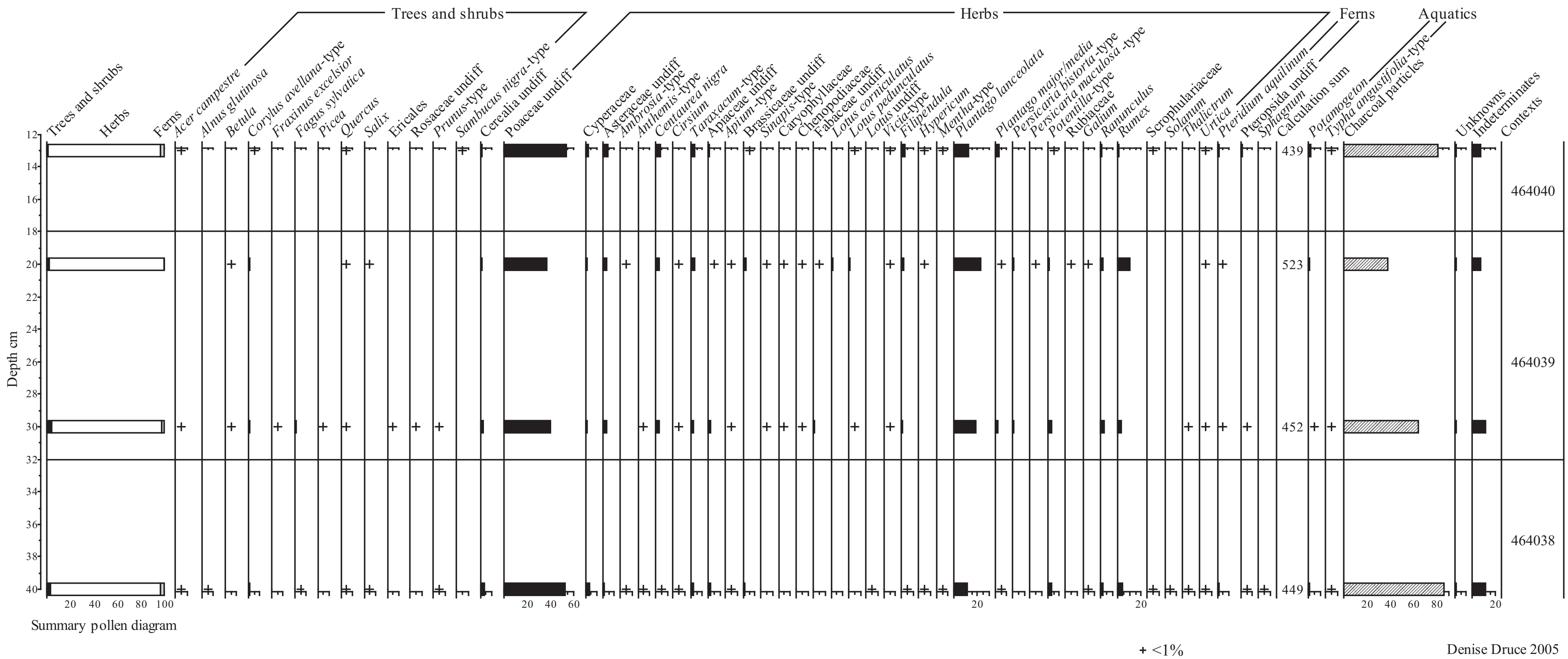


Figure 31.10: Post-medieval Sample 908, the fill of pit 464035
Percentage pollen diagram

CHAPTER 32

Animal bone

by Andrew Bates

32 Animal bones

Andrew Bates

A total of 31,889 animal bone fragments, or number of individual specimens (NISP), were recovered from phased contexts from four sites dating from the Bronze Age to the post-medieval period (Table 32.1).

Methodology

The vast majority of the material was recovered by hand collection only; no programme of sieving was employed on site for the explicit purpose of the recovery of animal bone and other small finds. The material was identified using the reference collection held at Oxford Archaeology North and the Natural History Collection held at Liverpool Museum. All parts of the skeleton were identified where possible, including long bone shafts, skull fragments, all teeth and fairly complete vertebrae. Sheep/goat distinctions were made using reference material and published work by Boessneck *et al.* (1969).

Records were entered onto computer using a Microsoft Access application. For each bone the following information was recorded where appropriate: Small Find Number, species or species group, element, number of bones, side, the diagnostic zone as either more than or less than half present, fusion state, preservation (eg burning), butchery, measurements, tooth wear development, and other comments. Pathology and other developmental or congenital anomalies were also noted.

The diagnostic zones used followed those described in Dobney and Reilly (1988), which are used to achieve minimum number of elements (MNE). Measurements followed those set out in von den Driesch's (1976). Tooth wear development for mandibular teeth was recorded following Payne (1973) and (1987) for sheep, Grant (1982) and Halstead (1992) for pigs and cattle. Skull and horncores were described following Grigson (1976), Armitage (1982) and Armitage and Clutton-Brock (1976). Horse mandibles were aged using data presented in Levine (1982).

Relative contribution to the diet of animals by an estimation of average meat weight uses figures for live meat weights presented in Boessneck *et al.* (1971). The percentage of live meat weights of principal domestic stock animals derives from the ratio of the weight of sheep to cattle and pig (O'Conner 2003, 140) multiplied by the total MNE. This method assumes that the relative values for live weight and dead weight increase to the same degree between species. This system is somewhat flawed, in that the dead weight of pig, compared to its live weight, will increase significantly more than that of sheep (Dobney *et al.* 1996, 22). It is also true that the MNE only gives relative proportions within the archaeological assemblage, rather than the death assemblage. The suggested relative meat weights are therefore subject to some biases, but go some way towards correcting the fallacies suggested in counts of NISP taken at face value. Analysis of the anatomical parts of species represented at individual sites was undertaken following O'Conner (2000), using MNE; maxilla being treated as a diagnostic zone of the skull, being absent from the Dobney and Reilly (1988).

Taphonomy

The general condition of the material in all phases is broadly consistent (Table 32.2). The figures presented for the post-medieval material are greatly affected by a smaller number of deposits, reflected in the smaller overall sample size. The material is reasonably robust, but with generally over half of its surface eroded. The majority of the assemblage is represented by material less than 25 mm in length, including those from larger mammals. Canine gnawing was attested to on a number of specimens, although only a fraction of the total assemblage. Similarly butchery marks were present on a small number of specimens. The condition of the assemblage is relatively good, due to the generally alkaline background conditions of the underlying London Clays, although it has evidently suffered a high degree of fragmentation in all periods. 35% of the material is represented by minute unidentifiable fragments weighing a small fraction of a gram recovered from soil samples, which were excluded from the figures in Table 32.2.

Inevitably a bias is caused within the assemblage. Larger mammals may have survived to a greater extent due to their higher bone density values (Lyman 1994, 146-7). Conversely, in a highly fragmented assemblage, bone splinters from sheep sized animals may have a greater chance of displaying a diagnostic characteristic (Maltby 1996, 19).

Middle and Late Bronze Age

Quantifications

A total of 821 animal bones identified to a species level were recovered from this phase (Table 33.3), 45% of which were identified as loose teeth. The useful sample is of such a small size that counts of the NISP are presented in Table 32.3. Sheep and cattle dominate the assemblage, although goat is also attested to at the site. It is thought unlikely that goat form much of the sheep/goat category, as in larger prehistoric assemblages in Britain where sheep and goat can be separated in any numbers goat form only a small part of the total (Maltby 1981, 159-160). The relative meat weights of cattle over sheep clearly establish cattle as the larger contributor to the diet, not reflected in counts of NISP (Table 32.3).

MTCP

A total of 44% of this material was derived from a single waterhole, 309075, and a further 43% from numerous pits located on the western and south-western sides of the settlement. There is little significant difference in the distribution of species, except with perhaps a greater number of sheep/goat bones located in the waterhole (Table 32.4). These figures based on counts of NISP are likely to suffer greatly from the problems of interdependence of fragments. Table 32.5 gives figures for minimum number of elements (MNE's) suggests a similar bias towards sheep/goat in the waterhole, although the total sample size is such that only a small number of extra fragments greatly affects the percentage values.

Waterhole SG309075 contained 15 episodes of deposition. Elements of cattle and sheep/goat occur in almost all phases of deposition, with occasional fragments of pig and horse. No bias towards any part of the body is visible, although mandibles and loose teeth make up a high proportion of the total assemblage, 11% and 49% respectively. It is clear that much of the material has suffered a high degree of fragmentation, quite possibly prior to its incorporation within the feature. A small number of cut marks associated with the dismemberment and skinning of cattle and the dismemberment and filleting of sheep/goat were noted, as well as a single chop mark and a skinning mark on pig bones. Scorched, charred and calcined material was also recovered. This is perhaps unsurprising, as deposits of burnt material were noted by the excavator in all but the primary and some of the final tertiary deposits, often with reference to the deliberate deposition of domestic debris or midden material which this bone appears to have been associated with.

A number of animal bones were recovered from pit 334059, located some distance from the area of the Bronze Age settlement, including 17 fragments of pig, seven of cattle, two of dog and one of sheep/goat and red deer. The elements represented almost exclusively relate to the heads and feet of animals, with the exception of a single sheep/goat scapula, and stratigraphically predate the cremation itself. None of this material shows evidence of having been burnt. The lack of major joints, particularly with reference to pig which is the most numerous species, suggests that they were removed elsewhere. From the deposit around the pit a small fragment of a single, very poorly preserved, cattle radius was recovered. A second pit, 316085, in close proximity to the first, produced three sheep/goat teeth.

Other Sites

Only very small numbers of animal bone were recorded from other sites, of which the majority were not identifiable to a species level. The material does little more than attest to the deposition of remains of domestic animals in these areas (Table 32.3).

Domesticates: Cattle/Sheep/Goat and Pig

<u>Cattle</u>

18 mandibles were recovered from which age stages could be determined. One of these fell within the range of 1-8 months; two within 8-18 months; six were from juveniles less than 3 years of age; and nine were adult mandibles of which at least one was considered old to senile. Twenty-six specimens produced epiphysial fusion data, which again attests to the slaughter of both older and younger animals (Fig. 32.1).

Butchery marks were scarce, present in only 10 specimens. These included a chop mark from the removal of the horn for working; cut marks associated with the dismemberment of the humerus and tibia to separate the upper from the lower limb; dismemberment of the mandible; filleting of the scapula and metatarsal; and the skinning of the animal.

Few measurements were taken, but when they recorded were comparable to other domestic cattle of this period in Britain.

Sheep and Goat

Animals within the sheep/goat category are thought most likely to predominantly represent sheep, although goat is also evidently present (see above). A goat horn core had been chopped where the horn had been removed for working. 32 loose teeth and mandibles produced data from which an age of death could be estimated, although few could be aged to within a small age range due to their incompleteness (Fig. 32.2). Most animals appear to have been slaughtered around mandible wear scores 20 to 35, or 1 to 3-4 years, suggestive of an emphasis on using sheep for meat. The epiphysial fusion (Fig. 32.3) data also tentatively supports this suggestion, with a greater number of unfused specimens appearing in the final fusion stage, although the sample sizes within each fusion stage is small.

Butchery marks were noted on seven bones. These included cut marks associated with the dismemberment of the humerus from the lower limb, and with the filleting of the femur, radius, metacarpal and mandible. A goat horn core had been chopped to remove the horn from the skull of the animal. Biometrical information was provided by 32 specimens, which were comparable in size to other material dated to this period.

Pig

Only six pig mandibles or loose teeth could be used to suggest an age of death, two aged as 6 months to 2 years, three as over 1 year and one as over two years. 11 examples produced information on epiphysial fusion, 6 fused and one unfused in stage A (by 12 months), one fused and one unfused at stage B (2-2.5 years) and two unfused at stage C (by 3.5 years). The presence of four young and one newborn shaft fragments attest to the presence of younger animals. Three mandibles were identified as from sows, and one from a male. Only seven specimens were measured; these proved to be comparable in size to other material of this period.

Other Species

Deer species include both red and roe deer in small numbers, including of red deer a dismembered mandible and a dismembered and filleted radius. The single occurrence of aurochs distal tibia derives from the barrow ditch, SG 324078, the measurements of which compare well to aurochs recovered from Star Carr (Legge and Rowley-Conwy 1988). The frog/toad bones were recovered from three pits and the waterhole.

One of the deposits from waterhole SG309075 contained bones from at least two polecats. Polecat has been noted at other prehistoric and Romano-British sites, such as Gussage All Saints, Dorset (Harcourt 1979), Oakridge, Basingstoke (Maltby 1993), and Watchfield, Oxfordshire (Hamilton-Dyer 2001). Although possibly killed as vermin, it may also have been exploited for its pelt (*ibid*). The single find of a rabbit or hare tooth is most likely to be from an intrusive rabbit.

Late Bronze Age/Early Iron Age

A total of 84 animal bone fragments were recovered from Late Bronze Age/Early Iron Age deposits, of which only nine fragments were identified to a species level. Of the MTCP features, pit SG 340004 produced the six cattle fragments and a sheep/goat metatarsal; all from a deposit of burnt material although none of the animal bone was burnt. Posthole SG 330068 produced a single sheep/goat loose tooth. Ditch SG 444010 produced a cattle tibia fragment, on the LBR site.

Iron Age to Early Romano-British

Quantifications

A total of 1506 animal bones identifiable to a species level were recovered from Iron Age and early Romano-British deposits (Table 32.6), 28% represented by loose teeth being the result of a high degree of fragmentation (Table 32.2). As with the Bronze Age assemblage, the total NISP presented in Table 32.6 indicates that fragments of cattle and sheep dominate the archaeological assemblage, cattle bones in slightly greater numbers. As with the Bronze Age assemblage, sheep are thought to predominate the sheep/goat category (see above), although goat was evidently present. Although cattle and sheep were found in similar quantities, the estimate of the meat weights clearly demonstrates the greater contribution of beef to the diet (Table 32.7).

LTCP

The LTCP site is formed by two areas of settlement, one to the east and one to the west. The eastern settlement forms the majority of the material (Table 32.8), with all but 42 identifiable fragments phased as either Late Iron Age or Late Iron Age to early Romano-British. The western settlement has only eight identifiable fragments in the later phase, the remainder dating to either the middle or Late Iron Age.

Separation of material produced very similar results. Cattle and sheep appear in roughly equal proportions in figures presented as NISP (Table 32.8) or MNE (Tables 32.9 and 10), possibly with a greater emphasis on cattle at the western settlement, with pig and other species in smaller quantities. However, the MNE presented for the western settlement are in such small numbers that their usefulness is questionable (Table 32.10 and Fig. 32.1).

There is a clear emphasis on the deposition of all species within ditches, with smaller quantities of material deposited in other feature types. Only four pits of this period across the excavations produced between 10 and 20 identifiable fragments, all other features having less than 10 NISP. Similarly only four ring gullies produced more than 10 identifiable fragments, the most coming from ring gullies SG 110036, SG 129068 and SG 137022, although predominantly comprised loose teeth fragments..

For the eastern settlement much of this material derives from the two ditches. 21% of the identifiable material recovered was from the late iron-age to early Romano-British phase of the large rectangular enclosure to the south of the settlement, and 37% of the identifiable material was recovered from the boundary ditch surrounding ring gullies 123162/129160 and 129088/129090. Although the ditches are evidently different in character, in their sizes form and purpose, both contain similar proportions of species (Fig. 32.4). Similarly much of the identifiable material from the western settlement (27%) was recovered from its surrounding boundary ditch (Fig.32.4).

Other Sites

The assemblage from the M11 sites is predominantly late Iron Age to early Romano-British in date, 59% of the identifiable fragments, with 25% of identifiable fragments recovered from late Iron Age deposits, and smaller quantities of material from other Iron Age contexts. Similarly 87% of the material from the MTCP site is Late Iron Age to early Romano-British in date, with a further 11% phased as Late Iron Age and the remainder Mid- to Late Iron Age.

Domesticates: Cattle, Sheep/Goat and Pig

Due to the small sample of material from most of the sites, only material from the eastern settlement on the LTCP site was included in the analysis of body part representations.

<u>Cattle</u>

Figure 32.5 presents the anatomical parts present at the eastern settlement in rank order. There is a clear bias towards elements of a more robust or dense nature, and against those that are less dense and smaller. This matches well data presented in Brain (1981, 23) for material which has been highly affected by the gnawing of dogs, which is evident on 9.7% of the cattle bones, although it is likely that this is only one of the destructive agents which has affected the material. It is also likely that the material has been influenced by recovery biases resulting in the loss of some smaller elements (Payne 1972). It is therefore implied that whole carcasses are represented, with cattle slaughtered at the site.

Butchery marks were recorded on 60 specimens (Table 32.11). The most common of these was the mandible, also one of the most common elements, which had cut marks associated with its dismemberment from the skull. There are also filleting marks where the tongue had been removed. Dismemberment marks occur at each joint of the forelimb, with filleting marks on all of the long bones as well as the scapula. Similarly the joints of the hind limb showed evidence of dismemberment, with filleting marks on the both the tibia and metatarsals. Lack of filleting marks on the femur may be due to the relatively poor survival of this element (Fig.. 32.5). A chop mark located on the occipital condyle of a skull shows where the animal was decapitated. Skinning of cattle was attested to by cut marks on a skull fragment and first phalanges.

Sheep and Goat

Figure 32.6 considers the presence of each anatomical part at the eastern settlement for sheep. Many of the elements show a similar pattern to that of cattle, with dense more robust parts in greater abundance than those less resistant to attritional processes. However, there is a clear bias towards distal tibias which can not be explained by purely taphonomic arguments. Neither does this imply an emphasis on prime cuts of meat brought to the site, as there is no suggested supra-abundance of femur or humerus, the upper parts of the limb which are of higher meat value.

This bias was also noted in the Essex County Council SC site at Stansted, in Late Bronze Age to Early Iron Age contexts, where a number of worked sheep bones were also recovered. Here it was suggested that this material was deliberately retained for working as a raw material (Hutton 2004, 60). No worked bone was recovered from deposits of this period at the eastern settlement site, although a worked sheep/goat tibia was recovered from a Bronze Age feature. However, it is unlikely that animal bone was not used as a raw material, and these straighter elements may have been opportunistically retained for this purpose. Whether the material here represents bone retained and not worked, or fragmented or failed worked material is unresolved.

Butchery marks on specimens in the sheep/goat and sheep categories were scarce, present on a total of nine specimens. These included cut marks associated with the dismemberment of two scapula from the humerus, filleting of the radius, femur and tibia. Cut marks on a goat femur showed where the hip had been disarticulated.

Pig

Numbers of pig bones were too few to provide an analysis of the anatomical parts in any one site. A general overview is given in Figure 32.7, combining data from all sites, showing a general trend towards the more robust elements. It is surprising that the mandible is so low in the rank order, although conversely maxilla are well represented and this anomaly is considered most likely the result of the small sample.

Butchery marks were only noted on eleven specimens. These included the dismemberment marks on the mandible where it was removed from the skull; dismemberment of the scapula and humerus; and disarticulation of the ankle. Filleting marks were also noted on the humerus. Chop marks on two proximal tibias are associated with the dismemberment of the knee joint.

Age at Death and Sexing Data

Cattle

Estimates of the age of death of cattle from mandible wear scores (MWS) and epiphysial fusion can be deduced from Figures 32.8 and 32.9. Figure 32.8 and 32.9 present data for all excavated areas, due to the small number of mandibles from each site, although inevitably this is dominated by material from the LTCP site. The general trend is towards a number of deaths before three years of age (up to MWS 36), but with a slightly greater number of animals surviving into adulthood, including old and senile animals (Fig. 32.8).

A total of 117 specimens with epiphysial fusion states was recorded (Fig. 32.9). Each fusion category where any quantity of material is present gives an emphasis on fused animals older than the relevant fusion age range. Although some cattle were slaughtered at an early age, like the mandible wear scores, the implication is that many cattle reached adulthood. A single radius was recovered from the MTCP site from a newborn individual.

Sexing data was scarce, but eight female and a further two possible female pelves were identified, and only two male and one possible male pelvis. This is suggestive of female as opposed to male animals surviving further into adulthood for their pelves to show sexual morphism.

Preservation and recovery factors have evidently affected this material, and a higher number of natural fatalities in first year is almost certainly absent from the archaeological material due to the fragile nature of bones from younger animals. The implication of this data is for a mixed slaughtering strategy. A number of animals, speculatively predominately males, were culled at or before the prime age for their meat, retaining a large percentage of older animals for breeding stock and milk production. In comparison to the models provided by Payne (1973), this data best fits his model for milk production.

Sheep

Estimates of the age of death of sheep from mandible wear scores and epiphysial fusion can be deduced from Figures 32.10-11, with the data combined for all excavated areas. No sheep/goat pelves were sexed.

The mandible wear scores indicate a number of deaths within the first year, up to MWS 19, a peak in slaughter between one and three years of age, up to MWS 32, followed by a reduced older population. Only 32 bones had useful epiphysial fusion states. The sample is only small and any interpretive statements must be tentative, but in general the fusion data agrees with the MWS. A noticeable loss to the flock is implied before 1.5-2.5/3 years (Fig. 32.9). However, 16 specimens were described as young and two described as from newborn animals, recorded from all the sites.

A significant percentage of sheep, therefore, appear to have been slaughtered at an early age for their meat. This would have left a surviving breeding population from which wool and milk could be taken.

Pig

Only 16 mandibles were recorded with useful mandible wear stages, of which five were from individuals under one year on age; a further three between one and two years; seven over one year; and two over two years of age. Similarly pig bones with epiphysial fusion states were too scarce to be overly useful (Fig. 32.12), although they were suggestive of an emphasis on younger deaths, as might be expected in a species primarily bred for its meat. Six canines were sexed, two as female and four as male.

Other Species

Horse

Horse was present in small numbers from each of the sites of this phase (Table 32.6). Six specimens had butchery marks, including dismemberment marks on the radius and metacarpal, the result of the disarticulation of the ankle joint; and filleting marks on the pelvis and femur. Two mandibles recovered from the M11/A120 Link Road site were aged as older animals, between 8 to 13 and 9 to 13 years respectively.

Dog

Fragments of dog were found at each of the sites in small quantities. Nine fragments from the LTCP were recovered from pit SG 102011, including a mandible, thoracic vertebra, rib, scapula, humerus, metacarpal, two first phalanges, and a third phalanx. Two of the phalanges were articulated, and it is possible that all of this material comes from the same individual. Butchery marks on dog bones were scarce, but were present on two femurs which had evidently been filleted.

Deer

Small quantities of deer bones were recovered from each of the sites. Although none had any signs of butchery they almost certainly represent part of the wild species used as a food resource. No antler was recovered, although this is likely to have been utilised as raw material along with the bone and hides.

Pathologies

Two pathological specimens were recorded of this phase. A Late Iron Age/early Romano-British proximal cattle or red deer femoral head had small areas of eburnation on their articular surface - a degenerative problem where the articular cartilage has failed and the subchondral bone has been exposed to wear. A Middle Iron Age cattle metatarsal had exostosis forming a raised area mid-shaft, most likely additional bone growth resulting from a small fracture which had long since healed before the death of the animal.

Romano-British

Romano-British animal bone was recovered from the MTCP site, where settlement of this period is located, with a smaller quantity from the LTCP site. It has been suggested that the MTCP site forms a satellite settlement within a larger estate or *latifundia*. A very small number of bone was recovered from other sites.

Quantification

A total of 1511 NISP were identifiable to a species level, of which 17% were represented by loose teeth. There is a clear indication of greater numbers of cattle in proportion to other species at the MTCP settlement, in comparison with settlements of earlier periods (Table 32.12 and 32.13). Beef evidently formed a high percentage of the overall meat diet (Table 32.13).

LTCP

Much of the Romano-British assemblage derives from just four features, the large rectangular enclosure, SG 136001/138030/140022/143007; ring gully SG 110036; boundary ditch SG 107022/147010; and pit SG 115020 within the aforementioned rectangular enclosure. These features account for 80% of the identifiable assemblage.

The material from the first two features may well be contaminated with material from earlier phases. The rectangular enclosure has an Iron Age phase to it, but was evidently re-excavated and used in this later period. The ring gully mentioned above is phased as Iron Age in date, with a quantity of animal bone from where this feature was disturbed by later activity. Re-worked material may account for the greater proportion of sheep/goat bones at this site in comparison with the MTCP site.

The lower fill of pit 115020, deposit 115121, contained only a few animal bones of domestic species, predominantly loose teeth, as well as at least one frog and one toad, and two bird skull fragments, a second phalanx, and a swallow/martin (*Hirundinidae*) leg bone, possibly all from the same bird (Fig. 32.12). The last two secondary fills contained larger quantities of material. The lower, 115023, contained three cattle fragments of the lower fore and hind leg; a sheep/goat mandible, radius and third phalanx; an antler fragment; and five elements of horse including two mandibles, a radius, femur and tibia. The final fill, 115022, contained seven fragments of cattle from the fore and hind limb; five fragments of sheep/goat from the fore and hind limb as well as a loose tooth; a horse humerus and femur; a pig scapula and femur; and a fox/dog tibia. The fox/dog tibia was incomplete, but was considered a very good match for fox.

Both meat-bearing limbs and sesamoids of lower utility are represented, and only the horse radius and tibia are complete with all other elements having suffered a high degree of fragmentation. The material represents a mix of body parts and species, with no indication of an emphasis on either primary or secondary butchery waste or complete carcasses.

MTCP

Similar quantities of sheep/goat and pig bones were found, predominantly in the pits and ditches excavated at the site. Sheep/goat was only found in small numbers in each feature excavated, typically less than 10 fragments. Larger quantities of cattle were recovered from two features, 118 NISP from pit 350020 and 41 NISP from pit 321226. It is the material collected from these two pits which somewhat affect the percentage of cattle in Table 32.14.

The first two fills of pit 350020 are described as deliberate backfilling of the feature. The first contained only two horse metapodial fragments. The second deposit contained 96 cattle bones, of possibly four individuals which were slaughtered and butchered. Within this assemblage, limbs, feet and mandibles are represented. One horncore/cranial fragment was recorded, of a small or short-horned animal, with two other skull fragments in the unidentifiable categories. Nine loose teeth were also recovered, four of which are maxillary.

The mandibles suggest that at least three animals are represented, one at 1.5 to 2 years, one at 2.5 to 3 years and one young adult or adult over three years of age. The fusion states of the long bones suggest that at least one additional individual aged between 1.5 and 2 years is also present. Only three rib fragments and no vertebrae were recovered, presumably removed with the meat attached. Filleting marks were noted on fragments of femur and scapula, with skinning marks on the cranial fragment. Other species represented included five fragments of horse, two of sheep/goat and a single fragment of red deer. The final tertiary fill of this feature continued to accumulate material, including cattle, horse, sheep/goat and pig, but in small quantities and with no suggestion of large collections of material from processed carcasses.

Pit 321226 contains two episodes of deliberate backfilling. In the first of these the NISP of 29 cattle skull fragments and loose teeth is considered to have over-represented the number of cattle, due to a deposit of highly fragmented cattle skulls. Only four skulls are thought to be present, including a short-horned female and a medium-horned bull. Only one mandible fragment was present. Two distal tibia fragments, a calcaneum and an astragalus were also present, as well as a single pig tarsal. The second episode of backfilling contained 12 cattle bones, including five elements of the feet, two mandibles, tibia, humerus, radius and two horncore fragments. The first deposit would appear to suggest material from primary butchery waste of cattle. The second deposit represents a more mixed assemblage, possibly included as part of midden material backfilled into this feature.

Domesticates: Cattle, Sheep/Goat and Pig

Cattle

Figure 32.13 gives the animal part representation of cattle across the MTCP settlement. Those elements lying below one standard deviation from the mean are most likely absent due to preservation and recovery factors. It is surprising that proximal and distal metatarsal are well represented. The proximal metatarsal is a dense bone and would normally survive well, although it would not normally be found as the most abundant bone. Distal metatarsal is not as dense, and would usually suffer from attritional processes to a greater degree than suggested here. Similarly distal tibia appears in greater abundance, although this element would be expected to survive well where whole carcasses are present. Comparison to the proximal end of the tibia is unhelpful, as this part is of low bone density and is usually poorly represented. The astragalus and first phalanges are well represented, but conversely the calcaneum and other phalanges less well. Each of these elements is prone to under-representation due to problems of preservation and recovery.

This supra-abundance of the metatarsal and distal tibia cannot be tied down to any specific features, but appears to be in the background of the cattle assemblage as a whole. It could be suggested that a greater abundance of rear feet and possibly heads is present at the site, with some beef removed on the bone. The distal end of the tibia may be separated from the proximal end during butchery and left with the feet. Similarly the forelimb may be separated between the distal humerus and proximal radius, the latter being well represented at the site, the lower part of the limb being disposed of as butchery waste. The same abundance, however, cannot be suggested for metacarpals of the fore limb.

Interpretation of Figure 32.13 is not unambiguous, probably because the beef of cattle was not always distributed in the same manner. Some of the meat may have been removed on the bone, and most likely in other cases whole carcasses disposed of at the site, resulting in a mixed picture.

A total of 78 bones with butchery marks was recorded (Table 32.15). These demonstrate the separation of the mandible from the skull, and the dismemberment of all the joints of both the fore and hind limbs. This was completed more frequently with chop marks, possibly from the use of a heavier blade and method than indicated in the earlier periods where finer cut marks predominate in the butchery record. Filleting of the scapula, humerus, radius, metacarpal, femur, tibia and metatarsal was also evident, as well as the removal of the hide.

Sheep/Goat

The number of fragments were too few to produce a reliable study into the anatomical parts of sheep/goat represented at the site. Only nine fragments in this category had butchery marks. Filleting marks were present on one mandible, three radii and one tibia, a cut mark on a calcaneus showed where the ankle had been dismembered, and chop marks were noted on two tibias and one sheep horn core, the latter where the horn had been removed from the skull.

Pig

As with sheep/goat, the number of fragments of pig were too few to produce a reliable study into the anatomical parts represented at the site. Only four bones were recovered with butchery marks, which comprised dismemberment marks on a mandible, distal humerus and astragalus, and filleting marks on a tibia.

Age at Death and Sexing Data

Cattle

Two peaks in slaughter can be seen in Figure 32.14. The first is at or just before three years of age, MWS 31 to 36. Including younger fatalities, this accounts for 46% of the herd, possibly predominantly male animals. The remaining 54% of the animals survived onto adulthood, including a number of old and senile animals. The epiphysial fusion data (Fig. 32.15) at 3.5-4 years give similar figures, with 47% of the animals culled before and 53% after this age range. Sexing data was scarce, with three pelves identified as female and three as possibly female, and a further three pelves as male and one as possibly male. As with the previous period the majority of animals would appear to survive into adulthood for their milk and most likely for traction.

Sheep/Goat

Twenty three mandibles or loose teeth were aged from this phase, considered too small a sample to give a reliable impression of the age of slaughter. No pelves were recovered from which the sex of the animal could be determined. Eight mandibles were recovered from the MTCP, including one from an animal of less than six months and a second at two to three years. A further two specimens were aged between one and four years, one between two and four years, and one between two and eight years. Only two mandibles were definitely from an animal over three years of age.

The LTCP site produced the remaining 15 mandibles, but which may possibly be residual material as previously discussed. Of these two was aged between two months and one year, three between one and two years, one between 6 months and two years, and one at between one and three years. A further two mandibles were aged at two to four years and one at three to six years. One adult recorded at four to eight years and four at four to ten years of age.

The fusion data was also scarce, with a sample of only 27 (Table 32.16), although hinting at the survival of most animals into adulthood. One bone was also recovered from a newborn individual.

Pig

Only seven mandibles for which an age of death could be estimated were recovered. From the MTCP site one was aged at six to 12 months, two at 6 months to two years and one at over one year. From the LTCP site, two were aged at less than one year, one at six months to two years, and one at over one year. Fusion data was considered too scarce to be useful. Four canines were identified as being from sows.

Other Species

Horse

Horse was evidently also utilised after death or slaughter. Seven occurrences of butchery showed where the upper spinal column had been chopped through, one humerus and two radii filleted, a cut mark on a pelvis from the dismemberment of the hip, and a chop mark on a metacarpal from the dismemberment of the lower forelimb.

Deer

Remains of both red and roe deer bones were found at the site in small numbers (Table 32.12). These included one worked and one naturally shed antler, the latter possibly collected to be worked. Butchery on a single roe deer antler/cranial fragment showed that its hide had been removed.

Cat

A single cat second phalanx was recovered from a boundary ditch at the MTCP settlement, although it is unclear if this is from a wild or domestic species.

Dog/Fox

What is recorded as a dog/fox tibia is considered a good match for a fox, but its incompleteness prevented a positive identification. It may well represent the killing of a pest to domestic fowl.

Birds

Domestic fowl, including bantam, and domestic/greylag goose were recovered from the MTCP, but only in very small numbers. A single domestic/greylag goose ulna had butchery marks, where it was separated from the rest of the lower wing. The single occurrence of a swallow/martin bone from the LTCP site may represent the chance inclusion of a wild species.

Pathologies

Two pathological specimens were recorded from this phase. Loose mandibular second and third molars of the same cattle jaw had abnormal root development, thought to be either associated with chronic infection (abscess) within the jaw of an unknown origin, or old age. Secondly, a cattle pelvis acetabulum had small areas of eburnation on its articular surfaces. A degenerative problem in the hip joint where the articular cartilage has failed and the subchondral bone has been exposed to wear.

Medieval

A total of 1511 fragments were recorded from medieval contexts, excluding the late medieval contexts of the hunting lodge. 284 were identifiable to a species level, of which 31% were loose teeth fragments. Three areas of settlement were identified, a Saxo-Norman building with associated pits and an enclosed 13th-14th century settlement, both on the MTCP site, and a settlement at the FLB site which was possibly associated with industrial activity (Table 32.17).

Each area only produced small numbers of animal bones within individual features. No contexts from the FLB were identified as the waste products of curing hides or working horns. The material at each settlement does little but attest the disposal of the remains of domestic animals at each site.

One feature that was not directly associated with the settlements produced larger quantities of animal bone.

Pit 310136 lay in the northern area of the MTCP site, within the medieval field systems. It contained 49 of the cattle bones listed in Table 32.17, an overview of which is presented in Figure 32.16. Parts of at least four individuals are included within the deposit, based on the metacarpals and skull maxilla. In addition to this material two thoracic vertebra, two other vertebrae fragments, 11 rib fragments and one rib end were recorded in the large mammal category, most likely of these cattle. The radius fragments are all end and shaft or shaft splinters of the distal end, possibly separated from the upper meat bearing part of the limb during the butchery of the animals. The two complete femurs and one complete tibia are evidently deposits of meat bearing bones, from which the meat was most likely removed, in what is otherwise a deposit of heads and feet. The other occurrences of femur and tibia are represented by shaft splinters. Butchery marks included a dismemberment mark on the astragalus and a chopped metacarpal.

Only one mandible was suitable for an estimate of the age of the animal, from an old adult. The fusion of the long bones, however, suggests the presence of animals no older than 3.5-4 years, possibly two individuals around 2-2.5/3 years and 3-3.5 years of age. Also included in this deposit were four fragments of sheep/goat, four pig skull fragments and a domestic fowl leg bone.

A deposit of yellow clay was placed over this material, suggested by the excavator to have been used to seal the deposit before further backfilling as though the cattle bones were still fresh when placed in the pit. Whole carcasses are evidently not represented within this material, with most of the meat-bearing limbs as well as the ribs and vertebrae removed elsewhere. Other pits in the vicinity also contained small quantities of animal bone, but none with the same evidence of processing of cattle carcases.

Pond 103027 lay on the eastern side of the LTCP site. Within its upper fill 19 horse bones were deposited, from at least three individuals. The remains comprised mainly leg bones, including radius, ulna, metacarpal, pelvis, femur, tibia and metatarsal. Filleting marks were noted on the femur and metacarpal, with a dismemberment mark on a metatarsal. The animals were unlikely to have been consumed by humans at this time, and may well have been butchered for ease of disposal or possibly as dog meat.

Late Medieval and post-medieval hunting lodge

A total of 2,791 animal bones were recovered from the hunting lodge, of which 696 were identified to a species level (Table 32.18). Pit 134059 lies 350 m to the south-west of the lodge itself, and contained large quantities of fallow deer from at least four individuals including a newborn or neonatal animal. Although beef evidently formed a significant part of the meat consumed at the site (Table 32.19), deer species collectively are also found and evidently consumed in significant numbers, predominately fallow deer (see below).

The apparent number of domestic fowl is over-represented in Table 32.18, due to two deposits of a large number of bird bones from a small number of individual birds. 83 of these 100 domestic fowl bones derive from a minimum of six birds deposited in pit 459019. 398 of the unidentified bird bones were also recovered from this pit, including phalanges, ribs, and vertebrae. A second deposit of 133 bird bones is found in the backfill of a latrine, 447014, including 13 domestic fowl bones from at least three birds, and three pheasant bones from at least one bird. A further 118 bird bones, including rib fragments, shaft splinters and skull fragments, were also recovered from this deposit.

The majority of the sheep/goat category is considered to be sheep rather than goat. Wool had been an important British export since medieval times, and by the sixteenth century made up four-fifths of England's export (Maltby 1979, 47).

Domesticates: Cattle, Sheep/Goat and Pig

Cattle

Figure 32.17 gives the presence of anatomical parts as NISP. The sample size for this analysis is small, but all elements of cattle are represented to some degree. It is noticeable that, despite being usually well represented, mandibles appear in smaller numbers than limb bones. This is likely to be the result of the small sample size, as there is only a difference of 13 NISP, or seven MNE, between metatarsals and mandibles.

A total of 53 cattle bones had evidence for butchery (Table 32.20). Dismemberment of all the joints of both fore and hind limbs was noted, predominantly with chop marks and occasionally saw marks. Filleting marks were noted on each of the major limb bones, as well as the metapodials and pelves, with skinning marks on a single first phalanx.

Sheep/Goat

As with cattle, the sample is small for a consideration of the body parts represented, but Figure 32.18 gives the NISP present. It is evident that both limbs and skulls are represented; the absence of some of the smaller feet bones is likely to be the result of a recovery bias.

Only ten sheep/goat bones with butchery marks were recorded. Chop marks were noted on a humerus, femur, tibia, and metatarsal. Some of these butchery marks are clearly associated with dismemberment such as the removal of the back feet. Filleting marks were recorded on a humerus, radius and metacarpal; and a skull had evidently had the horn sawn off for use as a raw material.

Pig

As with cattle and sheep/goat, the sample is too small for an analysis of the anatomical parts represented. Figure 32.19 demonstrates that all body parts are represented at the site.

Six pig bones with butchery marks were recorded, including a mandible chopped where it had been removed from the skull. A chop marks were also noted on a femur, associated with the dismemberment of the hip joint. A single calcaneum also had cut marks from the dismemberment of the ankle. Filleting of two humeri and a femur were also noted.

Deer species

Fallow deer is the most abundant deer species represented at the site, with red and roe deer occurring in smaller quantities. Although the sample is small, the apparent biases in terms of anatomical parts can be shown to have been the result of hunting practices associated with the ritual unmaking of the deer. The ritual of the ‘unmaking’ of the deer followed the kill in a hunt, and was normally carried out at the kill site. Hunting manuals explain how the deer were skinned, disemboweled and butchered (Cummins 2001, 41-44). Body parts were gifted to hunt members in a ceremonial fashion according to their social station, which should therefore be apparent in the anatomical parts of deer represented at the consumption sites of those of differing social status (N. Sykes pers. comm.). Specifically, during the unmaking the hunting dogs received much of the offal, the corbyn’s bone (pelvis) was cast away as an offering to the raven, the left upper shoulder was gifted to the forester or parker, and the right upper shoulder went to the best hunter or breaker of the deer (*ibid*). Only two thirds of the venison would therefore have been transported to the lord's residence or gifted to other members of the social elite (*ibid*).

Anatomical Part Representation of Deer Species

Figures 32.20 to 32.22 give the anatomical parts represented by each deer species at the site, separated by left and right side. It is noticeable in Figure 32.20 that no confirmed identifications of fallow deer femur and tibias were recorded; according to the above described practice these would have been removed to a higher status site. Out of 16 scapula, humerus and radii, there are seven recorded from the right side of the body (Fig. 32.20). The gifting of the forester's portion of the left fore limb would appear to hold true for this species, with the 'best hunter's' portion also found at the lodge. The presence of three metatarsals, potentially butchery waste of the hind limb, may suggest that in some cases this ritual took place within the vicinity of the lodge.

The anatomical parts of other deer species, although less common, clearly indicate the presence of the hind limb at the site. In the case of roe deer, where the tibia is most frequent, these are predominantly from shaft cylinders including both the proximal and distal ends of the bone, not consistent with the discarding of the distal tibia in the butchery waste of this limb. This may suggest differential treatment of red and roe in comparison to fallow deer. These animals may represent the buck and the doe owed to the park keepers on an annual basis as part of their fee. Alternatively, they may represent animals associated with the entertainment of the upper social classes when the lodge was used as a base for their hunting activities.

Butchery of deer

The number of deer antlers is deceptive in suggesting the number of antlers removed from a carcass. Table 32.21 shows that the majority of antlers, where they can be identified, are naturally shed from the live animal and collected, presumably as a source of raw material, and may have formed an additional income for the keepers.

Butchery marks on deer bones were scarce. On fallow deer chop marks were noted on two antlers, one where it had been removed from the skull, and on a scapula associated with the disarticulation of the fore limb. Two jaws had evidently been removed from the skull with a knife. Filleting marks were also noted on a single radius.

Similarly for red deer, a single antler had been sawn off the skull. Knife marks were also recorded on a mandible where it was removed from the skull and the tongue removed. A further antler was recovered with a cut mark and saw marks, and a pelvis had been chopped during dismemberment or the hip. Only a single butchery mark was recorded on roe deer, where a tibia had been filleted.

Three more antlers, not identified to a species level, were recorded with a chop, cut and saw mark respectively. A further deer mandible had knife marks where the tongue had been removed, and a red or fallow deer humerus was recorded with dismemberment where it was separated form the ulna.

Pit 134059

Pit 134059 was located approximately 350 m south-west of the lodge at the edge of the deer park near the former course of Bury Lodge Lane. It contained at least three adult and one neonatal deer. Table 32.22 gives the minimum number of elements of these remains, at least one of which was a hind as it was evidently pregnant at the time of death. Remains of only one skull are represented and no antlers were found, suggesting that at least two skulls were removed. A number of elements are absent, particularly a number of the hind limbs, with only one butchery mark recorded from the filleting of a humerus. Meat, therefore, appears to have been removed from the kill site both on and off the bone.

Pelves of two individuals appear to be present, suggesting that the practice of leaving the pelvis for the raven, the corbyn's fee in the unmaking of the deer (Cummins 2001, 42), has either been followed with only one individual or not at all. A further 141 rib fragments and 33 vertebra fragments were recorded which may have originated from these animals, although as the pit contains quantities of residual Romano-British pottery some animal bone may also therefore be residual.

It has already been shown that the distribution of body parts for fallow deer consistent with the unmaking of the deer ritual. It is therefore at odds that this example does not follow the same pattern. The explanation of a legitimate hunt, therefore, seems unlikely. An alternative explanation is that the butchered remains are from an illicit hunt within the deer park. Poaching within deer parks is known of since their early days (Birrel 1982). It is unlikely that the pit was excavated for the purposes of disposing of the remains of an illicit hunt, and there is no evidence of deliberate backfilling of the feature, but it may have been a pre-existing hole; possibly a waterhole.

Pond 103027

This lay on the eastern side of the LTCP site, from the same period as the use of the hunting lodge. Within its upper fill 19 horse bones were deposited, from at least three individuals. The remains comprised mainly leg bones, including radius, ulna, metacarpal, pelvis, femur, tibia and metatarsal. Filleting marks were noted on the femur and metacarpal, with a dismemberment mark on a metatarsal. The animals were unlikely to have been consumed by humans at this time, and may well have been butchered for ease of disposal or possibly as dog meat.

Age at Death and Sexing Data

Data concerning the age at which animals were slaughtered, including mandible wear scores and epiphysial fusion, as well as sexing data is scarce for all species. The data presented below demonstrates the presence of both younger and older, as well as male and female, animals; but does not imply a strategy in their husbandry.

Cattle

Only six mandibles or loose teeth were recovered from which an age of death for cattle could be estimated. Two mandibles were recorded at less than one month old, and a further two at one to eight months. Both of these may well represent natural fatalities. A fifth animal died at 2.5-3 years of age, and a further two adults at over three years of age.

Young animals are evidently present at the site, with a further six long bones described as being from young animals, including a newborn individual. Bones showing the fusion states of cattle were scarce, but again demonstrated the presence of younger animals slaughtered before three to four years of age (Fig. 32.23).

Only one pelvis was recorded from which the sex of the animal could be recorded; this was from a female.

Sheep/Goat

Only five mandibles were recovered from which an age of death could be estimated, one each at two to 12 months, one to two years, three to six years, four to eight years, and six to eight years. The younger mandibles attest to the consumption of lamb as well as older animals. The fusion data was too scarce to be useful. Two pelves were recorded from male animals.

Pig

11 mandibles were recorded from which an age of death could be estimated, two at less than one year of age, two at six to 24 months, and three at one to two years. A further four mandibles were recorded, two at over one year old, and one at over two years. 12 mandibles or loose canines were recovered from which the sex could be determined, seven from males and five from female animals. Specimens with epiphysial fusion states were too scarce to be useful.

Other Mammals

Horse

Horse bones are present at the site in small numbers. Although not used for human consumption, butchery marks are evident on the bones. In addition to those bones described in pond SG 103027, filleting marks occur on two humeri, as well as dismemberment marks on a pelvis. Chop marks also occur on an individual humerus, radius and pelvis. These animals could have been dismembered for ease of disposing of the carcasses, but the meat may also have been used for dog food, although there is no evidence of a kennels or large numbers of dogs at the site. The horse bones recovered from a medieval pond which may also relate to the activities at the hunting lodge can potentially also be added to this material.

Horses may have been brought to the lodge for the purposes of hunting, negating the need for a large number of animals to be kept at the lodge all year round or for the disposal of their carcasses at death.

Dog

Despite the fact that the site is a hunting lodge, only two fragments of dog are present in the form of a canine tooth and a humerus. However, canine gnawing was noted on 48 specimens of other species. This may indicate that only a small number of animals were actually kept at the lodge. As with horses, hounds may also have been brought to the lodge for the hunt rather than kept there on a permanent basis. The site of any kennels was not identified during the excavations.

Cat

Cat is represented by the single occurrence of humerus and metatarsal. This was of a domestic animal associated with the lodge.

Fox

A single fox radius suggests this animal was also killed, but is perhaps likely to represent the killing of a pest to domestic fowl rather than the hunting of the fox for sport which became popular in the 17th century (Wilson and Edwards 1993, 53).

Rabbit

Rabbit bones were recorded only in small numbers, but it is considered to have contributed to the diet of the lodge occupants.

Bird Species

Domestic fowl, including some smaller bantam, evidently form the main bird species consumed at the lodge, although these were over-represented in Table 32.16 (see above). Evidently these are predominantly from adults, with only a single unfused element demonstrating the presence of younger birds. Domestic fowl were most likely kept as a source of eggs as well as meat.

A deposit of at least three domestic fowl were recovered from the backfill of latrine 447014; all had spurs on the tarso-metatarsus. Although spurs can be found on hen birds, they are usually rare (Maltby 1979, 68). Of the five tarsus-metatarsus present three were pathological and the other two were normal examples from the same bird. The pathology was in the form of large areas of exostosis, mainly around the proximal end, the spur and shaft, although on one specimen it was also present to a smaller degree on the distal epiphysis. A small amount of exostosis was also present at the distal end of a tibio-tarsus. The cause of the exostosis is unknown, but suggests they represent older birds for this pathology to have developed to such a degree (Baker and Brothwell 1980, 167).

Although they may cocks used for breeding, a deposit of older male birds such as this may represent birds used as fighting cocks.

Domestic/greylag goose and pheasant were only present in small numbers, but included unfused elements of goose suggesting this bird was bred at the site. Only one fragment of grey heron was noted, from a later medieval deposit, but this is likely to have resulted from wildfowling expedition with the bird having been hunted with hawks (Cummins 1988, 204).

Pathologies

Only one pathological specimen was noted, besides the bird bones described above. This was in the form of a widening of the proximal articular surface of a cow second phalanx caused by limited amount of exostosis around the articular surface. This is the result of the ossification of cartilagenous excresences which may be compensating for a degenerative problem in the joint.

Metrical Analysis

The total number of potentially useful measurements within each period was too small to be useful, beyond comparison with the known size ranges of animal bones, noted in the text for each phase above. Below is presented some data for cattle which produced enough of some measurements for further comment between different periods.

Figures 32.25 and 32.26 present the measured breadth of the distal end of cattle tibia. Here an increase in cattle size is suggested by the late Romano-British period. Although the total sample is small, the size range from the Stansted excavations of the late Romano-British material extends beyond that indicated for pre-Romano-British material from 155 specimens in the ADS Animal Bone Metrical Archive (ADS: ABMA). The range of pre-Romano-British examples in this archive, including material dated from the Bronze Age to the Late Iron Age/early Romano-British, ranges between 39.28 and 60.6mm, and for Romano-British examples between 48.1 and 76.0mm (ADS: ABMA). The increase in the size of Romano-British cattle has been noted in other areas of Romanised Britain, suggested to have been the result of imported breeds (Maltby 1981, 185).

Discussion

Prehistoric and Romano British

Prehistoric domestic species

A number of areas of settlement and land use were excavated from which animal bone was recovered from the Bronze Age to the early Romano-British period, although the bones often in limited numbers when considered on a site specific basis. The Bronze Age settlement at the MTCP site comprises much of this material of this period, and two settlements at the LTCP site the bulk of the Iron Age to early Romano-British material. Cattle and sheep are demonstrably the most numerous domestic species, kept in roughly equal numbers. This conforms to a general pattern found in British Iron Age faunal assemblages, although this is not one without exceptions (Hambledon 1999, 33-60). Beef, however, forms the larger part of the meat diet simply due to the greater size of these animals. Pork was consumed, but as a consistently smaller percentage of the overall meat diet. Each of these species are bred, slaughtered and consumed at the settlement sites.

Cattle from Iron Age to early Romano-British sites were kept to an age likely to reflect their exploitation as milk herds as well as their use for traction. With sheep, although wool and milk would have been a useful resource, Iron Age to early Romano-British data suggests that the majority were killed before three years of age for consumption. Wool and milk would have been available from the remaining breeding stock. The ageing data from the Bronze Age settlement is scarce, but what is present hints at a similar method of sheep husbandry in this earlier period.

As has been noted at other Iron Age settlement sites in the area (Hutton 2004, 60), sheep/goat tibias appear in greater abundance that would normally be expected. Rather than being the result of movement of meat on the bone it has been suggested that this bone was, possibly opportunistically, retained by the inhabitants as a source of raw material for working (*ibid*). Gougers made from sheep/goat tibias, as well as other bones, are well known from prehistoric sites, although only one example was found from these excavations in a Bronze Age context. It is debatable as to whether this material represents fragmented offcuts or simply material that was kept but never required.

Butchery evidence for each species is scarce, although cattle, sheep and pigs were evidently dismembered and filleted, with skinning marks also recorded on cattle bones. One butchery mark was noted associated with the removal of the horn from a Bronze Age cow for working as a raw material. The lack of evidence for the removal of sheep and pig skins and the removal of the horn from cattle and sheep may say more about the paucity of the archaeozoological record that the absence of these practices.

The depositional characteristics of this material typically include small numbers of highly fragmented bone typically in pits or settlement boundary ditches, as well as the large rectangular enclosure ditch on the LTCP site, and thought to represent a number of individuals. There is no indication of the burial of butchery waste from the slaughter of individual animals in pits until the Romano-British period, where two such features are identified. Much of this animal bone may have been deposited in a similar manner to that best seen in the stratigraphic events of the Bronze Age waterhole 309075, which includes a sequence of backfilling episodes with midden material over an extended period of time.

Romano-British domestic species

The majority of the Romano-British material was collected from two areas, a settlement area on the MTCP site and features at the LTCP site. The contribution of material from the LTCP was considered problematic, due to the possible inclusion of residual Iron Age bone which may account for the larger percentage of Romano-British sheep/goat present at this site.

It has been suggested that the MTCP settlement forms a satellite settlement within a larger estate or *latifundia*. Within this period a higher percentage of cattle bones suggests an increase in this species, possibly to feed the Romano-British urban market or the military (Maltby 1984, 130). The age at which cattle are slaughtered is similar to that of the previous periods, ie older animals, suggesting that milk production was important in their husbandry as well as use for traction. However, beef removed from the site on the hoof would leave no trace of their presence at the site. The use of the cattle herd primarily for the production of beef may not be reflected in these results if significant numbers of the live sample were removed before slaughter. Larger breeds of cattle are suggested in this period, possibly from imported stock (Maltby 1981, 195).

There is some suggestion that beef was removed on the bone from the site, which is not noted in the earlier periods. Speculatively, this may have been to feed a villa or other settlements associated with the larger estate. Two pits were identified, each associated with the butchery waste from four cattle.

The butchery of animals demonstrates the dismemberment and filleting of domestic species, with a greater occurrence of chop marks compared to the earlier periods suggesting greater reliance on the cleaver. Skinning marks also appear on cattle, although sheep and pig skin is also likely to have been utilised.

<u>Other species</u>

Horses are present at the sites in small numbers, and butchery marks on their bones suggest their flesh is also consumed, although there is no evidence that they are bred at the sites during the earlier period. Horses may have been taken from wild stock at three years of age when suitable for use as working animals (Harcourt 1979, 158). Only one bone from a young horse was recovered from the excavations, from a late Romano-British deposit.

Roe and red deer are present in small numbers, occasionally represented by naturally shed antlers collected as a source of raw material. As well as butchery of the animals for their meat, one young roe deer from a Romano-British deposit had evidently been skinned. Domestic fowl, including bantams, and domestic cat are generally Romano-British introductions (Davis 1995, 177) and appear at the MTCP settlement in this period. Similarly, the Romans are thought to have domesticated the greylag goose (Maltby 1979, 71), which is also present at the settlement of this period. Bones from at least two polecats were recovered from a Bronze Age waterhole. These may have been killed as vermin, or possibly for their pelts. A single fragment of aurochs was recovered from the ring ditch of a Bronze Age barrow.

Medieval

Two areas of medieval occupation were noted, but the animal bones were few and do little but attest to the disposal of domestic species at these sites. One pit was identified from which the butchery waste of cattle was deposited, away from the areas of occupation, as well as a deposit of butchered horse bones in the fill of a pond. This latter deposit was thought to possibly relate to the later medieval to early post-medieval hunting lodge.

Late medieval and post-medieval hunting lodge

Cattle, sheep and pig evidently form a significant part of the diet for the lodge occupants, and were bred and slaughtered at the site which is consistent with the documented activities of the park keepers (see Chapter 10). The anatomical parts of fallow deer, the most prevalent species, suggests that the unmaking ritual associated with the hunt was followed closely for this species. The left fore limb, the ‘forester’s portion’ and to a lesser degree the right fore limb, the ‘best hunter’s/breaker’s’ portion, are those which are represented at the lodge. The hind limbs appear to be completely absent, except for three metatarsals potentially associated with the butchery waste, suggesting that meat from the hind limb was removed on the bone for consumption at higher status sites. Fallow deer were considered well suited to the enclosed park, and were more closely identified with the bow and stable form of hunting as opposed to *par force* hunting in an open forest (Cummins 2001, 87).

Red and roe deer appear in smaller quantities, but do not show the same pattern of selective body parts. It is suggested that this material represents animals hunted by the lodge occupants as part of their annual fee, or animals consumed at times when the social elite used the lodge as a base for their hunting activities.

Naturally shed deer antler was also evidently collected by the park keepers, possibly as part of their fee, although this is not mentioned in the documentary record (see Chapter 10). This may have formed an additional source of income.

Site Code	NISP	NISP identified to a species level
Neolithic	19	0
Bronze Age	7436	830
Iron Age	8621	1502
Romano-British	9779	1461
Medieval	2788	214
Post-medieval	2632	646
Total	31246	4653

Table 32.1: NISP per period

Category	Bronze Age	Iron Age	Romano-British	Medieval	Post-medieval
Robustness	0.51	0.62	0.61	0.69	0.54
Percentage of surface erosion	0.50	0.51	0.58	0.65	0.46
Absolute length	0.09	0.11	0.13	0.16	0.17
Percentage of the original element when identifiable	0.35	0.36	0.38	0.47	0.39

Table 32.2: Condition of the material, minus loose teeth, presented as a normalised value between 0 and 1; 1 being better preservation or less fragmentation

Species	LTCP	FLB	M11	MTCP	**Total**	**Live Meat Weight**
Horse	2			2 (0.3)	**4 (0.5%)**	
Cattle	5	4	10	285 (37.4%)	**304 (38.2%)**	**75.7%**
Sheep/Goat	3	7	2	380 (49.9%)	**392 (49.2%)**	**14.8%**
Sheep				4 (0.5%)	**4 (0.5%)**	
Goat				6 (0.8%)	**6 (0.8%)**	
Pig		1		85 (11.2%)	**86 (10.8)**	**9.5%**
Dog				8	**8**	
Red Deer			2	7	**9**	
Roe Deer				3	**3**	
Aurochs				1	**1**	
European Polecat/Ferret				4	**4**	
Deer		1	5	3	**9**	
Cattle/Horse	1				**1**	
Cattle/Red Deer	4			64	**68**	
Sheep/Goat/ Roe Deer	2	4		82	**88**	
Sheep/Goat/ Dog/Roe Deer				1	**1**	
Red/Fallow Deer				2	**2**	
Rabbit/Hare				1	**1**	
Medium Mammal	6	59	3	985	**1053**	
Large Mammal	63	11	33	767	**874**	
Small Mammal				41	**41**	
Unidentified Mammal	87	109	45	4124	**4365**	
Goose	1				**1**	
Unidentified Bird				1	**1**	
Frog/Toad				25	**25**	
Total Number	**174**	**196**	**100**	**6881**	**7351**	
Identified to a species level	**10**	**12**	**14**	**785**	**821**	

Table 32.3: Bronze Age NISP by site and percentage of total estimated live meat weight

Species	Cremation	Ditch	Gully	Natural Feature	Pit	Posthole	Ring Ditch	Ring Gully	Water-hole	**Total**
Horse									2	**2**
Cattle	7 (2.5%)		1 (0.4%)		149 (52.3%)	7 (2.5%)	8 (2.8%)		113 (39.6%)	**285**
Sheep/ Goat	5 (1.3%)	1 (0.3%)			150 (39.5%)	9 (2.4%)	1 (0.3%)		214 (56.3%)	**380**
Sheep					2				2	**4**
Goat					6					**6**
Pig	17 (20.0%)			1 (1.2%)	31 (36.5%)	1 (1.2%)	1 (1.2%)		34 (40.0%)	**85**
Dog	2	5							1	**8**
Red Deer	1				5				1	**7**
Roe Deer					1				1	**2**
Aurochs							1			**1**
Polecat/ ferret									4	**4**
Deer		3								**3**
Medium Mammal	58 (5.9%)	37 (3.8%)			417 (42.4%)	31 (3.2%)	31 (3.2%)	2 (0.2%)	408 (41.5%)	**984**
Large Mammal	30 (3.9%)	3 (0.4%)			330 (43.1%)	30 3.9%)	50 (6.5%)	1 (0.1%)	322 (42.0%)	**766**
Small Mammal					15				26	**41**
Total	**120 (4.6%)**	**49 (1.9%)**	**1 (0.04%)**	**1 (0.04%)**	**1106 (42.9%)**	**78 (3.0%)**	**92 (3.57%)**	**3 (0.12%)**	**1128 (43.75%)**	**2578**

Table 32.4: NISP by species and feature type

Species	Pit	Waterhole	**Total**
Cattle	37(38%)	16(27%)	**53**
Sheep/Goat	45(45%)	38(65%)	**82**
Sheep	1	0	**1**
Goat	4	0	**2**
Pig	13	4	**17**
Total	**100**	**58**	**158**

Table 32.5: Percentage of main domestic species (MNE) and feature type

Species	BAACP	BAALR	BAAMP	**Total**
Horse	49 (4.7%)	31 (11.2%)	13 (8.6%)	**93 (6.4%)**
Cattle	424 (41.1%)	133 (48.0%)	55 (36.4%)	**612 (41.9%)**
Sheep/Goat	389 (37.7%)	81 (29.2%)	52 (34.4%)	**522 (35.7%)**
Sheep	5 (0.5%)	1 (0.4%)		**6 (0.4%)**
Goat	2 (0.2%)	1 (0.4%)		**3 (0.2%)**
Pig	163 (15.8%)	30 (10.8%)	31 (20.5%)	**224 (15.3%)**
Dog	23	2	4	**29**
Red Deer	4		2	**6**
Roe Deer	5	2		**7**
Field vole	1	1		**2**
Cattle/Horse	1			**1**
Cattle/Red Deer	149	26	19	**194**
Sheep/Goat/Roe Deer	80	6	3	**89**
Fox/Dog	2		1	**3**
Rodentia sp		1		**1**
Medium Mammal	789	160	82	**1031**
Large Mammal	1282	532	186	**2000**
Small Mammal	4	7		**11**
Unidentified Mammal	3057	541	185	**3783**
Bird	1			**1**
Frog/Toad		1		**1**
Frog		2		**2**
Total	**6430**	**1558**	**633**	**8621**
Identified to a species level	**1065**	**284**	**157**	**1506**

Table 32.6: Iron Age NISP by site

Species	LTCP (n=East 148/West 85)		M11 (n=77)	MTCP (n=44)
	Eastern Settlement	Western Settlement		
Cattle	70.0	86.4	75.1	79.1
Sheep/Goat	15.8	8.1	11.0	9.1
Pig	14.2	5.4	13.9	11.8

Table 32.7: Percentage of estimated live meat weights derived from MNE (n=total MNE)

Species	Eastern Settlement	Western Settlement	**Total**
Horse	37 (5.6%)	8	**46 (4.7%)**
Cattle	262 (39.4%)	125 (2.7%)	**407 (40.3%)**
Sheep/Goat	254 (38.2%)	106 (42.4%)	**379 (37.5%)**
Sheep	5 (0.7%)		**5 (0.5%)**
Goat	1 (0.1%)	1 (0.3%)	**2 (0.2%)**
Pig	106 (15.9%)	55 (18.6%)	**161 (16.7%)**
Dog	18	4	**22**
Red Deer	4		**4**
Roe Deer	2	3	**5**
Field vole	1		**1**
Medium Mammal	585	171	**756**
Large Mammal	757	512	**1269**
Small Mammal	4		**4**
Unidentified bird	1		**1**
Total	**2189**	**1078**	**3291**

Table 32.8: NISP from the eastern and western settlement areas at the LTCP site

Species	**MNE**	Feature type (percentage of total MNE)						
		Cremation	Ditch	Grave	Gully	Pit	Posthole	Ring Gully
Horse	**21 (8.3)**		85.7	4.8		4.8		4.8
Cattle	**104 (40.9%)**		67.3	1.0	12.5	7.7	3.8	7.7
Sheep/Goat	**92 (36.2%)**		75.0		6.5	15.2	2.2	1.1
Sheep	**3 (1.2%)**		100.0					
Pig	**34 (13.4%)**	2.9	85.3			5.9		5.9
Total	**254**	0.4	74.4	0.8	7.5	9.8	2.4	4.7

Table 32.9: Percentage of total MNE of species within each feature type from the eastern settlement

Species	**MNE**	Feature type (percentage of total MNE)				
		Ditch	Gully	Pit	Posthole	Ring Gully
Horse	**6 (5.2%)**	83.3				16.7
Cattle	**61 (52.6%)**	73.8	4.9			21.3
Sheep/Goat	**39 (33.6%)**	51.3	7.7	7.7	2.6	30.8
Goat	**1 (0.9%)**					100.0
Pig	**9 (7.8%)**	100.0	33.3			16.7
Total	**116**	**65.5**	**6.9**	**2.6**	**0.9**	**24.1**

Table 32.10: Percentage of total MNE of species within each feature type from the western settlement

Element	Chopped	Dismembered	Filleted	Skinned	Other Cut Marks
Mandible	2	10	4		2
Skull - occipital condyle	1				
Horncore/Cranium				1	
Axis					1
Scapula		1	3		1
Humerus		4			
Radius		2	3		
Ulna		2			
Metacarpal		2	3		
Pelvis	2				
Femur		3			
Tibia			3		1
Metatarsal		1	1		
Calcaneus	1				
Astragalus		1			
Phalanx 1				5	
Total	**6**	**26**	**17**	**6**	**5**
Percentage	**10.0**	**43.3**	**28.3**	**10.0**	**8.3**

Table 32.11: Butchery marks recorded on mid-Iron Age to early Romano-British cattle bones

Species	LTCP	LBR	M11	MTCP	**Total**
Horse	55 (12.7)	2	1	113 (11.5%)	**171 (12.0%)**
Cattle	172 (39.7%)	2		649 (66.0%)	**823 (57.8%)**
Sheep/Goat	134 (30.9%)	2		160 (16.3%)	**296 (20.8%)**
Sheep	3 (0.7%^			4 (0.4%)	**7 (0.5%)**
Goat				1 (0.1%)	**1 (0.1%)**
Pig	69 (15.9%)		1	56 (5.7%)	**126 (8.8%**
Dog	25			27	**52**
Cat				1	**1**
Rabbit (intrusive)				1	**1**
Red Deer	3	1		9	**13**
Roe Deer	4			3	**7**
Deer	3			2	**5**
Cattle/Horse				1	**1**
Cattle/Red Deer	1				**1**
Sheep/Goat/Roe Deer	78			154	**232**
House Mouse (Intrusive?)	12			19	**31**
Fox/Dog	1			2	**3**
Medium Mammal	253	2		315	**570**
Large Mammal	480	4		2538	**3022**
Small Mammal	2			22	**24**
Unidentified Mammal	1067	22		3962	**5051**
Bantam				2	**2**
Dom. Fowl				2	**2**
Dom. Goose				2	**2**
Dom. Fowl/Pheasant				1	**1**
Gallioforme				2	**2**
Swallow/Martin	1				**1**
Bird	3			10	**13**
Frog	22			2	**24**
Toad	4				**4**
Frog/Toad	1				**1**
Total	**2393**	**35**	**2**	**8060**	**10490**
Total identifiable to a species level	**468**	**7**	**2**	**1033**	**1510**

Table 32.12: Romano-British NISP by site

Species	MNE		Percentage of Live Meat Weight	
	LTCP	MTCP	LTCP	MTCP
Cattle	73 (48.0%)	183 (73.5%)	83.5	93.9
Sheep/Goat	57 (37.5%)	48 (19.3%)	8.9	3.4
Sheep	2 (1.3%)	2 (0.8%)	0.3	0.1
Pig	20 (13.2%)	16 (6.4%)	7.2	2.6

Table 32.13: Percentage of estimated meat weights derived from MNE

Species	n	Ditch	Gully	Pit	Post Hole	Ring Gully	Other Features
Horse	113	60.2	3.5	34.5	0.9		0.9
Cattle	644	50.8	5.3	40.5	0.9	0.5	2.0
Sheep/Goat	160	59.4	7.5	23.8	0.6	2.5	6.3
Sheep	4	100.0					
Goat	1	100.0					
Pig	56	48.2	10.7	30.4	10.7		0.0
Total	978	53.4	5.7	36.3	1.4	0.7	2.5

Table 32.14: Percentage of NISP found within each feature by feature type, in Romano-British deposits on the MTCP settlement

Element	Chopped	Dismembered	Filleted	Skinned
Mandible	6	7	1	
Horncore/ Cranium	1			1
Scapula	3	4	3	
Humerus	4	4	5	
Radius	4	2	7	
Ulna		1		
Metacarpal	1	1	1	
Pelvis	1			
Femur	1	1	5	
Tibia	1	1	2	
Metatarsal		1	3	
Metapodial	1			
Calcaneus	1			
Astragalus	2			
Phalanx 1				2
Total	**26**	**22**	**27**	**3**
Percentage	**33.3**	**28.2**	**34.6**	**3.8**

Table 32.15: Summary of evidence for Romano-British cattle butchery

Fusion Stage Age Ranges	Fused	Unfused	Fusing
6 to 10 months	5		
10 to 16 months	7	1	
1.5 to 2/2.5 years	9	2	
2.5 to 3 years		2	
3 to 3.5 years			1

Table 32.16: Epiphysial fusion states of Romano-British Sheep/Goat; n=27

Species	Saxo-Norman Building	13-14th century Enclosed Settlement	FLB Settlement	Other Features	**Total**
Horse			14	11	**25**
Cattle	11	7	16	101	**135**
Sheep/Goat	14	9	26	17	**66**
Pig	11	5	8	24	**48**
Dog			3	3	**6**
Red Deer			1	0	**1**
Fallow Deer			1	0	**1**
Roe Deer				0	**0**
Deer			4	0	**4**
Cattle/Red Deer				8	**8**
Red/Fallow Deer			9	0	**9**
Sheep/Goat/Roe Deer				3	**3**
Fox/Dog				1	**1**
Rabbit/Hare			1	0	**1**
Medium Mammal	72	23	73	119	**287**
Large Mammal	46	21	55	797	**919**
Small Mammal		17	3	0	**20**
Bantam	1			0	**1**
Dom. Fowl				1	**1**
Bird		2		3	**5**
Toad				1	**1**
Unidentified				1487	**1487**
Total	**155**	**82**		**1274**	**1511**
Identified to a species level	**37**	**21**		**226**	**284**

Table 32.17: NISP in medieval contexts by area

Species	Later medieval	Post-medieval	**Total**	Pit SG 134059
Horse	8 8.2%)	53 (8.7%)	**61 (8.7%)**	
Cattle	23 (23.5%)	167 (27.6%)	**190 (27.0%)**	
Sheep/Goat	16 (16.3%)	104 (17.2%)	**120 (17.0%)**	6
Sheep	1 (1.0%)	3 (0.5%)	**4 (0.6%)**	
Pig	5 (5.1%)	71 (11.7%)	**76 (10.8%)**	
Dog	1	1	**2**	
Fox	1		**1**	
Cat		2	**2**	
Rabbit	2	3	**5**	
Red Deer	3 (3.1%)	26 (4.3%)	**29 (4.1%)**	
Fallow Deer	16 (16.3%)	65 (10.7%)	**81 (11.9%)**	98
Roe Deer	1 (1.0%)	14 (2.3%)	**15 (2.1%)**	
Deer	17 (17.3%)	79 (13.0)	**96 (13.6%)**	67
Cattle/Horse		1	**1**	
Cattle/Red Deer	8	45	**53**	
Sheep/Goat/Roe Deer	7	42	**49**	1
Red/Fallow Deer	8 (8.2%)	24 (4.0%)	**32 (4.5%)**	5
		1	**1**	
		1	**1**	
Medium Mammal	35	206	**241**	648
Large Mammal	56	373	**429**	
Small Mammal	1	8	**9**	
Unidentified Mammal	161	445	**606**	283
Bantam		2	**2**	
Dom. Fowl		100	**100**	
Dom. Goose		4	**4**	
Pheasant		3	**3**	
Heron		1	**1**	
Goose		3	**3**	
Dom. Fowl/Bantam		1	**1**	
Dom. Fowl/Pheasant		1	**1**	
Gallioforme		9	**9**	
Bird	2	529	**531**	
Frog/Toad		32	**32**	
Total	**372**	**2419**	**2791**	**1108**
Total Identified to a Species Level	**77**	**619**	**696**	**104**
Total Number of Deer	**45 (45.9%)**	**208 (34.3%)**	**253 (35.9%)**	**165**

Table 32.18: NISP associated with the hunting lodge

Species	MNE	Percentage of Live Meat Weight Ratios
Cattle	88 (49.4%)	83.7
Sheep/Goat	61 (34.3%)	7.9
Sheep	2 (1.1%)	0.3
Pig	27 (15.2%)	8.1

Table 32.19: MNE and percentage of live meat weight of the main domestic species from the hunting lodge

Element	Chopped	Dismembering	Filleting	Sawn	Skinning	Other Cut Marks
Mandible	1					
Scapula	1					
Humerus	1	1	2	1		
Radius	2	2	5	3		1
Radius/Ulna			1			1
Ulna	1					
Metacarpal	2		5			
Pelvis	2		1	1		
Femur	1	1	4	1		1
Tibia	3		1			
Metatarsal	4		1			
Phalanx 1					1	
Phalanx 2						1
Total	**18**	**4**	**20**	**6**	**1**	**4**

Table 32.20: Summary of evidence for cattle butchery at the hunting lodge

Species	Antler/Cranium	Shed Antler	Antler Chopped or Sawn off Skull	Total
Fallow Deer	2	3	1	6
Red Deer	6	9	1	16
Roe Deer		1		1
Total	8	13	2	23

Table 32.21: Antler from the hunting lodge

Element	Left	Right	Other
Maxilla	1	1	
Mandible	1		
Axis			2
Cervical Vertebra			6
Thoracic Vertebra			7
Scapula	2	2	
Humerus	3	3	
Radius	3	2	
Ulna	3	2	
Metacarpal	1	2	
Pelvis	2	2	
Femur	1	2	
Tibia	1	1	
Metatarsal	1	1	1
Metapodial	1		
Calcaneus	2	1	
Phalanx 1			13
Phalanx 2			10
Phalanx 3			6

Table 32.22: MNE of fallow deer divided by side, excluding neonatal remains

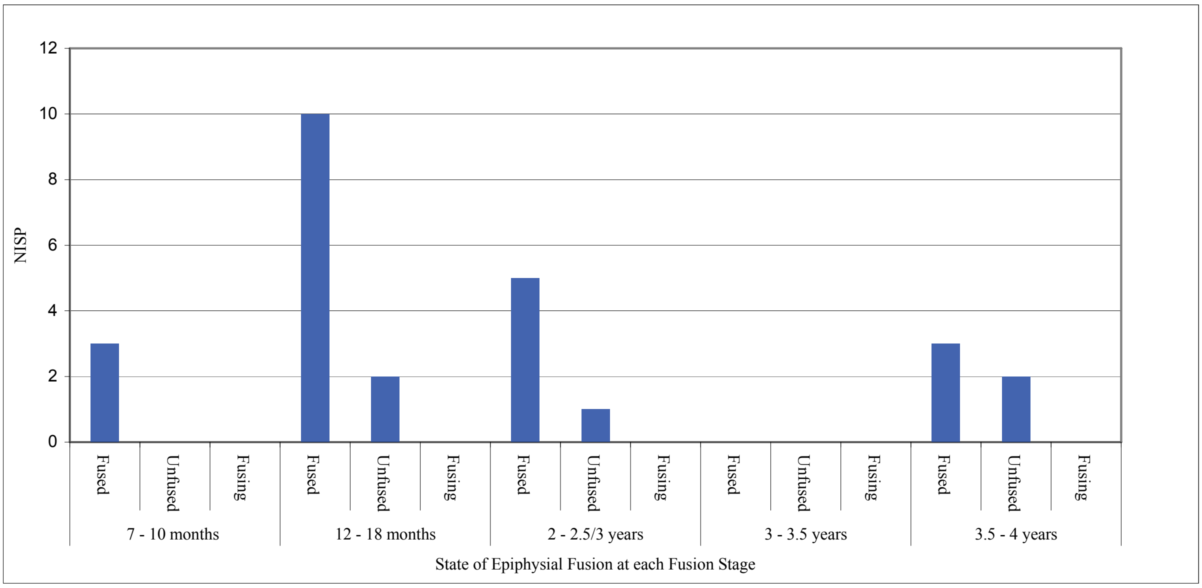


Figure 32.1: Epiphysial fusion of Bronze Age cattle; n=26

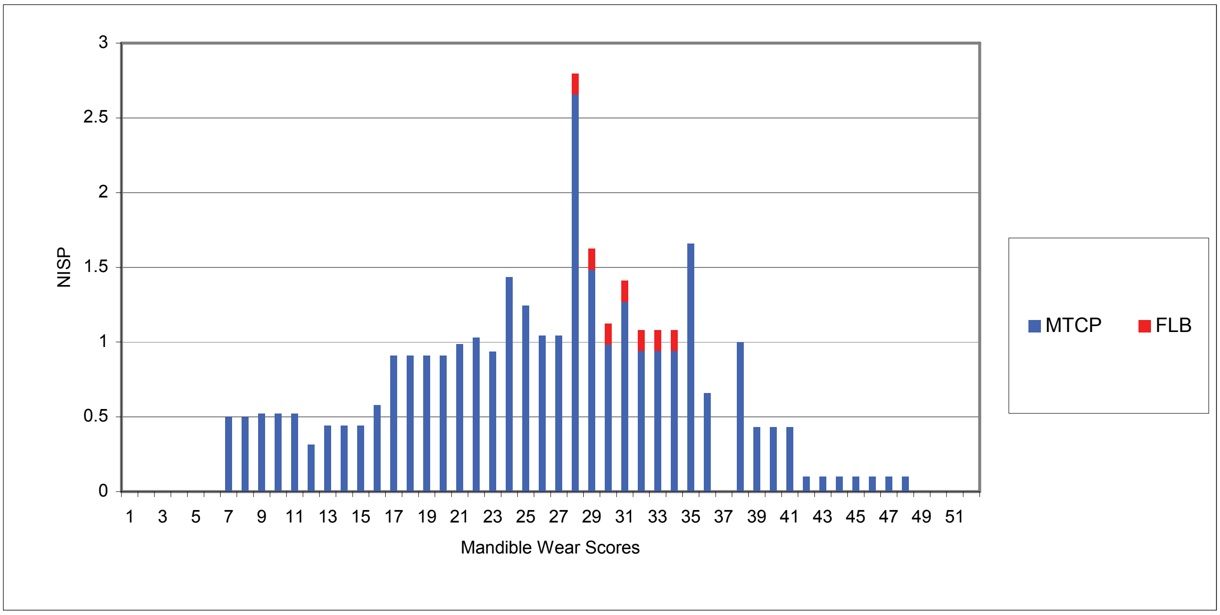


Figure 32.2: Sheep/goat and sheep mandible wear scores from Bronze Age phases, n=32

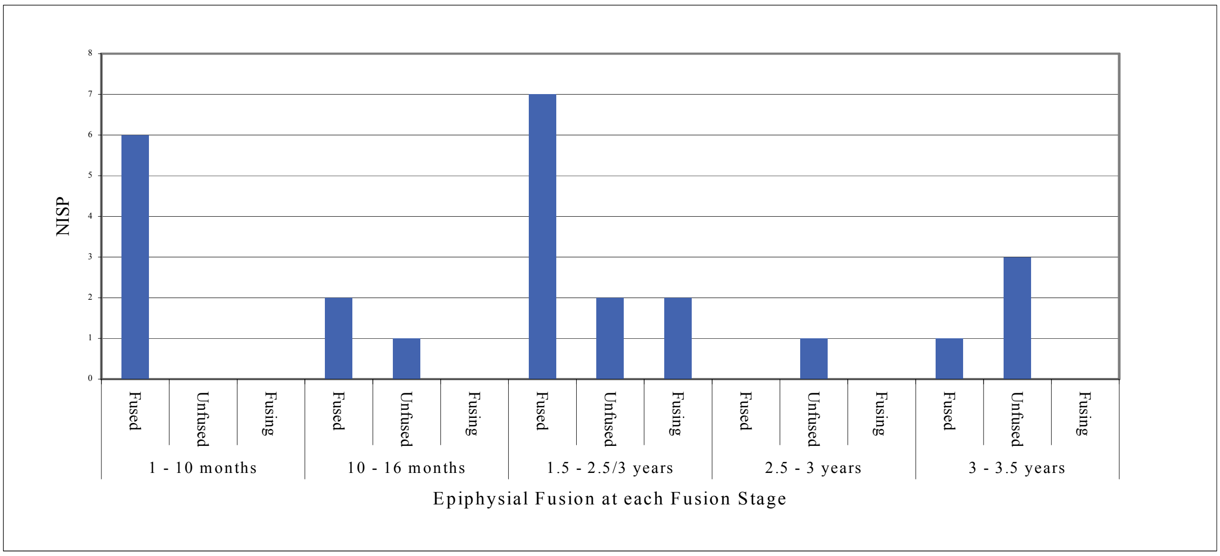


Figure 32.3: Epiphysial fusion of Bronze Age sheep and sheep/goat; n=25

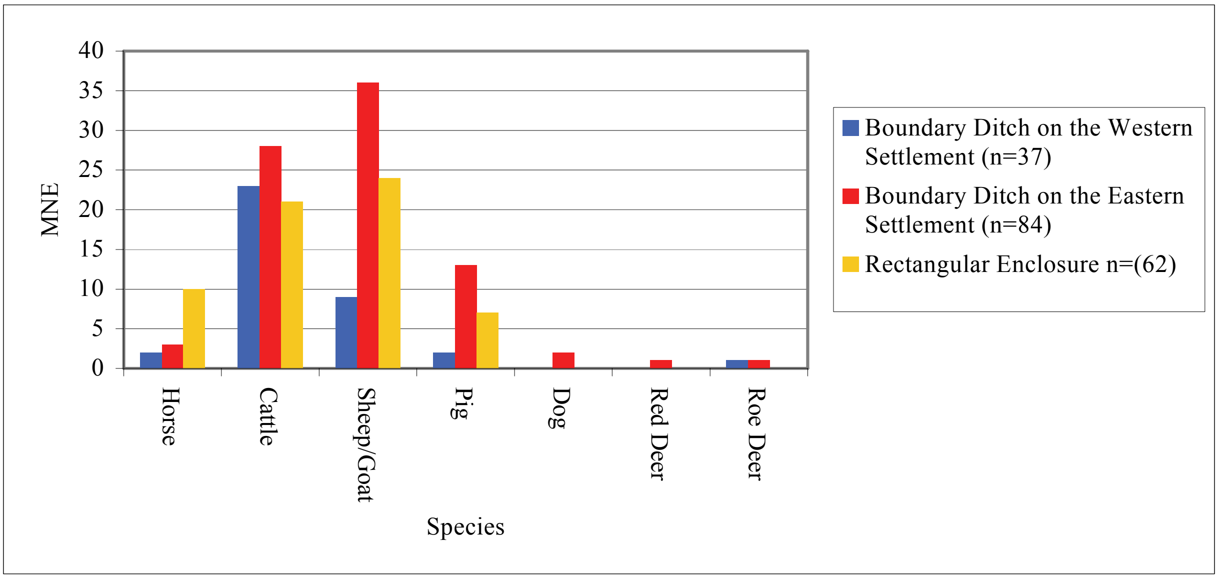


Figure 32.4: MNE recovered from the two boundary ditches and a large rectangular ditch on the LTCP site

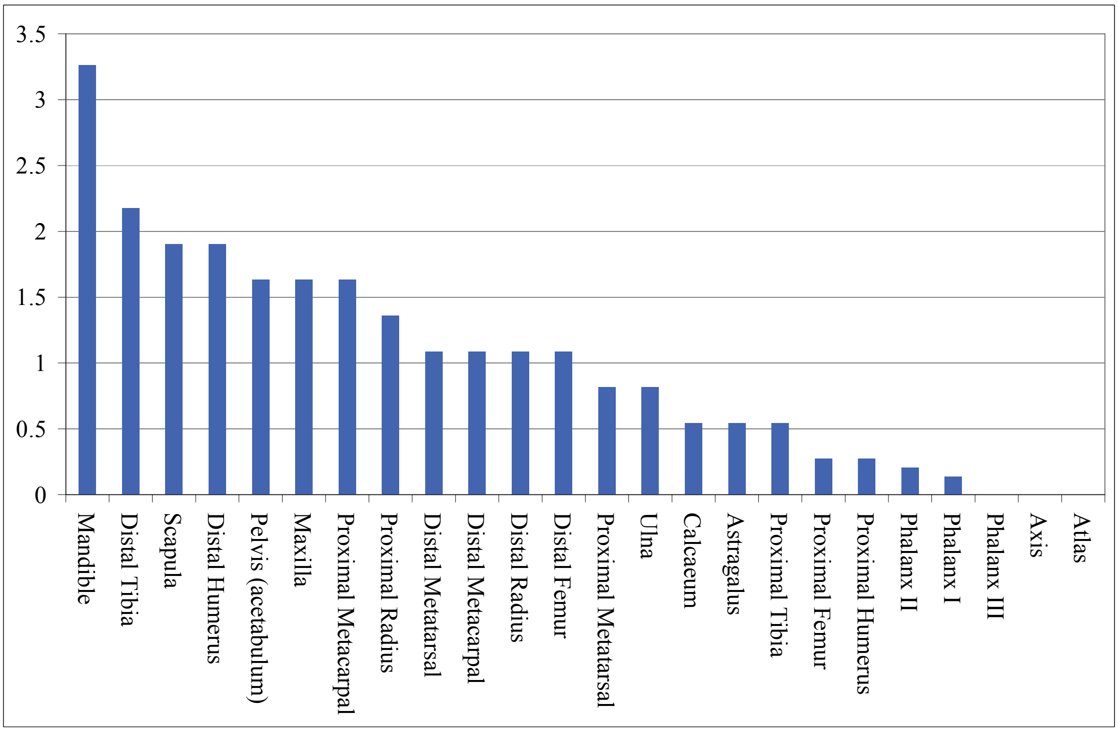


Figure 32.5: Anatomical part representation of cattle from the eastern settlement in rank order. Values to the left and including distal humerus lie above one standard deviation from the mean, and values to the right and including phalanx 1 lie below one standard deviation from the mean (n=86; SD=0.81)

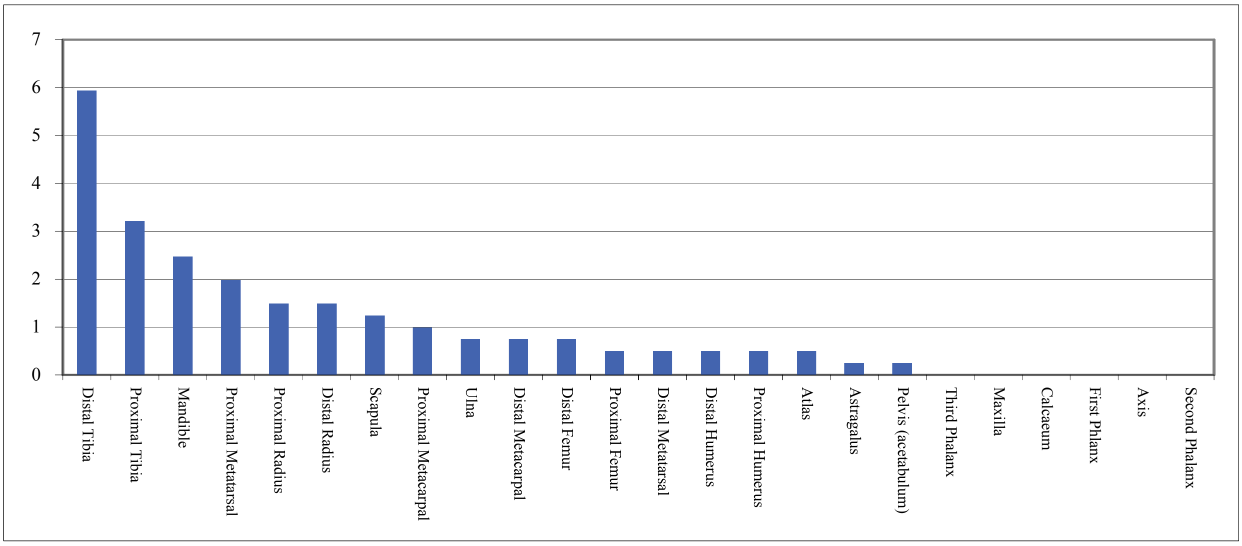


Figure 32.6: Anatomical part representation of sheep and sheep/goat from the eastern settlement in rank order. Distal tibia lies above one standard deviation from the mean (n=96; SD=1.34)

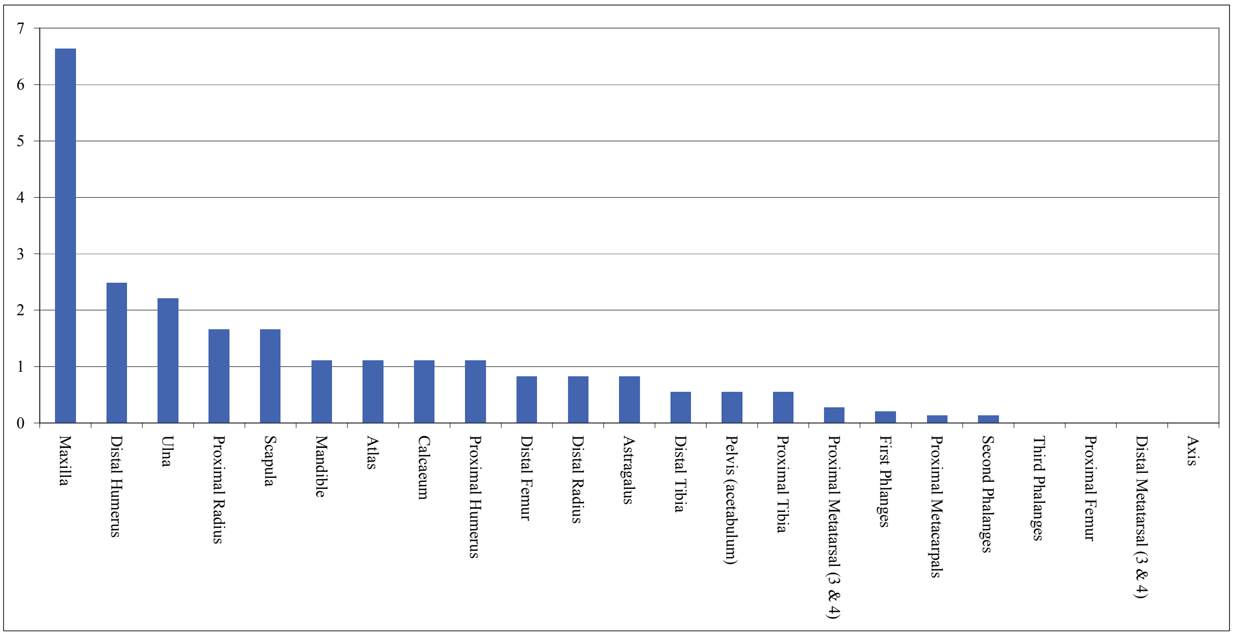


Figure 32.7: Anatomical part representation of pig including all sites in rank order. Values to the right and including distal humerus lie one SD above the mean. (n=90; SD=1.39)

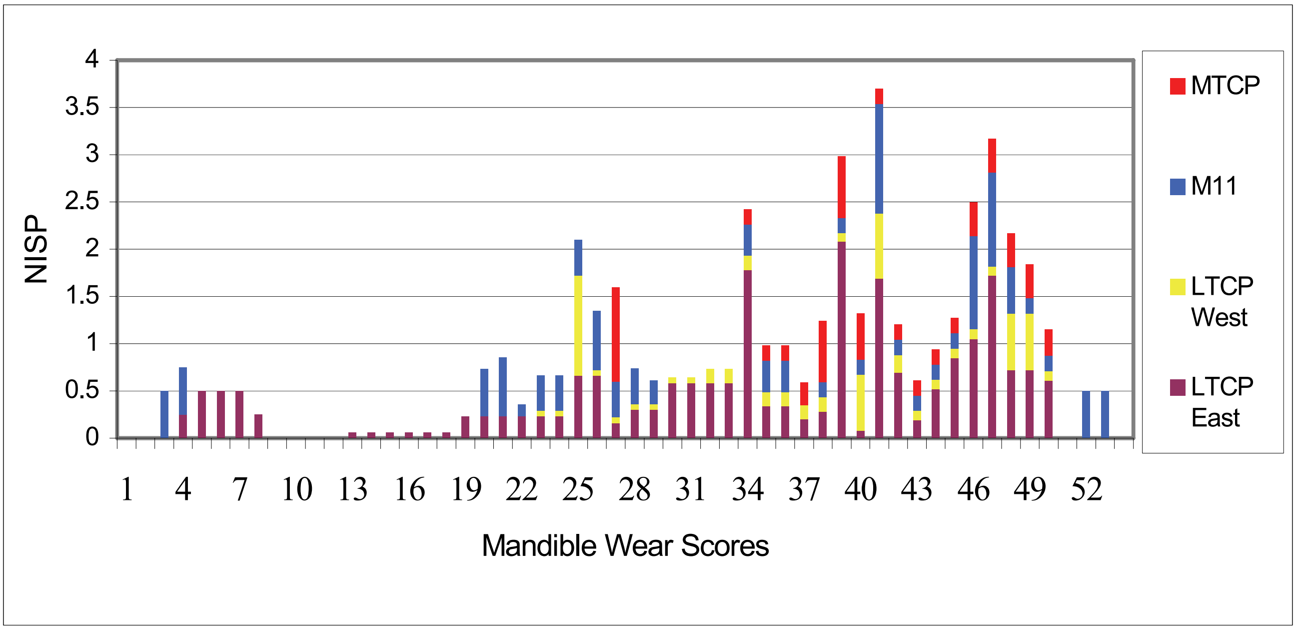


Figure 32.8: Cattle mandible wear scores from Iron Age and early Romano-British phases; n=46

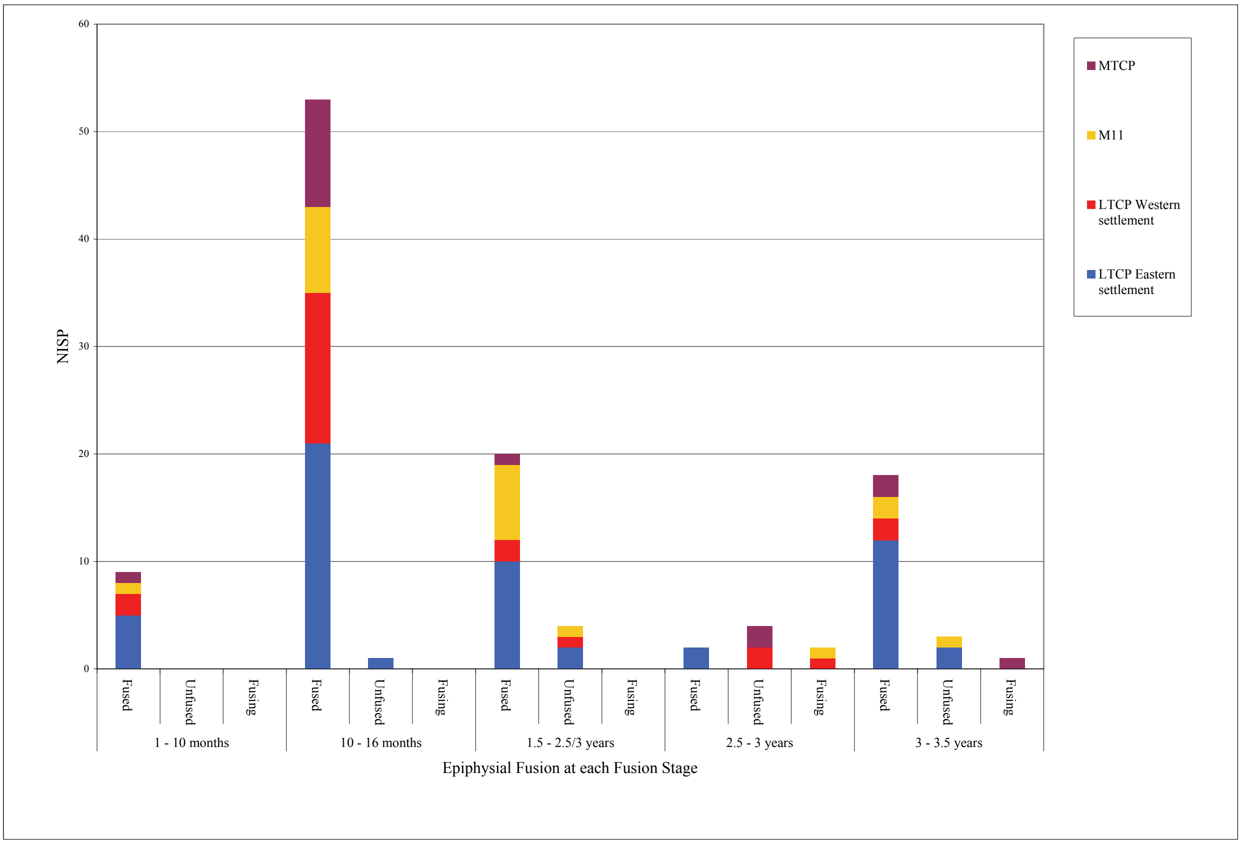


Figure 32.9: Epiphysial fusion of Iron Age to early Romano-British Cattle; n=117

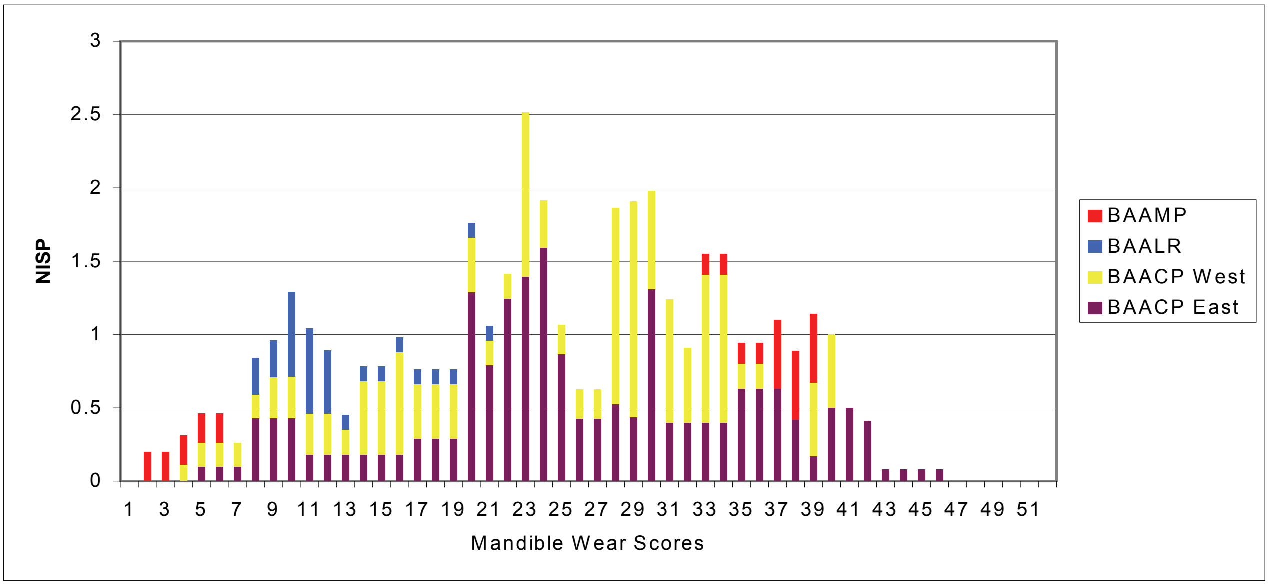


Figure 32.10: Sheep/Goat and sheep mandible wear scores from mid-Iron Age and early Romano-British phases; n=42

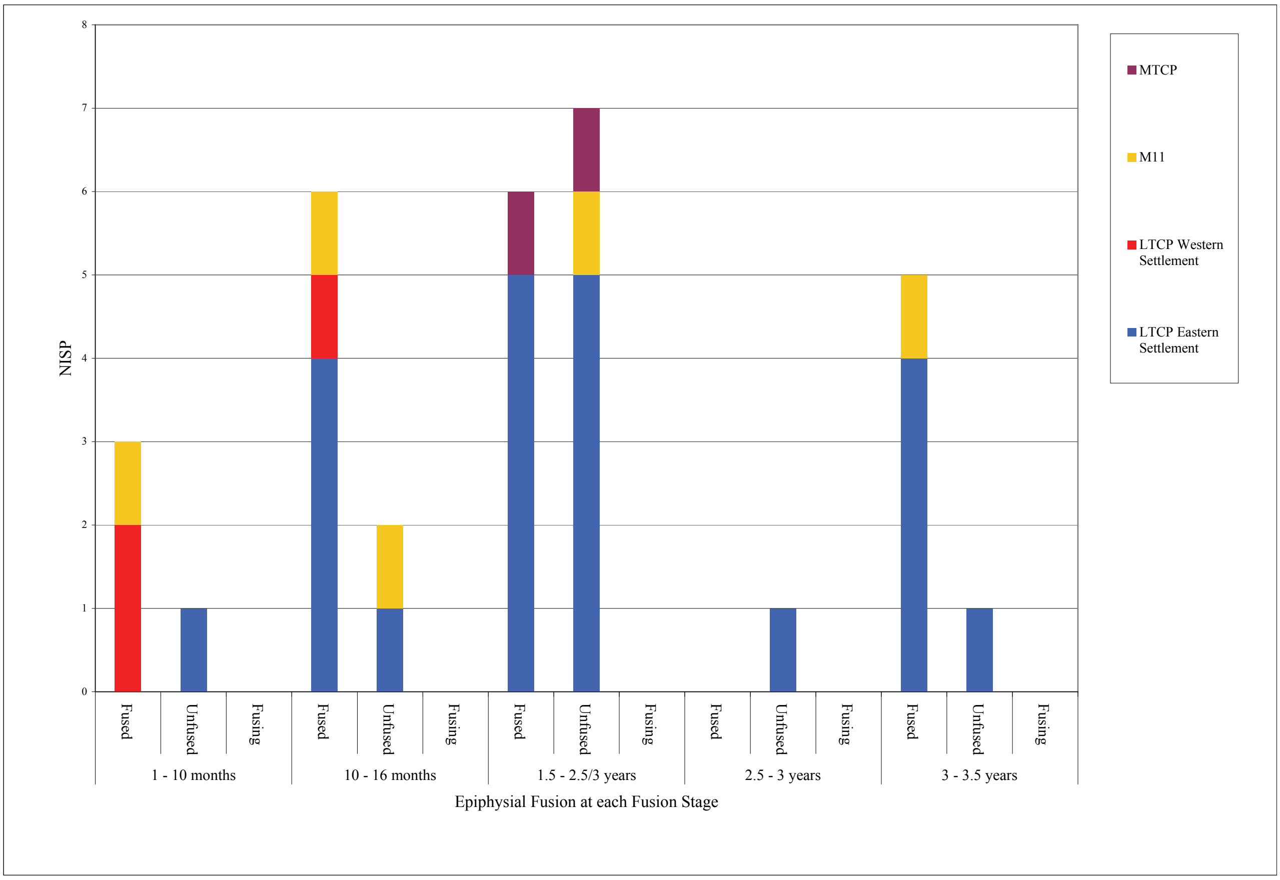


Figure 32.11: Epiphysial fusion of Iron Age to early Romano-British sheep/goat and sheep; n=32

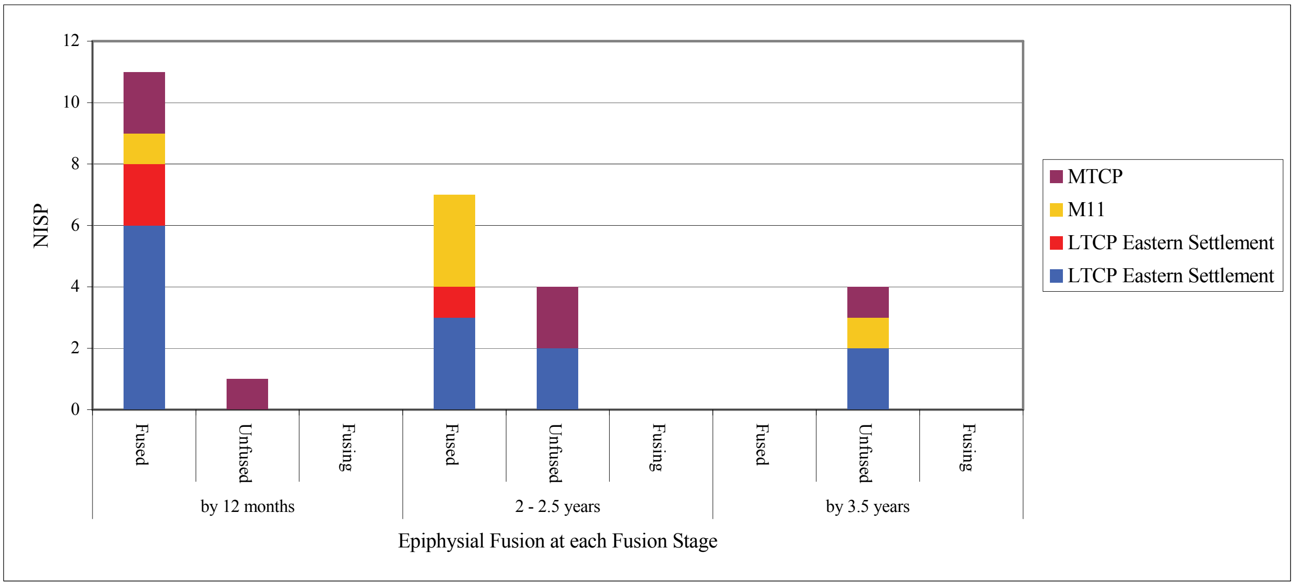


Figure 32.12: Epiphysial fusion of Iron Age to early Romano-British pig; n=27

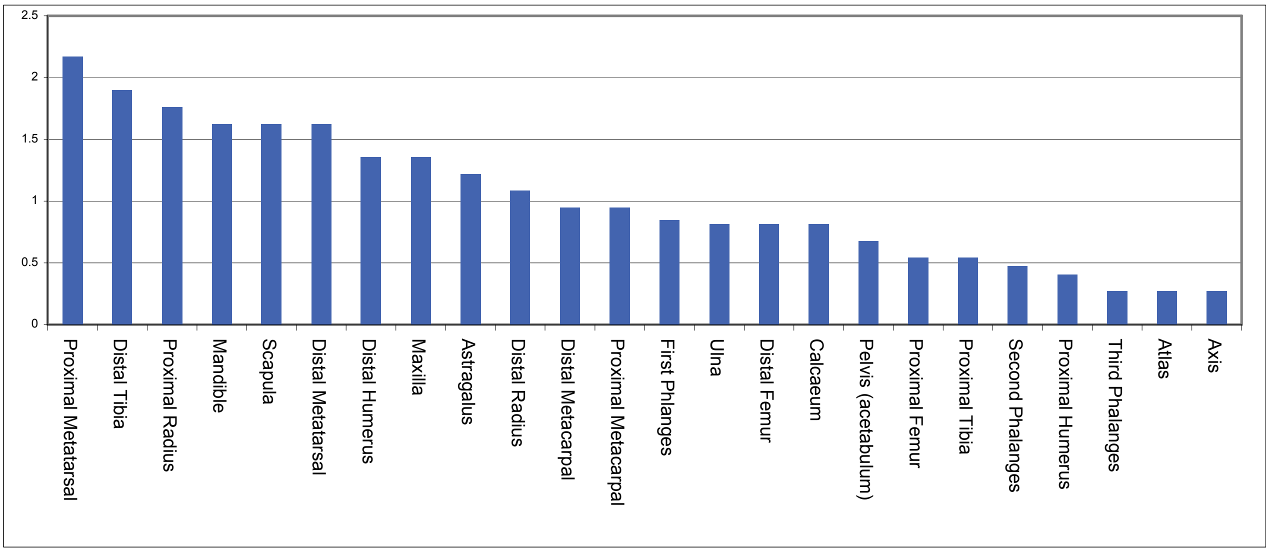


Figure 32.13: Animal part representation of cattle at the MTCP settlement in rank order. Values to the left of, and including, distal metatarsal lie above one standard deviation from the mean, and values to the right and including proximal humerus lie below one standard deviation from the mean. (SD=0.55)

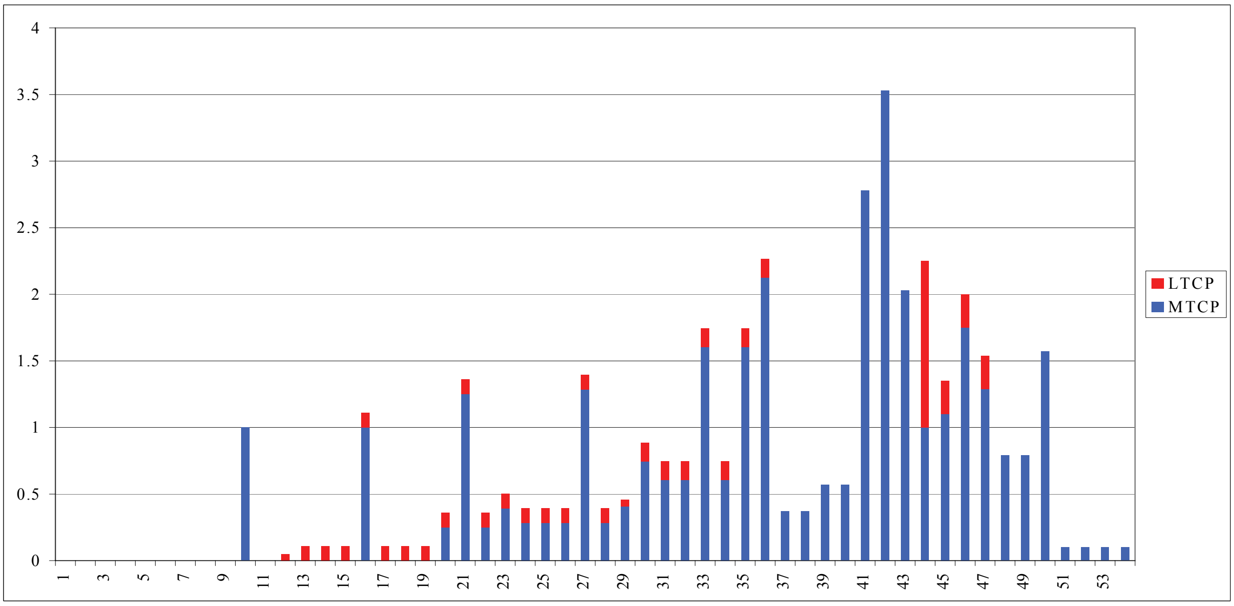


Figure 32.14: Cattle mandible wear scores from Romano-British deposits; n=37

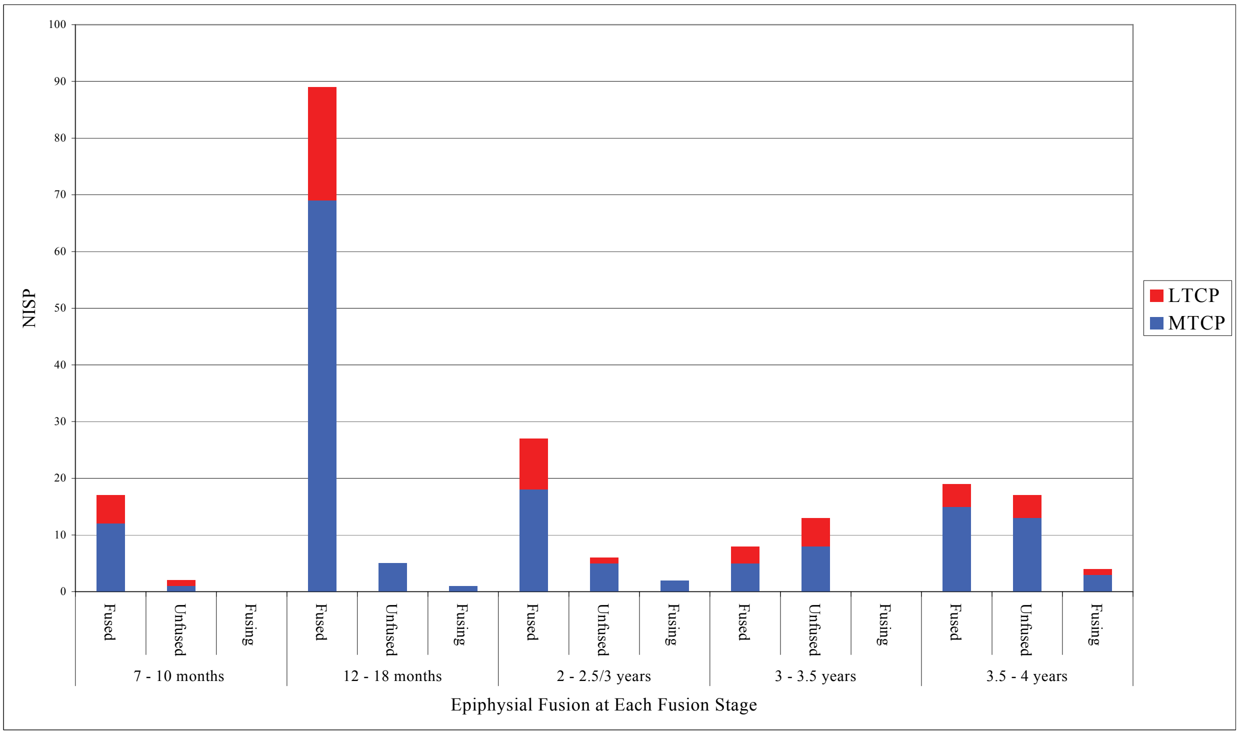


Figure 32.15: Epiphysial fusion states of Romano-British Cattle; n=210

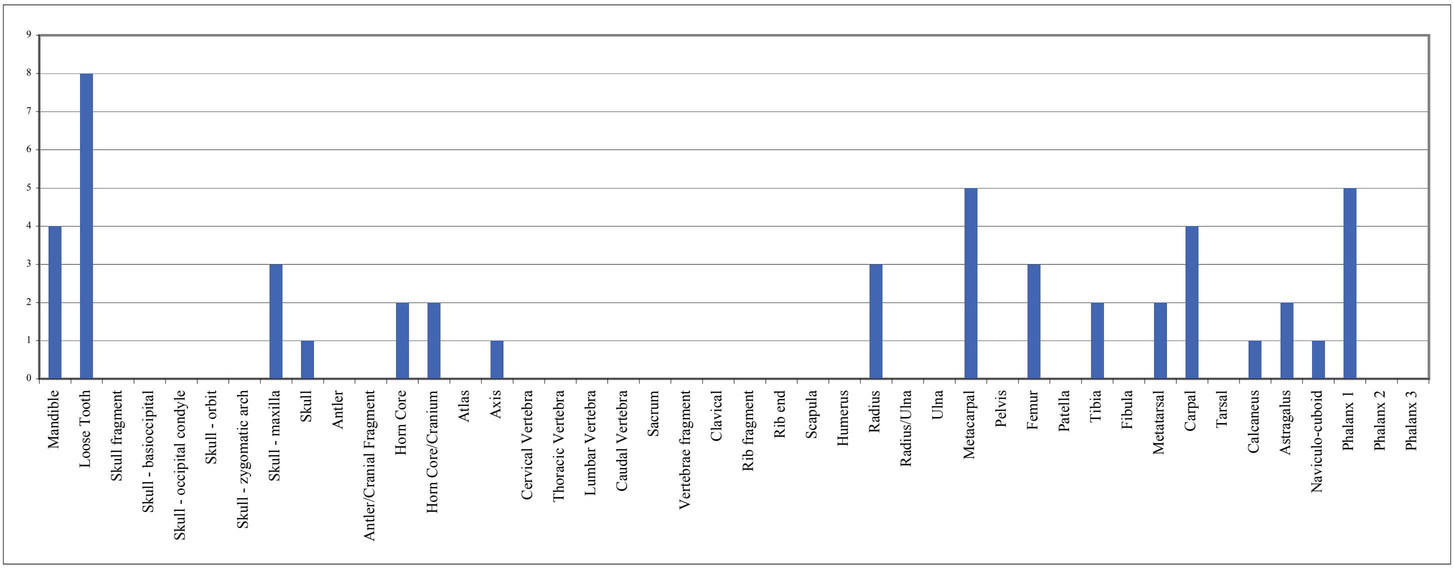


Figure 32.16: Cattle bones from medieval pit SG 310136, deposit 310139

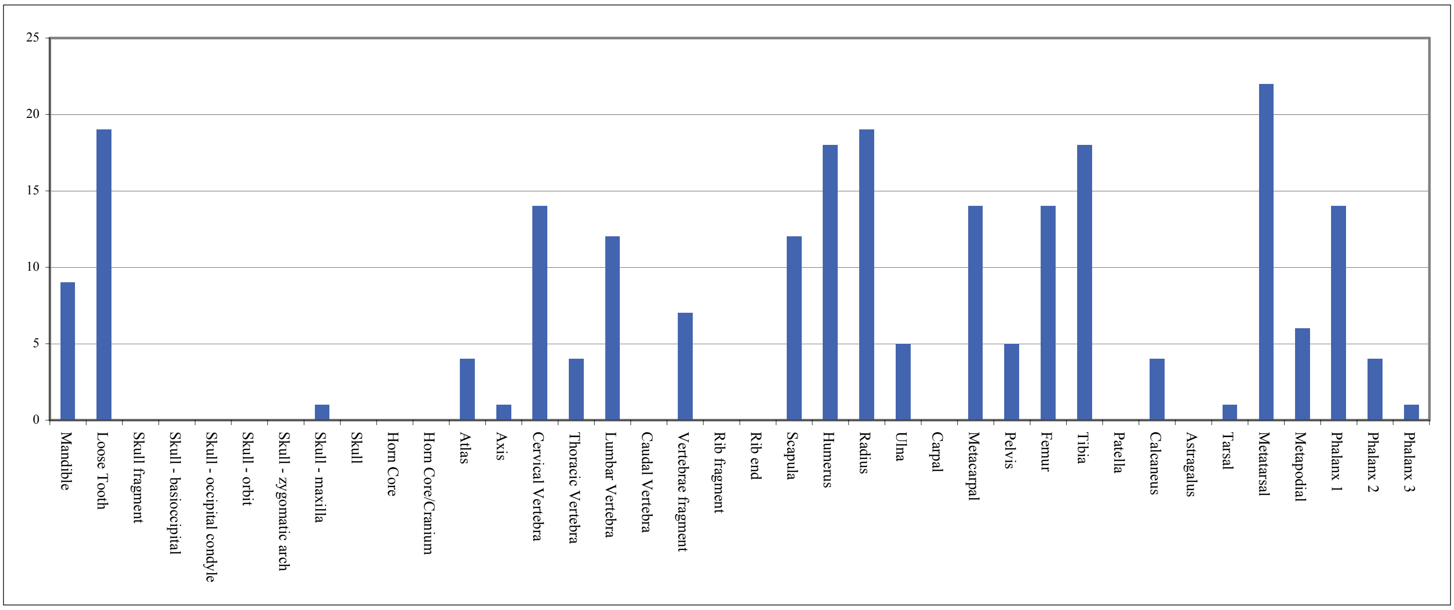


Figure 32.17: Anatomical part representation of cattle from the hunting lodge; n=187

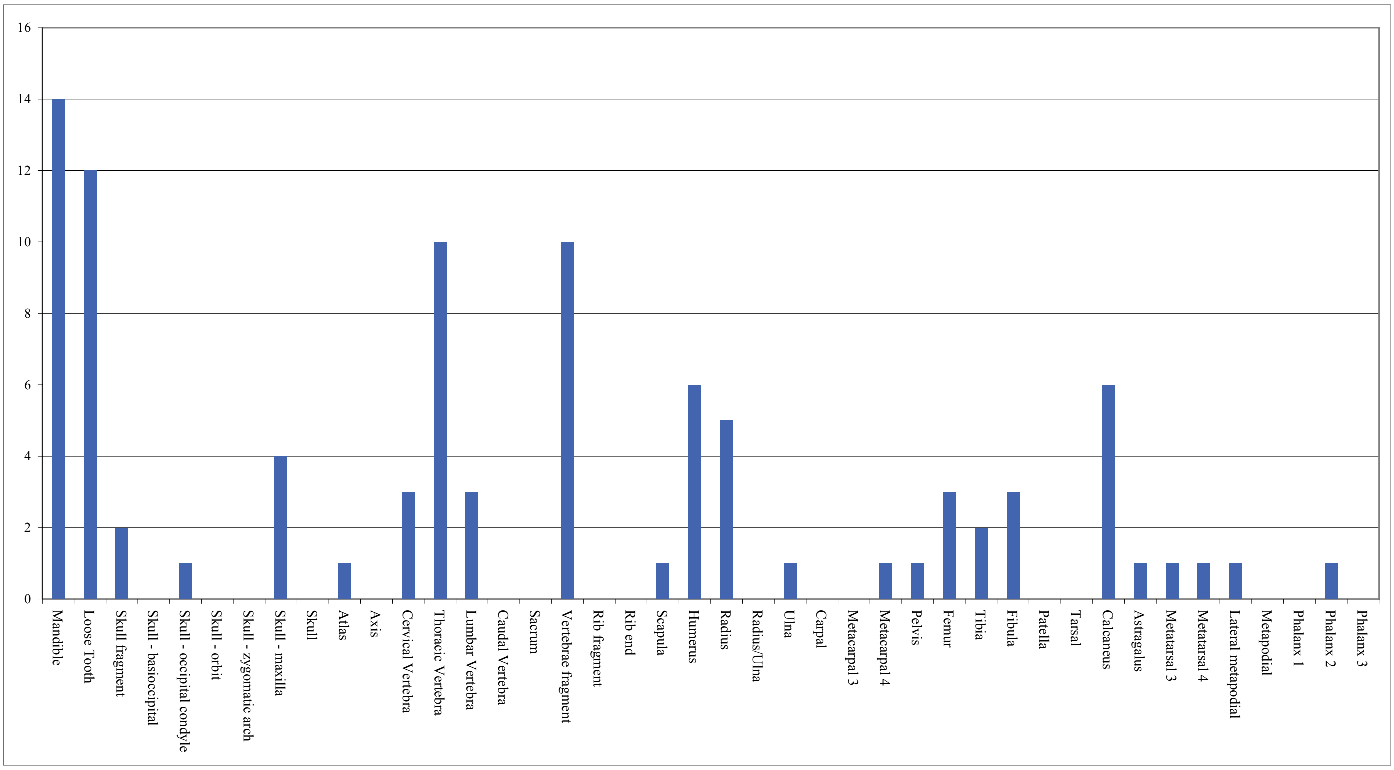


Figure 32.18: Anatomical part representation of sheep and sheep/goat bones at the hunting lodge; n=159 NISP (vertebra includes the unidentified large mammal categories which may belong to other species)

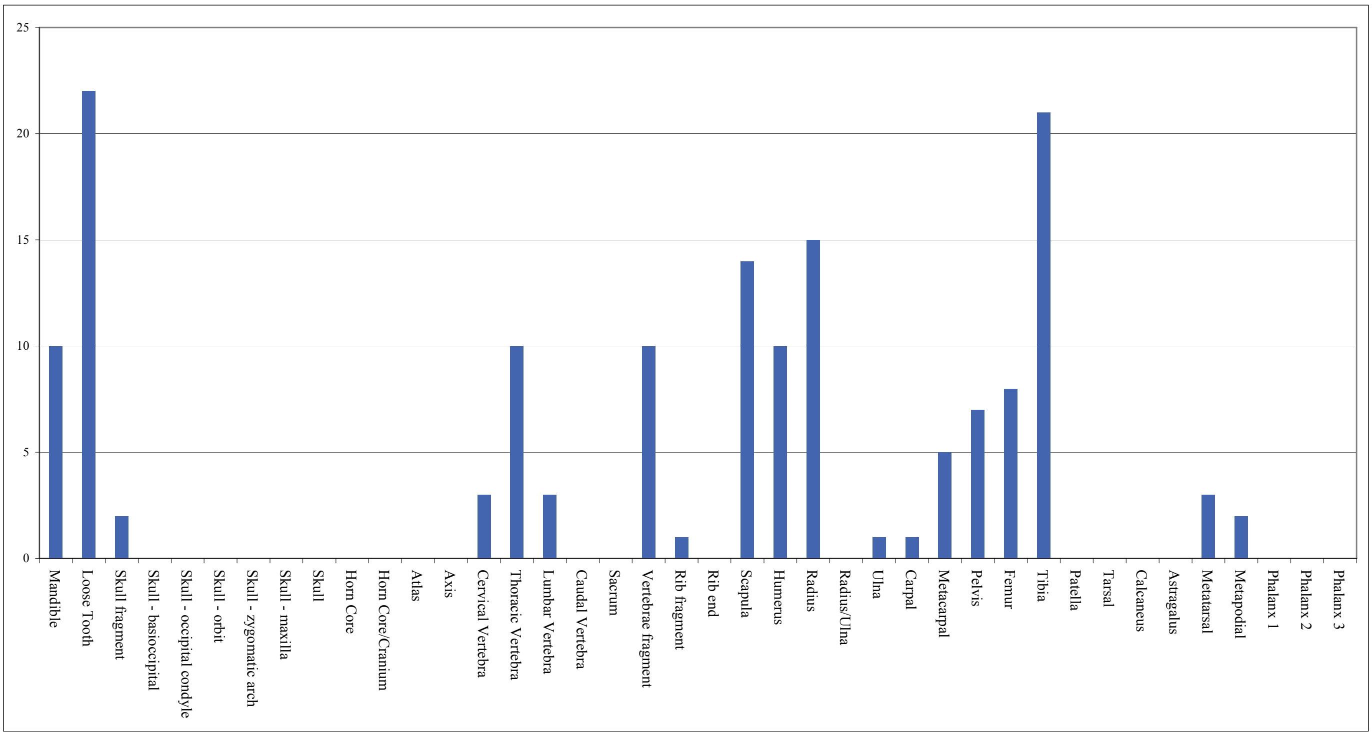


Figure 32.19: Anatomical part representation of pig bones at the hunting lodge; n=94 NISP (vertebra includes the unidentified large mammal categories which may belong to other species)

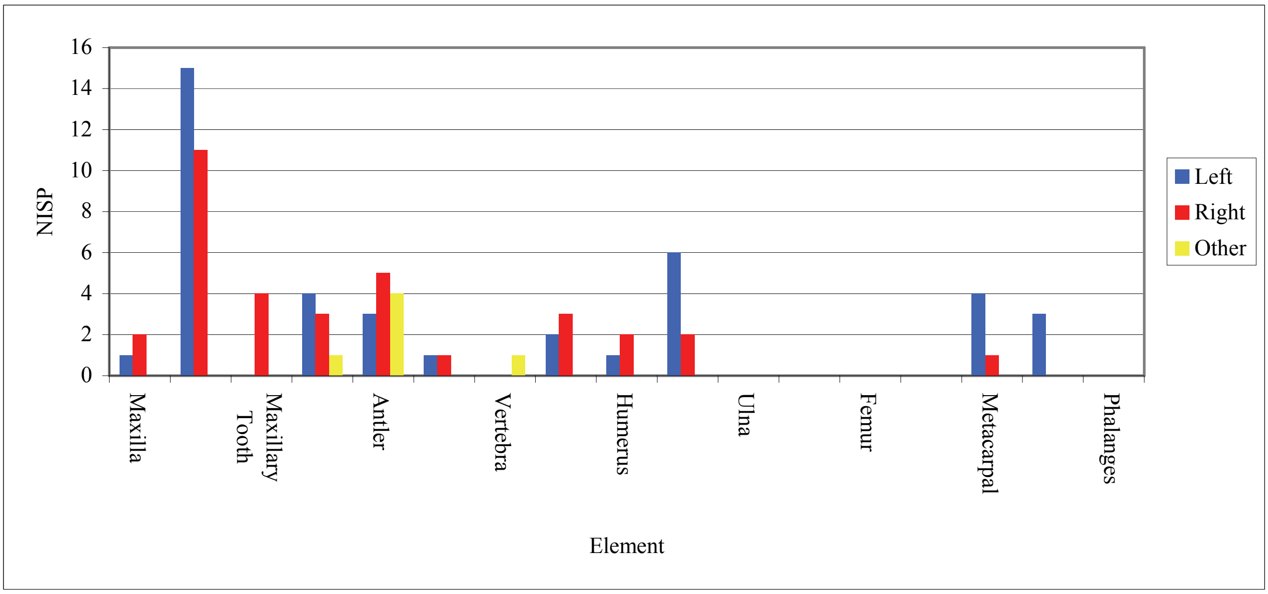


Figure 32.20: Anatomical part representation by side of fallow deer n=77

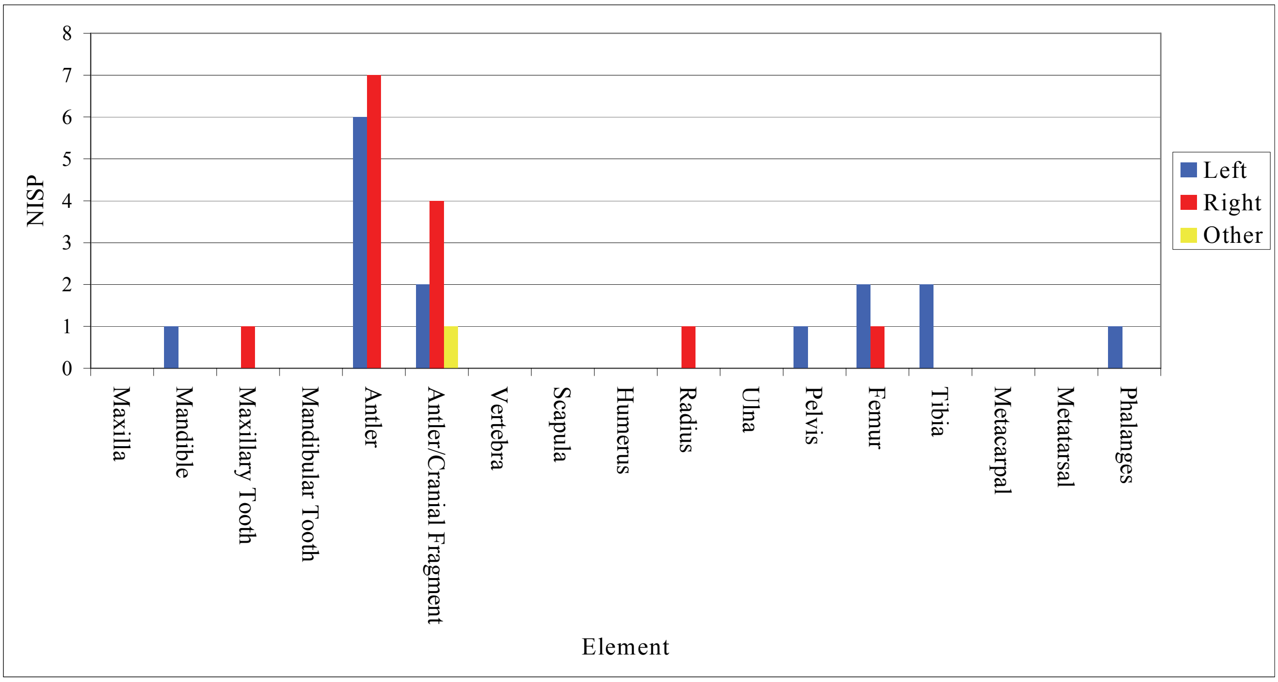


Figure 32.21: Anatomical part representation by side of red deer n=29

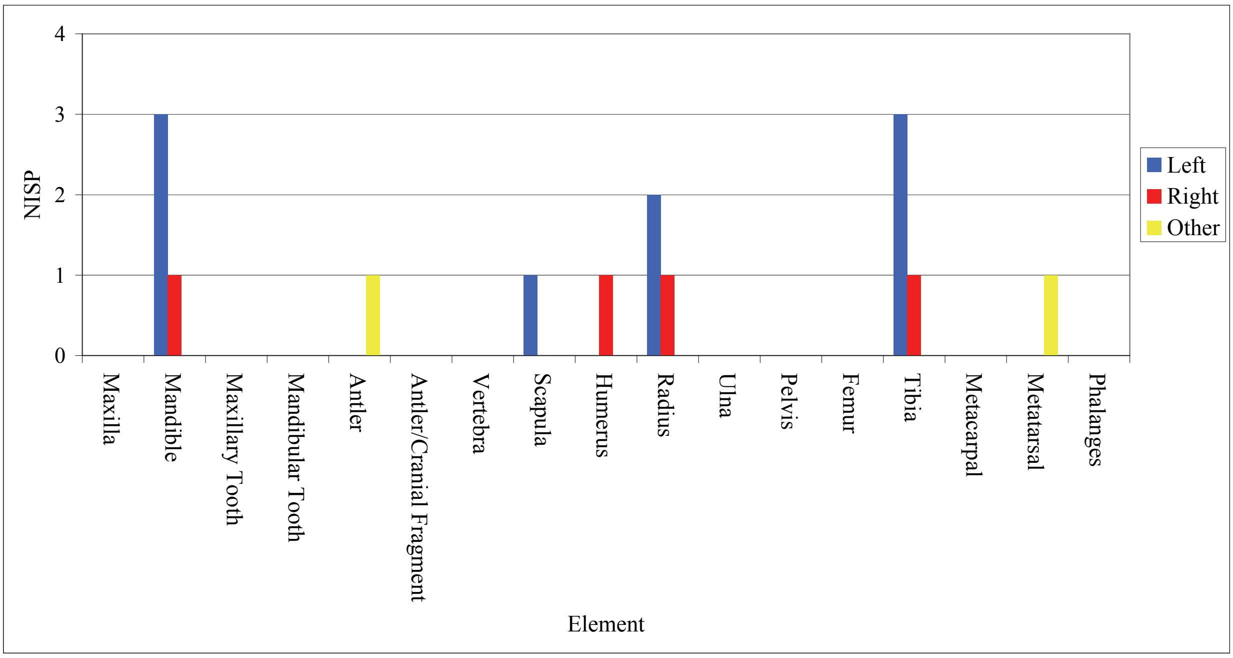


Figure 32.22: Anatomical part representation by side of roe deer n=15

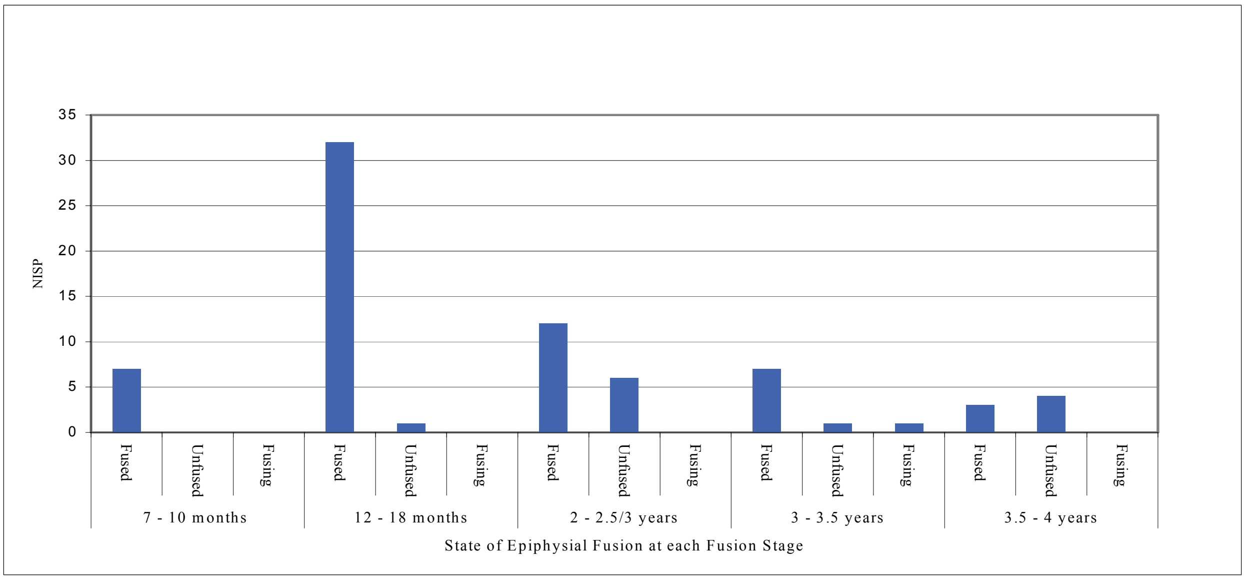


Figure 32.23: Epiphysisal fusion of cattle at the hunting lodge n=74

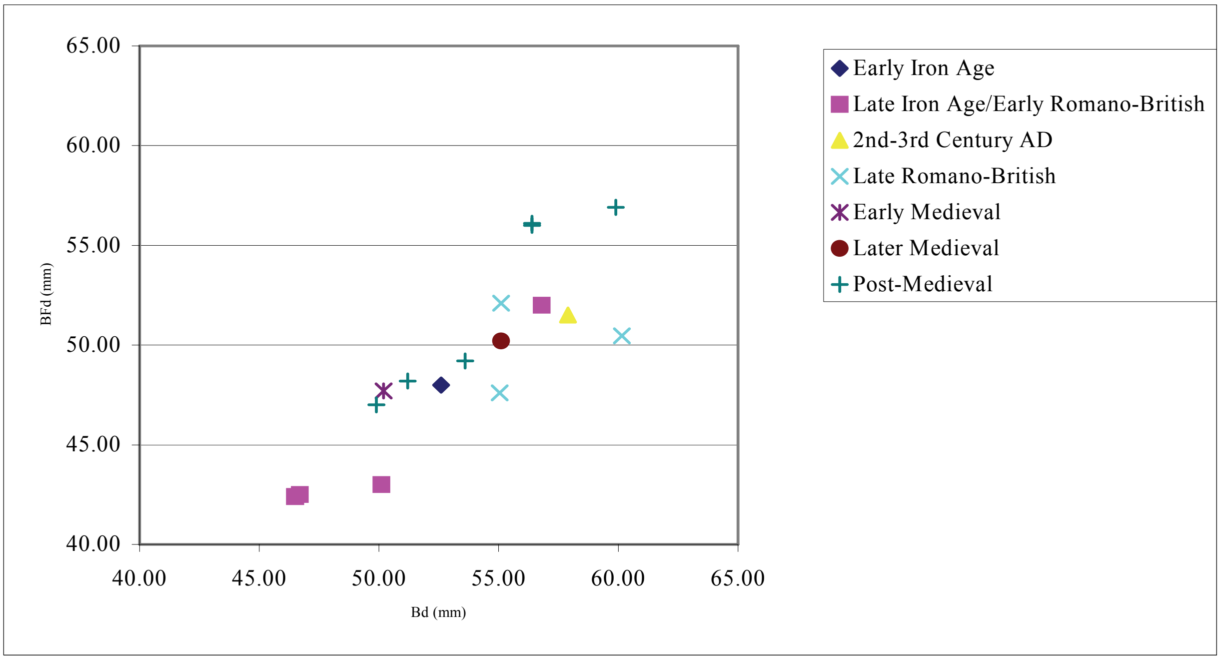


Figure 32.24: Cattle distal metatarsal, breadth of distal Bd against breadth of distal fusion (BFd) n=18

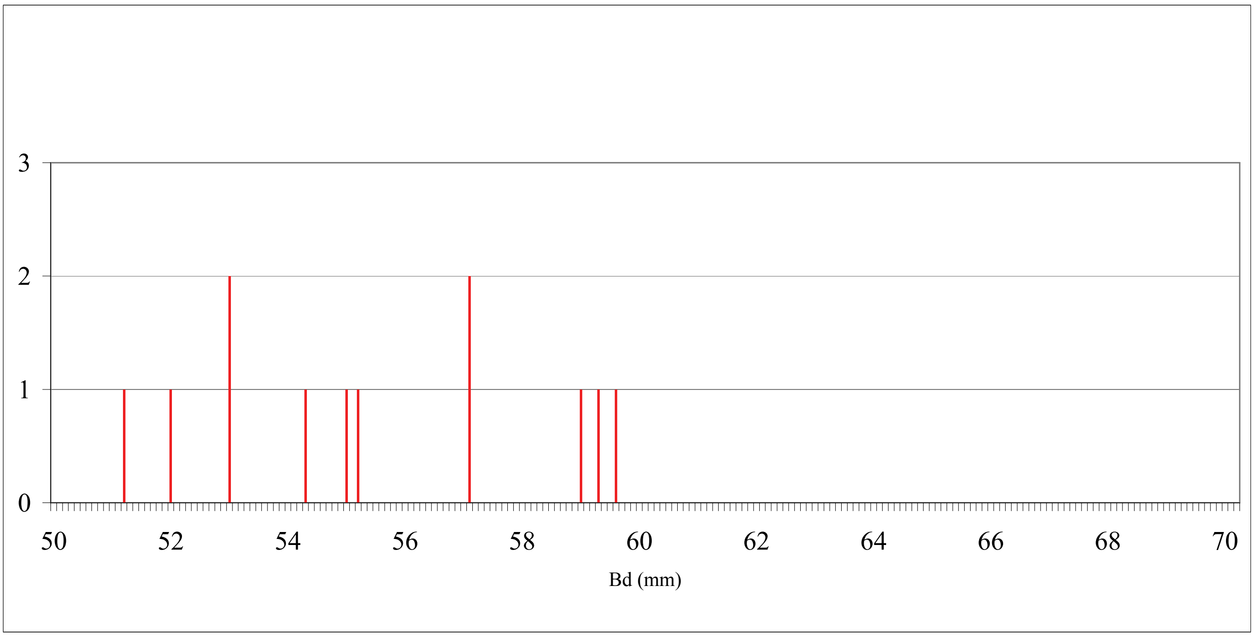


Figure 32.25: Breadth of distal tibia (Bd) of Bronze Age-Late Iron Age to early Romano-British cattle; n=11

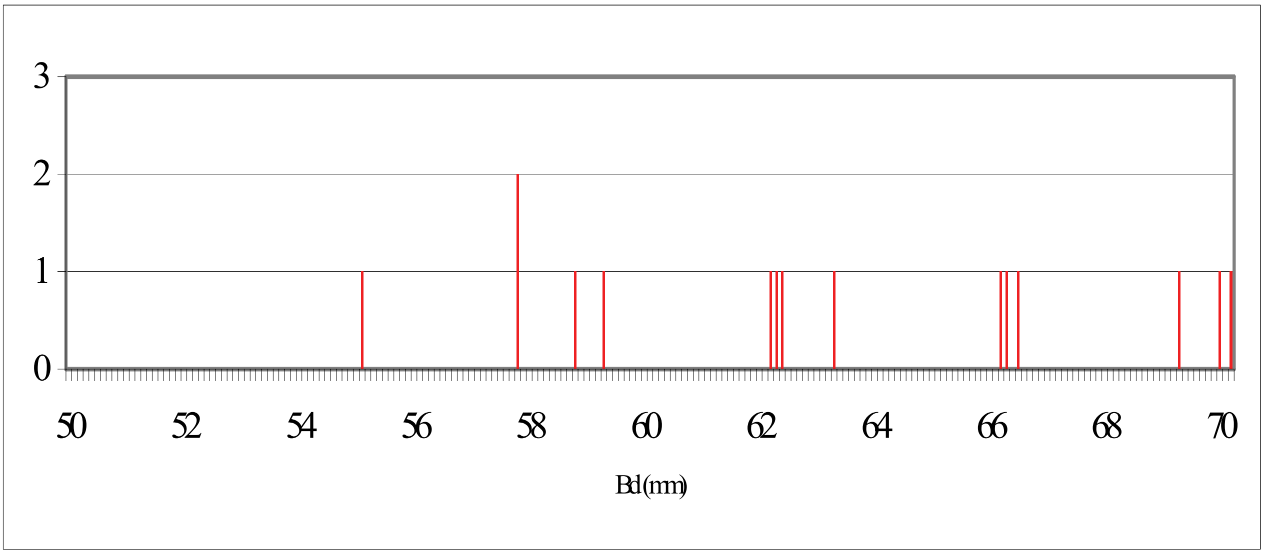


Figure 32.26: Breadth of distal tibia (Bd) of Late Romano-British cattle; n=13

CHAPTER 33

Marine shell

by Sarah F Wyles

33 Marine shell

Sarah F Wyles

The marine shell assemblage consisted of 1,339 shells, representing 798 minimum numbers of individuals. These were retrieved from 209 deposits over four phases and from four of the sites at Stansted: namely the LTCP, MTCP, LBR and the FLB sites (see Table 33.1).

All the shell has been recorded by species and by context, with the oyster shell being sub-divided into left and right valves.

The predominant species of the assemblage was oyster (*Ostrea edulis*), forming 98% of the minimum number of individuals. The remaining 2% of the assemblage was comprised of bivalves, cockles (*Cerastoderma edule*), whelks (*Buccinum undatum*) and mussels (*Mytilus edulis)*. There was no significant change in the occurrence of these other species by phase, but they were all recovered from either the LTCP or the MTCP sites.

Although the marine shell was retrieved from four sites, 64% of the assemblage came from the MTCP and 34% from the LTCP sites. The shell recovered from both the LBR and the FLB sites only represented 3% of the total assemblage (see Table 33.2).

The oyster shell from six phased deposits was analysed in more depth, three from the LTCP site and three from the MTCP site (see Table 33.3). The oysters were subdivided into measurable and unmeasurable left and right valves. Just over half the shells from the selected deposits were measurable, with a greater number of the unmeasurable shells being left valves (over 60%). The measurable valves were then measured and examined, both for traces of infestation and physical characteristics.

Early Romano-British

From the MTCP site, the shells from a pit (309169) and ditch (306045) of early Romano-British date were analysed in more depth. A higher percentage of shells were measurable from this period (62%), possibly due to the rapid disposal of the shell in the pit. The oysters were of a good average size again, with the majority of the shell having a maximum length of between 60 and 79 mm, and the only trace of mild infestation on 10% of them was also *Polydora ciliata*. Two-fifths of the shells were misshapen, possibly an indication of competition for space in a less well managed oyster bed. 80% of the misshapen shells were amongst those looked at in more detail. Notches and traces of opening were recorded on about 40% of the shells.

Late Romano-British

The oyster shell from a single ditch fill of late Romano-British date from the MTCP site was looked at in more detail (ditch 319319). Shells of small size were generally absent, indicating some form of selection before they were brought to site. Most of the shell had a maximum width of between 60 and 84 mm. 30% of the shells had traces of a small amount of infestation by the polychaetic worm *Polydora ciliata*. This was the only indication of infestation observed. Over half of the shells were flaky, which could be a result of a slow rate of deposition of the shells.

Later medieval

The assemblage from a single later medieval midden deposit (467008) in the LTCP site was looked at in more detail. The shells were smaller than in the earlier periods but still indicated some sort of selection process. Most of the shell had a maximum width of between 45 and 64 mm. 30% of these shells showed signs of low level infestation by *Polydora ciliata*, while there were notches on two fifths of them.

Post-medieval

The shells from two post-medieval deposits, an occupation layer (472004) and a ditch fill (ditch 466020), in the LTCP site were studied in greater depth. The shells were again smaller than those of the Romano-British periods, with generally maximum lengths of between 40 and 64 mm. Traces of mild infestation by *Polydora ciliata* were observed on 16% of the shells. These shells were not in as good a condition as some of those from earlier phases, with around half of them being worn and a fifth of them flaky. This could be as a result of depositional processes. Notches were recorded on a fifth of them.

Conclusions

In general the oyster shells represent an augmentation and variety of the basic diet rather than a significant part of the diet. This is true for all phases and all sites where shell was recovered.

As there were no significant differences between the disposal of the 582 right oyster valves and the 600 left valves, no indications of areas of preparation or consumption can be detected in any of the sites. The proportion of unmeasurable to measurable shells is an indication of the degree of post-depositional damage and wear. As just under half of the shells from the selected deposits were unmeasurable and also, of the shells studied in more detail 37% were worn and 26% were flaky, it is probable that a significant amount of the shell was not disposed of rapidly.

There were few changes between the examined shells over time. There is an indication that the oyster beds, although still being managed, were relatively more cramped during the late Romano-British period. Also smaller shells (generally with maximum widths of less than 65mm) were exploited during the medieval and post-medieval periods. This could be a result of a slightly less rigorous selection procedure.

The oyster shells examined in more detail were mainly healthy with only low level traces of infestation on the shells by *Polydora ciliata*. (This polychaetic worm is widespread and is most prevalent on hard, sandy or clay grounds particularly in warm shallow water). The shells were slightly elongated, indicative of softer substrates.

It is likely that the shells came from an East coast source and that similar sources were exploited throughout the history of the sites.

Table 33.1: Marine shell by phase

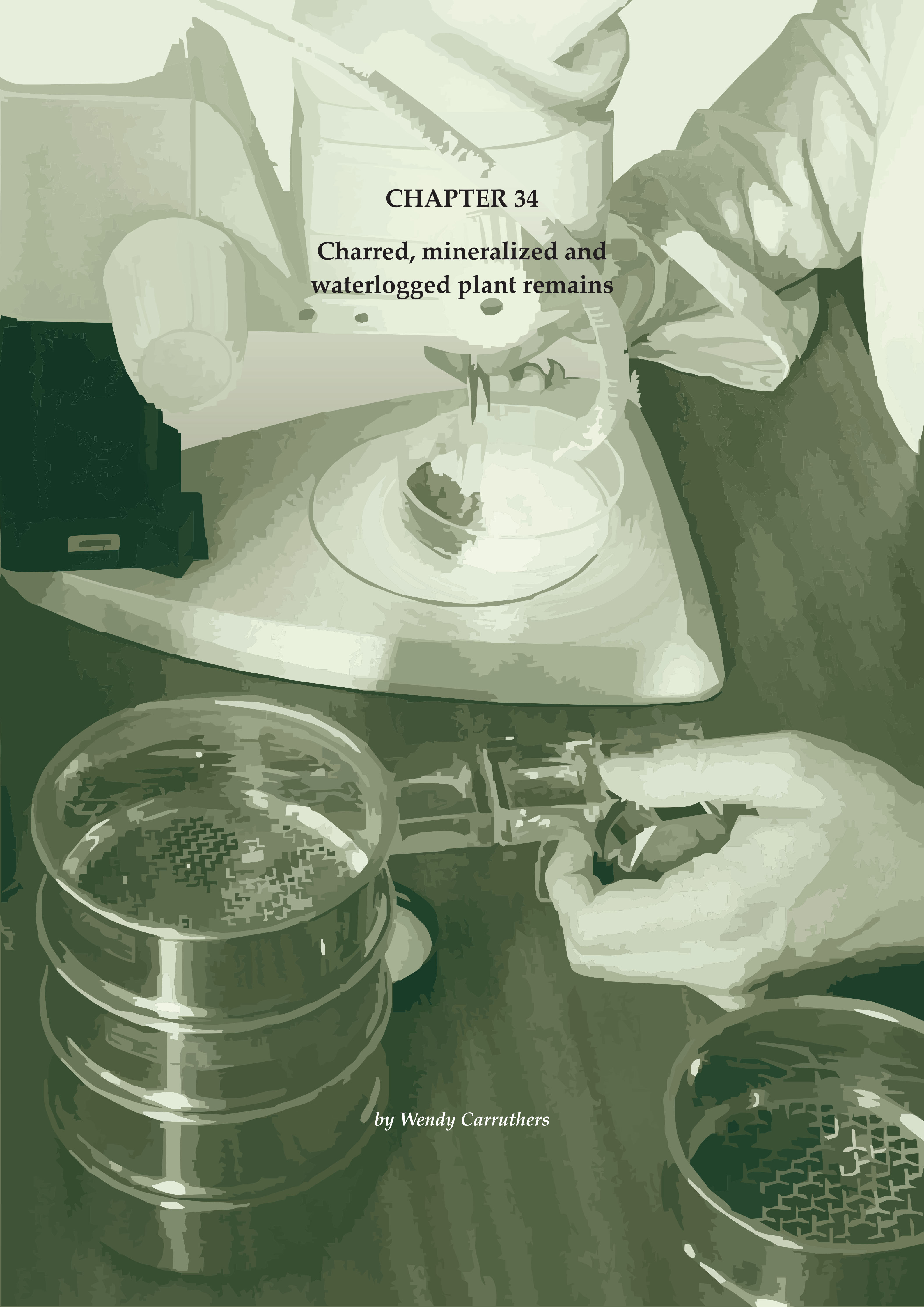
No of Sites	**Material Date**	**No of Deposits**	**Oyster MNI**	**Bivalve MNI**	**Cockle MNI**	**Whelk MNI**	**Mussel MNI**	**Total MNI**
3	Early Romano-British	17	40	1	1	0	0	**42**
2	Late Romano-British	54	193	0	1	1	1	**196**
3	Med	11	36	0	0	0	0	**36**
1	Post-Med	37	194	1	1	1	2	**199**
4	Unphased	90	322	3	0	0	0	**325**
TOTAL		**209**	**785**	**5**	**3**	**2**	**3**	**798**

Table 33.2: Marine shell by site

Site	**Material Date**	**No of Deposits**	**Oyster MNI**	**Bivalve MNI**	**Cockle MNI**	**Whelk MNI**	**Mussel MNI**	**Total MNI**
LBR	Early Romano-British	2	3	0	0	0	0	**3**
LBR	Unphased	1	1	0	0	0	0	**1**
Sub total		*3*	*4*	*0*	*0*	*0*	*0*	***4***
FLB	Med	4	7	0	0	0	0	**7**
FLB	Unphased	4	11	0	0	0	0	**11**
Sub total		*8*	*18*	*0*	*0*	*0*	*0*	***18***
LTCP Phase II	Early Romano-British	3	2	0	1	0	0	**3**
LTCP Phase II	Late Romano-British	1	1	0	0	0	0	**1**
LTCP Area B	Med	2	24	0	0	0	0	**24**
LTCP Area B	Post-Med	37	194	1	1	1	2	**199**
LTCP Area B	Unphased	10	40	0	0	0	0	**40**
Sub total		*53*	*261*	*1*	*2*	*1*	*2*	***267***
MTCP	Early Romano-British	12	35	1	0	0	0	**36**
MTCP	Late Romano-British	53	192	0	1	1	1	**195**
MTCP	Med	5	5	0	0	0	0	**5**
MTCP	Unphased	75	270	3	0	0	0	**273**
Sub total		*145*	*502*	*4*	*1*	*1*	*1*	***509***
TOTAL		**209**	**785**	**5**	**3**	**2**	**3**	**798**

Table 33.3: Deposits analysed in more detail

Site	Period	Deposit	Feature	UMLV	MLV	UMRV	MRV	MNI	Max ave width	Max ave length	P. Ciliata	Thin	Thick	Heavy	Chambered	Chalky dep.	Worn	Flaky	Stain	Irreg shape	Notches
MTCP	early Romano-British	349053	Ditch 306045	8	9	8	3	17	63.7	62.5	1	7	0	0	0	1	4	4	1	3	8
MTCP	early Romano-British	309174	Pit 309169	7	13	2	16	20	69.7	61.3	3	7	0	0	2	6	7	0	4	5	10
MTCP	late Romano-British	319333	Ditch 319319	32	21	10	16	53	74.8	68.6	11	3	1	2	0	19	13	20	3	1	8
LTCP	MED	467008	Midden deposit	7	8	11	12	23	58.0	53.6	6	5	0	0	0	5	4	3	3	0	8
LTCP	PM	472004	Occupation layer	23	13	7	16	36	56.2	48.9	4	13	0	0	0	4	17	7	0	1	4
LTCP	PM	472007	Ditch 466020	5	11	12	14	26	60.9	53.5	5	8	1	1	0	4	12	5	2	1	6
TOTAL				**82**	**75**	**50**	**77**	**175**	**63.9**	**58.1**	**30**	**43**	**2**	**3**	**2**	**39**	**57**	**39**	**13**	**11**	**44**



CHAPTER 34

Charred, mineralized and waterlogged plant remains

by Wendy Carruthers

34 Charred, mineralized and waterlogged plant remains

Wendy Carruthers

Excavations were carried out at Stansted Airport by Framework Archaeology during 2000 to 2001 in advance of the expansion of car parking facilities. An intensive program of soil sampling for the recovery of environmental remains was undertaken under the direction of Dana Challinor (OA Environmental Coordinator). Deposits dating from the Neolithic to post-medieval periods were sampled, including hearths, pits, ditches, postholes and occupation layers. Sample sizes varied, but were generally 1 litre for waterlogged deposits and around 40 litres for charred plant remains (see the bottom of Tables 34.1-6 for sample sizes).

The soil samples were processed using standard methods of wet-sieving and floatation by OA staff. During 2002 to 2004 charred and waterlogged flots and some residues were assessed by Ruth Pelling, Gaylynne Carter and the author. A total of 516 samples were assessed out of 797 samples taken from the five sites at Stansted. This report discusses the full analysis of 38 charred samples, 2 mineralised samples and 6 waterlogged samples highlighted as containing well-preserved and informative plant assemblages in the assessment reports. The samples originated from Neolithic to post-medieval contexts from the MTCP (BAAMP00), M11 (BAALR00), LTCP (BAACP00), LBR (LBR) and LTCP (BAACP01) sites. Most of the productive samples were dated to the Late Iron Age/early Romano-British and mid to late Romano-British periods.

Twenty-two additional charred flots were assessed from Stansted Southgate (BAA SG 03) during 2003, from which eight were selected for further analysis. These dated from the Early Neolithic to Late Saxon periods. The results from the Southgate analysis are discussed in a separate report (see below), but used for comparative purposes in this report.

Results

Tables 34.1 to 34.6 present the results of the analysis. Nomenclature and most of the habitat information was taken from Stace (1997). Other texts consulted for details of habitat and plant ecology include Haslam *et al.* (1976), Hill *et al.* (1999) and Ellenberg (1988).

Quantification – Many of the mid to late Romano-British samples contained concentrated spelt processing waste, comprising vast numbers of charred plant remains. It is often impossible to make meaningful counts of the spelt grains and spelt chaff in these types of deposits, so an indication of their abundance was given instead (>500). Since the character of these deposits is clear without having to examine proportions of spelt grain to chaff etc., it was thought to be more useful to examine the minor components in detail, such as non-spelt cereal remains and weed seeds, as this information could be used to compare samples from different sites. Therefore, in most cases (except sample 6117 = 50% analysed) full flots rather than sub-samples were scanned for ‘non-spelt’ charred plant remains.

An estimate of abundance was used for a couple of taxa in the waterlogged samples whose seeds were present in numbers too large to be counted (aquatic buttercups (*Ranunculus* subg. *Batrachium*) and stinging nettle (*Urtica dioica*). However, sub-sampling was undertaken for most of the waterlogged flots, since it was possible to obtain a good understanding of the character of these diverse assemblages by examining small fractions of the flots. Waterlogged flots are very time-consuming to sort, so sub-sampling is usually the most cost-effective way to retrieve the maximum amount of information from waterlogged deposits.

The quantification of mineralised faecal deposits presents yet another problem, as mineralised remains such as bran fragments and legume (pea and bean) testa (seed coat) fragments can be too numerous to count. They are also often concealed within faecal concretions. Since it would be difficult to convert these remains back into 'slices of bread' or whole peas, and preservation conditions can greatly influence the quantities recovered, it is often only worthwhile making general qualitative and comparative comments about these types of assemblages.

Discussion

Considering the large number of samples taken from the Stansted sites, relatively few produced useful plant assemblages. The c. 8% of charred samples that were productive was dominated by samples from Late Iron Age/early Romano-British and mid to late Romano-British. Fortunately, the excavation of waterlogged Bronze Age features (barrow ditch 324080 and waterhole 430084) and a mineralised early medieval cess pit (310136) increased the range of information obtained for these periods.

The Stansted plant remains have been discussed period by period below, in order to try to track changes in the landscape, agricultural practices and diet through time. Because the evidence from this study is sparse for some periods but a relatively large number of other excavations have taken place nearby (in particular, Murphy and Wiltshire 2004), information from published reports has been brought in to assist in the interpretation. Evidence from other environmental specialist reports has also been included (see reports by Gale, CD Section 35; Huckerby *et al*. CD Section 31; Macphail and Crowther, CD Section 30; Robinson, CD Section 36).

The Neolithic

Very little environmental evidence was recovered from the few features dated to this period, but the small scatterings of flintwork suggest that the environment was likely to have been largely wooded with a few small clearings (Nick Cook and Fraser Brown, pers. comm.).

A single sample from the lower fill of pit 353011 (sample <2670>, context 353012) produced poorly preserved, abraded charred plant remains comprising a bread-type wheat grain (*Triticum aestivum*-type), two unidentifiable cereals and a hundred and three small eroded fragments of hazelnut shell (*Corylus avellana*). This context, containing a typical

Neolithic flint assemblage, is said to be a placed deposit of possible ritual significance (Nick Cook, pers. comm.). The charred plant remains, however, appear to be too poorly preserved to have been deposited immediately after charring. Perhaps they had been exposed to the elements prior to burial.

Small quantities of cereal grains and frequent hazelnut shell fragments are typical of Neolithic sites in England (Mofftett *et al.* 1989). The general scarcity of cereals and cereal processing waste during this early stage in the development of agriculture, and frequency of evidence for gathered wild foods such as hazelnuts, apples and tubers suggests that arable cultivation was being carried out on a small scale in most cases. However, larger quantities of cereal remains were recovered from The Stumble in the Blackwater estuary (Murphy 1989), indicating that river valleys and coastal plains may have been favoured for arable cultivation. No charred plant evidence was recovered from Neolithic deposits from the A120 sites (Carruthers 2007), and some Early Neolithic charred plant remains from a treethrow at Stansted Southgate are suspect, as a Late Saxon date was recovered from flax seeds in this feature.

Although the evidence is scant, it is interesting to note that the one identifiable cereal grain was a bread-type wheat (*Triticum aestivum*-type) grain. Bread-type wheat has been recovered from several early prehistoric sites in small quantities, often alongside emmer wheat and barley. However, despite its apparent advantage of being free-threshing, ie being easily removed from the husk once ripe, it is not recovered in large quantities until the Roman period. There maybe some significance in its appearance in a ‘ritual’ deposit, as it has been found in similar Neolithic and Bronze Age contexts on other British sites (eg Le Pinacle, Jersey; Carruthers 2001; Amesbury, Carruthers forthcoming).

<u>Middle Bronze Age</u>

Two charred and four waterlogged samples were examined from this period as follows:

BAAMP00 -	<2241> context 322018, MBA pit 322014: charred
	<2684>, <2685> and <2687>, BA ring ditch 324078: waterlogged
BAALR00 -	<6140> context 423050, MBA pit 423049: charred (3.6 fpl)
	<6223>, context 431042, LBA waterhole 430084: waterlogged

The samples from the two MBA pits produced low concentrations. Sample <2241>, from a charcoal-rich upper fill of pit 322014, comprised mainly emmer (*Triticum dicoccum*) and spelt (*T. spelta*) chaff fragments (both species were identified), with a few poorly preserved grains and common disturbed/cultivated ground weed seeds (ratio of grain to chaff to weed seeds (G:Ch:W) = 3:9:1). This probably represents a small deposit of cereal processing waste - perhaps sweepings from a domestic hearth over which the final stages of processing (removal of grain from the husks) had taken place.

Sample <6140>, from a deliberate backfill in the base of pit 423049, was richer in cereal grains than chaff and weed seeds (G:Ch:W = 6:2:3). Because chaff is more readily destroyed by charring than grain (Boardman and Jones 1990) this could have originally been a deposit of whole unprocessed spikelets that had been burnt and placed in the base of the pit. Several poorly preserved 'slaggy-looking' cereal fragments were present in this sample suggesting that the temperature of combustion had been high, so differential preservation may well have occurred. Alternately, a mixture of processed grain and cereal processing waste may have been deposited. Once again, both emmer and spelt wheat were identified. Barley (*Hordeum* sp.) and possible oat (cf. *Avena* sp.) were present as single grains, although the state of preservation was poor. Several weed taxa were represented in this assemblage, most of which were tall and often twining/climbing weeds of cultivated and disturbed soils, eg black bindweed (*Fallopia convolvulus*), vetches/tares (*Vicia/Lathyrus* sp.) and cleavers (*Galium aparine*). This could be because unprocessed sheaves had been burnt, including the twining stems and fruits of weeds that were growing amongst the crop. The seeds of cleavers were particularly frequent (27 nutlets). This weed is said to be an indicator of autumn sowing (Reynolds 1981), so its frequency could relate to the introduction of spelt wheat into Britain around the MBA, which is hardier than emmer and better suited to autumn sowing.

These two samples were very similar to the small number of Bronze Age samples from the A120 excavations that produced low concentrations of cereal remains (Carruthers 2007). Evidence for the cultivation of emmer, spelt, and barley was recovered from both excavations, with small quantities of hazelnut shell indicating that gathered wild foods were still important. Because only low concentrations of remains were recovered from just a few samples, very little reliable information about crop husbandry can be extracted from the data. Weed assemblages were often fairly limited and unspecialised during this period, probably because cultivation was taking place at a low intensity on newly ploughed soils that had not had time to develop a specialized arable weed flora. A small difference between Stansted and the A120 was that a sedge nutlet and several leguminous weed seeds were recovered from Stansted but not the A120 sites. The single sedge nutlet is of minor significance, indicating the cultivation of a wet area of the boulder clay plateau. The presence of several small seeds from leguminous weeds in M11 sample, however, could suggest that cultivation had taken place for a longer period on this site or on a larger scale, since these weeds are more common on impoverished soils. Clearly, more evidence is needed to follow up this tentative suggestion.

The waterlogged samples from the BA ring ditch 324078 and LBA waterhole 430084 provided valuable evidence of the local environment, as well as conditions within the features themselves. Ring ditch 324078 encircled the remains of a round barrow, but there was no evidence of pyres within the barrow (see Chapter 4). The three samples were taken from a single section through the ditch representing the earliest stages of silting up (2687 below 2685 and 2684, respectively). Although all three samples produced a similar range of aquatic, marginal and terrestrial taxa, the lowest fill (context 316120) produce the lowest concentration of plant remains. This may have been because it was derived from the initial silting, before a diverse ditch flora had become established, or grazing could have prevented the local plants from setting seed. Macphail and Crowther (CD Section 30) note that there was a possible dung element in the ditch soil profile. The second fill, <2685> (context 316123) contained the highest concentration of plant remains, with aquatic and marginal taxa such as crowfoot (*Ranunculus* subg.

Batrachium), water plantain (*Alisma plantago-aquatica*) and duckweed (*Lemna* sp.) being particularly abundant. Water plantain is often found in nutrient-rich waters and it is notable that disturbed ground plants such as nettles (*Urtica dioica*) and docks (*Rumex* sp.) were also frequent in this sample. This level in the sedimentation of the ditch, therefore, appears to represent a period of disturbance around the ditch, but not so much as to prevent a diverse aquatic and marginal flora from becoming established in the ditch itself.

The examination of a sample from another section of the ring ditch for insects (Robinson, CD Section 36) showed that the ditch was set in an open, grazed grassland environment, with only 1% of the terrestrial Coleoptera being associated with wood. Dung beetles were fairly frequent, demonstrating that livestock were grazing the area. This may account for nutrient enrichment of the ditch and the establishment of areas of nettles and docks. However, Robinson noted that insects associated with arable and disturbed land were not frequent, so this may be a fairly localised vegetation type. He also suggested that human habitation did not occur nearby.

Open grassland plant taxa were not frequent in the plant assemblages, but this is not surprising if the sward was too heavily grazed for many of the plants to set seed. Thistle achenes (*Cirsium/Carduus* sp.) were present in small numbers in all three ditch samples, and this type of unpalatable weed can become abundant on well-grazed pastures. The presence of open ground plants such as ribwort plantain (*Plantago lanceolata*) was confirmed by the insect record, but seeds were not recovered. Plants whose presence was confirmed by both plant remains and insect feeders, however, included duckweed, sedges, buttercups and stinging nettle. These taxa are less palatable to grazing livestock than grasses, so will only be eaten where very little grass is available.

Although the evidence for wood was low amongst the insect and pollen remains, a few hedgerow, scrub or woodland plant remains were present in the ditch at all three levels. The earliest deposit produced an alder seed (*Alnus glutinosa*) and possible sloe stone fragment (*Prunus* sp.). Unless carried by humans or animals, these remains are unlikely to travel far from their parent trees. There may have been small areas of alder woodland or hedgerows nearby, or the seeds may have been brought in on feet and in dung. The two upper levels contained bramble seeds, Rosaceae thorns (rose/bramble and hawthorn/sloe), a possible maple seed fragment and elderberry seeds. Some of these are from edible fruits, but the thorns obviously represent woody material that had fallen into the ditch or been brought onto the site. This could indicate that scrub was becoming established around the site by the time <2685> was being deposited. Huckerby *et al.* (CD Section 31) noted that the pollen evidence indicated some evidence of scrub/woodland re-growth. Alternatively, some of the material could have been brought onto the site for leaf fodder as cut branches.

More substantial evidence for the existence of woodland, scrub or hedgerows was recovered from the MBA waterhole 430084 on site BAALR00. In addition to a similar range of scrubby taxa as the ring ditch, four woody taxa and several herbs characteristic of shaded places were recorded. The woody taxa comprise hawthorn (*Crataegus monogyna*), rose (*Rosa* sp.), dogwood (*Cornus sanguinea*) and alder buckthorn

(*Frangula alnus*). It may be significant that none of these are large trees, and all can be found in hedgerows or scrub. The woodland/hedgerow herbs include three-nerved sandwort (*Moehringia trinervia*), garlic mustard (*Alliaria petiolata*) and possible lords and ladies (cf. *Arum maculatum*). Leaf fragments, twigs, wood fragments and moss were frequent in this sample (unlike the ring ditch samples which only contained a few small fragments of wood) providing further evidence that the trees/shrubs were growing close to the waterhole. In addition, the insect assemblage contained a strong woodland/scrub component (Robinson, CD Section 36). Robinson has suggested that this could represent rapid post-abandonment re-growth of woody vegetation. However, it is notable that almost all of the MBA and LBA waterholes examined at Heathrow (Carruthers 2006; Framework Archaeology in preparation) produced very similar ranges of fruits, leaves and thorns from hedgerow/scrub/woodland taxa, and these assemblages were in samples taken from both primary and secondary fills. It is likely, therefore, that waterholes were located close to hedgerows, perhaps in the corners of hedged fields, or even in woodland clearings.

Numerically, the dominant taxon in this sample was stinging nettle seeds, which were too numerous to count. The very high frequency of seeds suggests that this plant was probably growing around the waterhole. Other weeds of nutrient-enriched, disturbed soils such a dock and common chickweed were also frequent. Since the sample came from a 'deliberate backfill' in one side of the waterhole, the assemblage may have contained dumped material in addition to evidence of the surrounding vegetation. A small quantity of domestic waste, including a probable emmer/spelt glume base and a few small fragments of cultivated flax (*Linum usitatissimum*) capsule, was present. A similar range of aquatic taxa to the ring ditch was present, but marginals such as mint (*Mentha* sp.), gypsywort (*Lycopus europaeus*) and sedges (*Carex* sp.) were absent or scarce. It is likely that the water was fairly eutrophic, due to the deposition of waste in the feature. Daphnia egg cases (Cladoceran ephyppia) and fruits of water starwort (*Callitriche* sp.) are characteristic of this type of habitat, and both taxa were common in this sample. The remaining few taxa were common grassland weeds, such as buttercups (*Ranunculus acris/repens/bulbosus*), ribwort plantain (*Plantago lanceolata*) and grasses (various Poaceae). To summarise, therefore, the suggested vegetation in and around the waterhole was probably grassland with scrub or hedgerows very close-by, or with woody taxa becoming re-established soon after abandonment. Areas of nettles and other disturbed ground plants were dominant around the feature. A well-developed aquatic flora was growing in the waterhole, reflecting the nutrient-enriched status of the water, but the margins were probably too disturbed by trampling for marginal plants to survive.

Iron Age to early Romano-British

The settlement pattern up to the MIA appears to have remained fairly unchanged, consisting of small, scattered un-enclosed settlements. By the LIA/ERB period enclosure and more intensive settlement, including settlement of the clay plateau, created a patchwork of large fields linked by droveways. Quern stones and animal bones were much more frequent (Nick Cook and Fraser Brown, pers. comm.). Since very few EIA and MIA samples were available for study, this change is difficult to detect using the charred plant remains evidence. Only one sample was fully analysed from the EIA (pit 436091), and this produced a low concentration (1 fpl) of emmer/spelt wheat and barley grains with some chaff, common weed seeds (blinks and cleavers) and hazelnut shell that was similar in nature to earlier assemblages. This probably represents low-level mixed domestic waste. Of course, the scarcity of features and charred waste from this period is, in itself, evidence that the level of agricultural activity in the area was low during the EIA to MIA.

The LIA to ERB samples mainly came from the two sites along the western side of the Stansted excavation area; BAALR00 and BAACP00, although an ERB pit was located at BAAMP00 in the east. A number of particular characteristics can be seen in the LIA to ERB samples, so they have been discussed as a group below. Because so many of the LIA and RB samples produced useful quantities of charred plant remains, it is useful to compare samples from the earlier and later Roman periods to look for changes in crop husbandry practices. This is done in the section below.

EIA	BAALR00 -	<6211>, context 436092, pit 436091 (1 fpl)
LIA	BAALR00	<6131>, context 439014, ditch 439013 (52.4 fpl)
LIA/ERB	BAACP00 -	<476>, context 107067, ditch 109169 (13.5 fpl)
LIA/ERB	BAALR00	<6117>, context 430019, ring gully 430039 (52.5 fpl)
ERB	BAACP00	<297>, context 138015, ditch 109212 (5.3 fpl)
ERB	BAACP00	<324>, context 150003, ditch 102071 (17.7 fpl)
ERB	BAACP00	<371>, context 136013, pit 136045 (12.9 fpl)
ERB	BAAMP00	<2516> context 330146 – pit 330145 (67 fpl)

As can be seen from the charred fragment concentrations given above (fpl = fragments per litre of soil processed), much higher concentrations of charred cereal remains were recovered from most of the Late Iron Age and early Roman samples than from earlier periods.

The LIA to ERB samples from all three sites produced predominantly grain-rich or grain- and chaff-rich samples, rather than cereal processing waste (chaff and weed-rich). Grain-rich assemblages are likely to have originated as processed grain that has been accidentally burnt during the preparation of food, or, if larger quantities are present, the parching of processed grain prior to storage, grinding or during the production of malt. In addition, spoilt grain, including the waste from cleaning out storage pits (Reynolds, 1976), may have been deliberately burnt in order to destroy pests and diseases.

Grain- and chaff-rich assemblages may have been derived from;

- whole ears of wheat
- burnt spikelets, ie semi-processed grain still in the husk. It is thought that hulled wheats would have been stored in this form in regions with damp climates (Hillman 1981).

In some cases where chaff fragments were common but not as frequent as grains, whole spikelets or ears may have been present, but differential preservation brought about by charring may have reduced the proportion of chaff (Boardman and Jones 1990).

Spikelets or whole ears are most likely to have become charred during parching – a stage in the processing that makes the removal of chaff easier. Accidental fires and the destruction of infected spikelets could also produce this type of assemblage. The presence of concentrations of material of this type in a number of pits and ditches suggests that cereal processing was occurring on a much larger scale than in previous periods. Although corn driers were not found amongst the LIA/ERB features, they were probably being used to parch large quantities of wheat and barley at a time, rather than the small scale piecemeal parching over domestic hearths that took place in earlier periods. A late Roman corndrier was excavated at BAAMP00 (see below).

Notable characteristics of the LIA/ERB assemblages were as follows:

- None of the assemblages were rich in cereal processing waste (ie abundant chaff and weed seeds with very little grain). Where chaff was frequent (eg ditch 109214) grain was also frequent, so whole spikelets were probably represented. This is also true of the A120 sites up to the Early Romano-British period (see Table 34.2). However, it is probably simply due to chance (see below).
- Barley was much more common in the IA to ERB samples than in any other period. This was not the case with any of the A120 sites – barley was sparse on all sites from the IA to RB period. Barley was more frequent in the LIA/RB samples from BLS than the other two sites studied by Murphy (2004). Higher proportions of barley could relate to the local soils being more suitable for this crop (perhaps more calcareous and less heavy), or could indicate increased livestock levels at these sites, since barley was probably used primarily as a fodder crop at this time).
- Both emmer and spelt wheat were still being cultivated at least until the LIA/ERB. This also applies to the A120 sites, the Stansted sites studied by Murphy (2004) and for most other sites in southern England of this period. It was difficult to determine the relative importance of the two hulled wheats at Stansted, since so few glume bases were identifiable to species level. In all cases except LIA/ERB sample 6131, emmer chaff was greatly outnumbered by spelt chaff. However, it should be noted that the data may be biased, due to spelt chaff being more robust.
- A number of arable weed seeds first appear and increase during this period, a factor that probably relates to the widespread cultivation of spelt wheat as the primary cereal crop. These include large grasses such as chess (*Bromus* sect. *Bromus*) and perennial rye grass (*Lolium perenne/rigidum*), and a number of indicators of damp soils such as blinks (*Montia fontana* ssp. *chondrosperma*) and spike-rush (*Eleocharis* subg. *Palustres*). Weeds characteristic of acidic and nutrient-poor soils (small-seeded legumes eg *Vicia/Lathyrus* sp.) also become frequent (see Table 34.1 below). These weed groups vary in frequency from site to site for both the Stansted and A120 excavations. To some extent this reflects the variable nature of the clay soils in the area, but it may also indicate changes in crop husbandry practices, as discussed further below.

Some differences can be seen between the LIA/ERB samples and they may indicate that changes were occurring between the LIA and ER periods. However, it is difficult to confirm these changes with only seven samples. For example, emmer chaff was only positively identified in two of the LIA/ERB samples, whilst bread-type wheat was only found in two of the ERB samples. Oats appeared to become more frequent in the ERB samples when compared to the LIA/ERB samples, whilst the two samples that produced bread-type wheat (samples 371 and 2516) contained a much lower quantity of barley (one grain) than the other five samples (a ratio of 458:1 hulled wheat to barley as opposed to 7:2). Tentative suggestions of the changes taking place, therefore, are that spelt wheat increasingly replaced emmer as the main cereal for human consumption, and bread wheat began to become more important at the start of the Romano-British period. Being a free-threshing cereal, it is probably greatly under-represented in the charred plant record, as it does not need to be parched in order to remove the grain from the husk. With regards to animal fodder, barley was fairly important in the LIA/ERB but may have become replaced to some extent by the cultivation of oats in the ERB. Oats are a valuable source of high energy fodder for draft animals and they can tolerate poor, damp, acidic soils better than barley.

<u>Mid to late Romano-British</u>

Charred plant remains were recovered from the MTCP site (BAAMP00/MTCP) and LTCP/BAACP00 and LBR as follows:

C2nd-C3rd	BAACP00 109214 (19.2	<258>, context 129025 (>50 fpl) and <296>, context 129032, ditch
		fpl)
C2nd-C3rd	BAAMP00	<2709> context 319313 – ditch 319313 (>36.3 fpl)
C2nd-C3rd	LBR	<4013> context 207021 – ditch 207013 (70.1 fpl)
LRB	BAAMP00 334015 – pit	<2407> context 33016, <2408> context 334014, <2409> context
		334013
		<2434> context 319139 - pit 319140
		<2520> context 347046 – pit 347041
		<2425> context 338015 – stoke pit of kiln 338022 (>16.9 fpl)
		<2428> context 337019 – ditch 333072 (>57.7 fpl)
		<2436> context 319148 – gully 319149 (>46.7 fpl)
		<2437> context 319150 - gully 319151 (>29.6 fpl)
		<2438> context 319153 – gully 319154 (>8.8 fpl)
		<2439> context 319158 – gully 319158

All but three samples from BAAMP00 (2709, 2516 and 2520) were in the vicinity of a kiln or oven, feature 338022. It is clear that the richness of these eight samples was associated with the operation of the oven, ie it had served as a corn drying oven for at least some of the time and chaff had been used to fuel the oven.

Activities involving the oven had led to a particular distribution of cereal remains in the surrounding enclosure ditch. Sample 2439 from near the northern terminus of the ring gully and sample 2407 from nearby pit 334013 produced fairly clean, processed emmer/spelt grain samples, with just a few spelt chaff fragments and very few weed seeds remaining as contaminants. Samples 2436, 2437 and 2438, however, from the gully terminus to the south of the oven, all produced chaff-rich assemblages indicative of cereal processing waste. Only one straw node was recorded, weed seeds were not frequent and the weed taxa represented were mostly large, heavy-seeded types. It is likely, therefore, that this was the waste product from removing the husks from fairly clean spelt spikelets. The spikelets would have been parched in the oven in order to make the husks brittle, before being pounded, winnowed and sieved to remove the brittle husks (Hillman 1981). It is unlikely, however, that the cereal processing waste had then simply been burnt as waste. Processing waste was a valuable fuel for ovens and kilns, so the presence of these large deposits in the ditch probably represent fuel cleaned out of the oven that had been dumped in the southern end of the gully. The concentration of waste was highest directly to the south of the oven, trailing off towards the terminus of the gully.

The sample from stoke pit, 2425, was not as rich in charred plant remains as the gully samples. The cereal to chaff proportions indicated that the remains of charred spikelets might have been represented (perhaps spikelets that had accidentally fallen into the fire), although a mixture of clean grain and chaff burnt as fuel is equally as likely in a context of this nature. Weed seeds, however, were fairly rare, so if chaff was being used as fuel it was probably only the waste from dehusking clean spikelets, and not the straw and weed-rich waste products from earlier stages in the processing. One further possible use of the oven was for roasting malt, although the relatively low occurrence of sprouted grains and detached sprouts suggests that this was likely to have been sporadic, if at all (see discussion below).

Spelt wheat and possible bread wheat were the only two cereals present in the oven, but it is interesting to see that peas may also have been present (cf. *Pisum sativum*). Leguminous crops are often under-represented in the charred plant record, so their presence in the oven was a useful reminder that other crops were probably being dried prior to storage or grinding into flour, in addition to cereals. A few possible peas were recovered from the A120 and Stansted Airport 1986-91 (Murphy 2004) samples.

Sample 2434 from the primary deliberate backfill of pit 319140 to the south-west of the oven produced a grain-rich deposit with few weed seeds, some spelt and possible emmer chaff and remains of hay from damp meadows. The hay consisted of grass-sized stem fragments, sedge seeds (*Carex* spp.) and a sheep's sorrel nutlet (*Rumex acetosella*). Of particular note in this sample was the relatively large number of rye (*Secale cereale*) grains (23 grains) – the most recovered from any of the periods studied. A few oats were also recorded, but it is not known whether these were from wild or cultivated oats. The hay, rye and oats were probably present as fodder. Rye is not commonly recovered in substantial quantities from Romano-British deposits, although occasional grains are quite common. Murphy (2004) recorded a single rye rachis fragment from site BLS, and several possible rye grains have been recorded from other Romano-British A120 and Stansted samples. This low but common occurrence is typical of cereals that were being cultivated for fodder, as they are less likely to become charred during processing (processing would have been less thorough for fodder crops), but more likely to have been widely strewn around the settlements as unburnt waste, occasionally becoming charred amongst mixed domestic waste.

The three samples located some distance from the ring-gully produced more mixed types of waste. The greater range of weed taxa recorded was probably due to the presence of hay and other waste materials in the samples. Sample 2520 in pit 347041 appears to have been a deliberate dump of charred spelt spikelets, with some straw and hay. Sample 2709 was a grain-rich deposit that also contained some domestic waste, including hazelnut shell fragments and a sloe stone. The wide range of weed taxa represented in these samples was probably due to the inclusion of burnt hay from damp meadows.

During the mid to late Romano-British period both emmer and spelt wheat were still being grown, although spelt appears to have been by far the dominant cereal grown for human consumption, according to the best preserved chaff deposits. Emmer may have persisted as a volunteer crop for a while, or it might have been more often used for fodder. Bread-type wheat was present in more samples than in earlier periods, but the grains still occurred in low numbers.

It is notable that very little barley was recovered from these samples, perhaps because both rye and oats were being grown as fodder crops in its place. This is difficult to demonstrate from so little evidence, and it was not possible to confirm the identification of cultivated oat. However, the frequency of oat awns and grains suggests that a significant quantity of oats were being grown. For the A120 sites, evidence for large-scale spelt cultivation from the charred plant remains, in addition to pathological evidence from the animal bones, demonstrated that a great deal of ploughing of the heavy clay soils was taking place during this period. Since oats are a valuable high-energy fodder for draught animals, they may have been far more important to the RB economy than the charred evidence suggests.

Other plants that are likely to be under-represented in the charred plant record but which may have been of economic importance during this period are a) fibre crops, b) fruits and nuts, c) legumes, d) vegetables, e) herbs and spices and f) medicinal plants.

a) A single flax (*Linum usitatissimum*) seed was recovered from BAACP00 ditch sample 258 (C2nd-C3rd), indicating that, like many other RB sites, this fibre crop was being cultivated. Flax seeds also produce a useful oil, and they can be consumed for medicinal purposes, eg as a laxative.
b) Hazelnut shell (*Corylus avellana*) was present in eight of the twenty-two LIA/ERB to LRB samples, four of which produced quite a few fragments. Sloe stones (*Prunus spinosa*) were present in three C2nd-C3rd samples (4 stones; ditch 109214 and ditch 319313), which is a relatively large number for charred remains, when compared with other sites. Rose (*Rosa* sp.) and hawthorn (*Crataegus monogyna*) seeds were also recovered from ditch 109214. It is interesting to see that no imported exotic fruits or nuts were present in the samples. Admittedly charring does not favour the preservation of these types of remains, but that is the case with all of the economic plants discussed in this section. An ERB waterlogged ditch sample from the A120 sites added only a couple more native fruits to the list of possible food plants (bramble and elderberry), and a similar range of wild taxa was recovered from the 1986-91 excavations, with the addition

of possible wild strawberry (Murphy 2004). This underlines the rural nature of the economy – good, plain food supplemented by native hedgerow fruits and nuts, with no evidence of imported luxury produce.

c) Three samples (C2nd-C3rd and LRB) produced possible peas with one pea (*Pisum sativum*) being positively identified due to the presence of an intact hilum (detachment scar). No beans (*Vicia faba*) were found, although they have been recorded from other Romano-British sites.
d) It is impossible to tell how many of the edible native species had been exploited as leafy and root vegetables, particularly since these types of plant tissues are unlikely to survive charring in a recognizable form. Of the list of wild taxa represented during the Romano-British period, plants such as wild carrot (*Daucus carota*) and orache (*Atriplex patula/prostrata)* are known to have been consumed in classical and later periods (Harrison *et al.* 1969). Mallow (used as a leaf vegetable) was present in the A120 samples.
e) No imported herbs or spices were recovered from the samples. Imported spices such as coriander and dill are commonly recovered from urban Romano-British sites, occasionally even as charred remains.
f) Unless large quantities of remains from native species such as hemlock (*Conium maculatum*) and henbane (*Hyoscyamus niger*) are recovered it is impossible to determine whether they had been used for medicinal purposes. However, their common occurrence in the British Isles as charred remains in Romano-British samples, in comparison with samples from other periods, suggests that they were being gathered or grown for medicinal purposes. In addition, classical references demonstrate that the medicinal properties of poisonous herbs such as these were well-understood. Even if these particular seeds from C2nd-C3rd ditch 109214 (which contained a wide variety of other edible remains including cereals, legumes, flax, fruits and nuts) had not been deliberately gathered for use, the fact that these plants were present in the area means that they would, undoubtedly, have been made use of. Seeds, leaves and roots of both plants have been used (externally!) to relieve swellings and pains, including earache (Culpeper 1826).

The C2nd-C3rd sample from site LBR <4013> produced a concentration of spelt processing waste that was similar to those from BAAMP00, with a trace of bread-type wheat, barley, possible rye, oats and emmer. There were no noticeable differences in the weed composition or crop composition with the BAMP00 samples, so they may well originate from the same period of activity.

Comparisons between the LIA/ERomano-British and mid/late Romano-British samples

The interpretation of the assemblages depends to a large extent on whether each sample of charred plant remains came from a single type of burnt waste, or whether a mixture of waste materials were deposited in the features. Material from sources other than cereal processing were obviously present, since charcoal, hazelnut shell fragments (*Corylus avellana;* LIA to LR), sloe stones (*Prunus spinosa;* C2nd-C3rd), cultivated flax (*Linum usitatissimum;* C2nd-C3rd) and peas (*Pisum sativum;* Late Roman) were recovered. With regards to the weed taxa, however, it is more difficult to determine whether they were growing as arable weeds or were deposited amongst burnt waste hay or turf. This is because many plants that were growing as arable weeds at the time will grow in a wide range of habitats, including disturbed areas of grassland, wasteground, waysides and cultivated soils. The situation is complicated further by the possibility that an arable crop may have been sown in fields that were previously down to grass, and grassland taxa may have persisted as arable weeds for a while. For this reason the main taxa used to provide information about crop husbandry were weeds that occurred in a large proportion of the assemblages, such as small-seeded legumes (*Vicia/Lathyrus* sp.), blinks (*Montia fontana* ssp. *chodrosperma*) and chess (*Bromus* sect. *Bromus*). This is also the case where comparisons between sites and periods have been made.

The occurrence of small-seeded leguminous weeds such as vetches, clovers and black medick (*Vicia/Lathyrus* sp., *Trifolium/Medicago lupulina/Lotus* sp.) is indicative of soils with a low nitrogen content. Long-term experiments on the Broadbalk plots at Rothamsted Experimental Station have shown that a group of weeds including black medick and red bartsia (*Odontites verna*) are dominant on wheat plots with soils that are low in nitrogen, but decline rapidly when nitrogen levels are increased (Moss 2004). The high occurrence of these two taxa in the LIA to MRB samples suggests that nitrogen levels were low during this period. By the later Romano-British period, however, these taxa were present in much lower levels (see Table 34.1). Since fairly intensive spelt cultivation appears to have been occurring at this time, manuring must have been taking place in the later Romano-British period to have caused these changes. In addition to restoring fertility to the soil, manuring helps to improve the structure and drainage of clay soils, a fact that was undoubtedly known to the Romans. The alternative explanation is that arable cultivation moved to more fertile soils, but by this period the most promising soils in the locality are likely to have been ploughed for several centuries.

Other differences between the samples listed in Table 34.7 are more difficult to interpret, since they may reflect differences in the soils at the sites rather than changes through time. Some of the differences relate to soil moisture content and, although difficult to interpret with any certainty, could reflect differences in drainage activities, eg the smaller number of seeds from wet-ground weed taxa in the later period could indicate improved drainage regimes or movement to drier areas. Others could relate to crop husbandry practices, eg lower levels of large-seeded weedy grasses (chess and *Lolium*-type) in the later period could indicate increased weeding of the crops. Since the local clay soils show wide variations in qualities such as moisture content and pH (Macphail, pers. comm.), interpretations are at present tentative until a larger number of sites on the Boulder clay has been investigated. The following changes that appear to occur between the C2nd-C3rd and LRB, however, have been validated to some extent because the main site of interest (BAAMP00) produced mostly LRB samples but one C2nd-C3rd sample showing different characteristics.

Sample 2709 (C2nd-C3rd) produced a grain-rich assemblage with frequent small leguminous weed seeds, several wetground weeds and an acid soil indicator. It also contained no bread-type wheat. All of the later Romano-British samples from the same site produced sparse leguminous weed seeds, few wetground weeds and virtually no acid soil indicators (Table 34.7). Weed seeds in general were scarce in the LRB samples, and this applied equally to the grain-rich, spikelet-type and cereal processing waste assemblages. Most of the LRB samples contained a few bread-type wheat grains. The differences between the periods appear to reflect changes in crop husbandry practices. The later crops must have been much more intensively weeded in order to remove difficult to spot, invasive grasses like chess and rye-grass. The only weed seeds present in any quantity in the LRB samples were from docks (*Rumex* sp.) – perennial weeds with long, fleshy tap roots. Docks cannot be eradicated by hand-weeding, as any sections of their long, tough tap roots that get left in the ground can re-grow. Even deep ploughing will only serve to propagate docks, unless all the fragmented sections of root are picked out by hand. This is particularly difficult to do in a clay soil. Dock seeds were frequent from the LIA onwards but became particularly numerous in the C2nd-C3rd samples, possibly due to increased autumn ploughing giving the docks a head start on spring germinating annual weeds. Stinking chamomile (*Anthemis cotula*) made its first appearance in the C2nd-C3rd samples. This is a weed typical of heavy, damp soils that is often linked to increased ploughing of clay soils for spelt crops during the Roman period (Jones 1981).

Although hand weeding may have decreased tall-growing, obvious weeds such as chess and rye-grass, it is unlikely to have completely eradicated low-growing, twining weeds such as the small-seeded legumes. Therefore, the reduction of leguminous weeds in the LRB is more likely to be due to soil improvement (ie manuring), as is the reduction of wet ground weeds (improved drainage). Sedges and spike-rush are fairly low-growing, inconspicuous weeds that are not invasive or particularly problematic to the farmer, so they are unlikely to have been sought out during hand weeding.

Although concentrations of charred cereal remains greatly increased from the Late Iron Age through to the Romano-British period, it was not until the late Roman period that large deposits of cereal processing waste occurred on the Stansted sites. Samples from E/MRB Strood Hall and Rayne Roundabout (A120 sites, Carruthers 2007) produced some deposits of this nature (Table 34.8), but at Stansted it was only in the late Roman samples from a ring gully around a corn drier at BAAMP00 that this type of waste was found. However, it is likely that the lack of processing waste (CPW) from the earlier Romano-British samples at Stansted is only due to the chance nature of sampling. The concentration of CPW in the ring ditch samples illustrates this point, showing that different types of waste can be very localised in distribution. This is particularly the case if CPW was a valued commodity that was collected and stored for use as fuel in corndriers, as it would then not find its way into general domestic waste in any quantity or become widely distributed around the site.

The combined evidence from the A120 and Stansted sites indicates that the scale and organisation of spelt production increased from the C2nd-C3rd into the LRB. Changes in crop husbandry practices were probably essential in order to obtain high yields. Although clay soils are fertile when first cultivated, they soon become impoverished if nutrients are not returned to the soil in large-enough quantities. As modern agricultural practices have shown, weed and pest problems usually become worse as crops are grown on a larger and more intensive scale. Hand weeding became more necessary by the LRB, perhaps because of loss of yield, but also possibly because grain standards may have become more strictly regulated and weed contamination was no longer tolerated. Increased incidence of sprouted grain from the MRB onwards (Table 34.8) could relate to brewing, but no definite assemblages of malted grain have been found on the Stansted sites. Comparing quantities of sprouted grains and detached sprouts at Stansted to a confirmed deposit of malting waste such as that recovered from Northfleet Roman Villa, Kent (Smith in prep.), the evidence for malting was much less convincing at Stansted. Only one sample (2437, gully fill close to oven 338022) contained enough sprouted remains, and even this must have been mixed with dehusking waste. Because spelt began to be de-husked on a large scale during this period (rather than being stored in the better-protected spikelet form, as in earlier periods), the grain was more vulnerable to damp. Dehusking may have been a requirement for military purposes, or it may have been carried out in order to make the crop more fit for market, or to reduce transport costs.

Other changes seen over these periods include the increased occurrence of bread-type wheat, and the replacement of barley as a fodder crop with oats and rye – two cereals that will tolerate poorer soils and damp climates better than barley. Peas were being grown from the C2nd-C3rd, and these may have helped to improve soil fertility if grown in rotation with cereals. Flax (*Linum usitatissimum*) was also cultivated at this time, and its importance may have been much greater than the sparse evidence suggests.

Taking into account the biases of preservation by charring, it is interesting to note that no exotic fruits, herbs or spices were found. Wild, hedgerow fruits and nuts were still important in the mid to late Romano-British, although fewer hazelnut shell fragments were found in the LRB samples. This could suggest further removal of hedgerows, scrub and woodland, perhaps in order to increase arable production.

The Late Saxon period

Very few deposits dating to this period have been excavated in the Stansted region, so an examination of the six samples listed below has helped to fill a gap in the chronology.

BAAMP00	Sample 2004, context 309032	}
	Sample 2005, context 309033	} beamslot 302020
	Sample 2019, context 315009	}
	Sample 2068, context 307012	}
	Sample 2211, context 322008	– pit 322007
	Sample 2212, context 315052	– pit 315051

The main component of the beamslot fill was oat grains. Comparisons between the four beamslot samples showed that the assemblages were very similar in character. The grains were concentrated in the upper fill of the slot, towards the western-most corner of the building. Since it is thought that this building burnt down (see Chapter 9), the assemblages appear to represent an accidentally burnt deposit of clean, processed oats that had been stored in the corner of the building. After the building bunt down, the oats probably spilled into the beamslots. The few bread-type wheat grains, possible rye grains, weed seeds, damp hay taxa and hazelnut shell fragments recovered with the oats could have been contaminants of the crop, or could have been from other waste that was lying on the floor. It is interesting that eleven emmer/spelt grains and an emmer/spelt glume base were present in one of the lower samples, 2019. Hulled wheats are rarely found in post-Roman contexts, having been rapidly replaced by free-threshing bead-type wheats by the Saxon period. However, occasional small quantities of hulled wheats have been recovered from later deposits, including a sample radiocarbon dated to the C15th at Brough St Giles (Huntley 1991). A radiocarbon date from one of the emmer/spelt wheat grains from beamslot 302020 produced a Late Saxon date of AD 960-1040 ± 30 (NZA-23235) demonstrating that small amounts of hulled wheat (probably spelt) were still being grown at this time.

Because this deposit probably represents a single event, it is not possible to determine how important oats were in relation to other cereals at the time. The only other assemblages of this date in the area were from possible Saxon pit fills at the SCS site examined by Murphy (2004). These produced a few oats, in addition to some hulled wheat remains. Although Murphy suggested that the hulled wheat remains may have been residual, it is now clear that hulled wheats continued as a minor crop in this area. Spelt wheat grows well in heavy clays, often producing higher yields than free-threshing wheats, particularly in areas with milder winters such as southern England (van der Veen and Palmer 1997). Alternatively, having been grown on such a large scale during the RB period on the boulder clay, it could have persisted for a while as a volunteer crop. This is perhaps less likely because hulled wheats require different processing methods to separate the grain from the chaff, so, unless growing as weeds of fodder crops, volunteer plants would probably have been weeded out rather than tolerated.

Samples 2211 (pit 322007) and 2212 (pit 315051) were from features towards the southern end of the site. Sample 2211 came from a secondary fill of ashy material that may have been used to dampen the smells from cessy material. Unfortunately the residue from this sample was not available for microscopic examination, so it is uncertain whether faecal material had been preserved in the feature. The flot produced several well preserved charred Celtic beans (*Vicia faba* var. *minor*) and a quantity of free-threshing wheat. The presence of a couple of well preserved rachis fragments suggests that both rivet-type wheat (*Triticum turgidum*-type) and bread-type (*T. aestivum*-type) wheat were being grown. Since the two types of wheat have different culinary properties and different growth requirements there can be advantages in growing both types (Moffett 1991). Rivet wheat is used for biscuits, whilst bread wheat produces a well-risen loaf of bread. Rivet wheat grows on a long straw which is useful for thatching. It is also awned and so has better protection from bird predation, and is rust resistant. However, it is more sensitive to bad weather and is late-maturing. An increasing amount of evidence suggests that both types of wheat were grown during the medieval period in many parts of Britain, particularly central and southern areas (Moffett 1991). A Late Saxon date is a fairly early record for rivet-type wheat, but an AMS date of cal AD 770-100 (1150±45 BP) (OxA-10126) has been obtained from rivet-type wheat remains from Higham Ferrers (Moffett

2007, 169). Sample 2211 also produced small amounts of rye and oats, but no barley was recovered from any of the six samples. Barley is the least well-suited cereal for heavy clay soils, so by the Late Saxon period its place as a fodder crop had probably largely been taken by oats, rye and legumes.

Sample 2212 primarily comprised free-threshing wheat grains, with just a few chaff fragments and weed seeds. Both 2211 and 2212 probably originated as domestic waste, either as processed grain accidentally burnt during cooking or as deliberately burnt infested grain. Both samples contained a few fragments of hazelnut shell, indicating that other types of waste were mixed into the deposit. They also contained a few larger (3 mm diameter) vetch/tare (*Vicia/Lathyrus* sp.) seeds which may have been cultivated vetch (*Vicia sativa* ssp. *sativa*). Cultivated vetch was identified by Murphy (2004) in medieval samples from the RWS and tentatively identified at Blatches, A120 (Carruthers 2007). It was commonly grown as a fodder crop during the medieval period, but its status during the Late Saxon period is less clear. Possible cultivated vetch seeds were present in Late Saxon deposits at West Cotton, (Campbell 1994), but as the seeds from Stansted were not well-enough preserved to confirm the identification (no hila were observed) the record must remain as vetch/tare. A Late Saxon sample at Stansted Southgate, however, did produce more convincing evidence for the cultivation of vetches.

<u>Early medieval period</u>

A pit fill and two cess pit fills from site BAAMP00 were dated to this period:

Sample 2741, context 366004	– pit 366001
Sample 2737, context 310139	}
Sample 2738, context 310140	} cess pit 310136

Sample 2741 from pit 366001 towards the northern end of the site produced an assemblage of grain, straw and weed seeds that had probably been burnt at a high temperature, causing 'melting' of grain and straw into slaggy lumps. The remains that survived in an identifiable state consisted of free-threshing wheat grains (*Triticum aestivum/turgidum* -types) and chaff, straw nodes and frequent weed seeds. Stinking chamomile was particularly frequent, providing evidence that the cereals were being grown on the local heavy, clay soil. This deposit may have consisted of an unprocessed deposit of cereals, perhaps ears still on the straw.

The early medieval cess pit 310136 was located some distance to the north of the burnt Late Saxon building. The samples produced a few charred bread-type wheat grains, hazelnut shell fragments and arable weed seeds, but the main component of the assemblages recovered from flots and residues was mineralised (calcium phosphate replaced; see Green 1979) plant material. The presence of frequent concretions containing bran fragments and fragments of legume seed coat (testa) confirmed that the material was of faecal origin. Further evidence for this was that edible plant remains, such as fruit seeds, were the dominant components. The few remains from non-edible taxa such as buttercup (*Ranunculus repens/acris/bulbosus*) and sedges (*Carex* spp.)

probably came from hay that had been used as toilet paper, or had been added to soak up liquids and dampen odours. Grass/rush/sedge stem fragments were present and were frequent in the lower of the two deposits. The charred remains may also have been added to suppress smells, having perhaps originated as sweepings from a hearth or oven.

Sample 2737 came from context 310139; a large deposit containing an intact cattle skull and frequent well preserved cattle bones. It overlay a deposit containing burnt bone that had been dumped into the north side of the pit (context 310140, sample 2738). Both samples produced very similar concentrations of remains suggesting that conditions of preservation and formation processes had been similar. Minor differences in quantities of the different food remains were observed between the samples, but since only two samples were examined it is difficult to say whether this simply reflects variation within each deposit or a larger scale slight change in the diet, perhaps due to seasonal changes. Therefore, although the differences are described below the significance of these should not be over-emphasized.

Numerically, bramble (*Rubus* sect. *Glandulosus*) seeds were the most frequent component of both samples, not including the cereal bran and legume testa fragments which were too numerous to be quantified. Sample 2737 produced roughly twice as many bramble seeds as 2738 (per litre of soil processed). Many of the seeds in 2738 were preserved without their seed coats (*Rubus* sp., possibly including raspberry but not confirmed), indicating that conditions of preservation in the pit may have been wetter by the time 2737 was deposited (see Carruthers 1993). Each bramble fruit contains numerous seeds, so a single meal could make this type of numerical difference. In addition, brambles are easily preserved, so it is not possible to suggest that this has a seasonal implication.

Other fruits were also well-represented, including crab apple (*Malus sylvestris* and *Malus/Pyrus* sp., possibly including pear, but not confirmed), damson or bullace (*Prunus domestica* cf. ssp. *insititia* embryos), sloe or cherry (*P. avium/spinosa* embryos) and possible strawberry (*Fragaria/Potentilla* sp.). Apple pips were much more frequent in sample 2738, but *Prunus*-type fruits were relatively frequent in both samples.

Both peas (*Pisum sativum)* and beans (*Vicia faba*) were being consumed, identified from fragments of macerated testa with hilums attached. One whole pea was recovered from 2738 indicating that at least some of the legumes had been consumed as vegetables rather than ground into flour. However, the presence of frequent concretions consisting of curled fragments of legume testa with bran fragments inside could indicate that some legume flour had been mixed in with the cereal flour to make a low-status bread (Tannahill 1975). Legume testa fragments were much more frequent in sample 2738 than 2737.

Apart from the crop plants, the only non-native taxon represented in the faecal deposits was opium poppy (*Papaver somniferum*), but this oil-seed and medicinal plant was introduced into the British Isles from at least the Iron Age (Godwin 1975). No exotic fruits or spices were present in the samples, indicating that the early medieval diet at

Stansted was fairly rural in character, consisting of cereals, legumes, hedgerow fruits and nuts and an unknown range of leafy and root vegetables that leave little trace in archaeobotanical assemblages.

Very similar results were recovered from three Saxon cess pits at Abbots Worthy, near Winchester (Carruthers 1991). Additional plants being exploited at Abbots Worthy included elderberry, probable mustard (*Brassica/Sinapis* sp.) and perhaps a few native medicinal plants such as henbane and hemlock. The only non-native taxon was, again, opium poppy. In comparison with Stansted, fewer fruit remains and more pea hilums were recorded at Abbots Worthy. A more urban type of diet was indicated in the large number of Middle Saxon cess pits excavated at St Mary's Stadium, Hamwic (Carruthers 2005). A similar range of native fruits were present, but these were much less prominent than leguminous remains. The only evidence of imported fruits was a single waterlogged grape pip (Clapham 2005). However, a few imported herbs were available to the Hamwic population, including dill, coriander and possible fennel. Perhaps the reduced access to hedgerow fruits and nuts was compensated for by adding herbs to the monotonous diet of pea, bean and cereal dishes. It may also be relevant that pot herbs such as these could easily be grown in the more restricted space of an urban settlement.

These few findings from the Late Saxon and early medieval periods are very similar to those from the A120 sites and the Stansted sites examined by Murphy (2004), ie both bread-type and rivet-type wheat were the principal crops, with smaller quantities of the other cereals, beans, peas and possibly cultivated vetch. Hedgerow fruits and nuts were relatively common in the samples. Murphy also recovered evidence for the cultivation of flax and for malting. The only slight evidence for exotic foods in this area was a single pollen grain of grape from a cess pit at Stebbingford (Wiltshire 1996).

Post-medieval

Samples from this period were associated with a hunting lodge set in parkland (Nick Cook and Fraser Brown, pers. comm.). Five samples from site BAACP01 were examined, including two from hearths, one from a rectangular feature in a palaeochannel and two from a well. The well produced only charred material in the upper layer but well-preserved waterlogged remains from the primary fill, demonstrating the level to which it had remained waterlogged.

Sample 840, context 467028 – hearth 459026
Sample 841, context 467030 – hearth 467032
Sample 909, context 464037 – feature 464035
Sample 920, context 461027 – well 461038, upper fill
Sample 921, context 461035 – well 461038, primary fill

As with the medieval samples, the hearth samples were dominated by free-threshing wheat grains with both bread-type and rivet-type wheat being identified from a few well-preserved rachis fragments. Sample 841 produced very little charred material, but it included two possible peas and a possible oat grain. A well preserved pea was also present in sample 840, confirming the importance of this crop. Sample 840 contained a surprisingly large amount of cereal chaff, including chaff from the two types of wheat, barley and rye. This may represent cereal processing waste that was being used as fuel, or unprocessed crops could have been parched or burnt amongst waste in the fire.

Sample 920 from the well also contained wheat, barley, oats and possible rye, with a reasonably large number of chaff fragments being preserved. Only rivet-type wheat was identified amongst the rachis fragments. A bean fragment was also present. The waterlogged primary fill, sample 921, contained abundant wood fragments, twigs, buds, rose and hawthorn-type thorns and some leaf fragments. This woody material may have fallen into the well or been dumped as waste after it was abandoned. It seems unlikely that trees and shrubs would have been allowed to grow close to an uncovered, active well, as falling leaves would taint the water. However, the well may have been covered while it was in use, and material may have accumulated post-abandonment. The plant remains suggest that it was situated in a woodland clearing or close to woods, scrub or hedgerows. Seeds from several herbs of woodland margins were present, such as agrimony (*Agrimonia eupatoria*) and hedge woundwort (*Stachys sylvatica*). Cow parsley fruits (*Anthriscus sylvestris*) were numerically the most abundant items, and this is typically a plant of hedgerows and woodland margins. Not counting the edible taxa, immature hawthorn berries (*Crataegus* sp.) were the only identifiable tree/shrub remains. Damson-type stones (*Prunus domestica* ssp. *insititia*) were probably deposited as waste, since a couple of other edible plants were also represented; grapes (*Vitis vinifera*) and peas (*Pisum sativum*). A small fragment of corn cockle seed (*Agrostemma githago*) indicated that the edible remains may have entered the well as sewage, since corn cockle fragments are typically recovered from waterlogged cess deposits (having been present as a contaminant of grain that had been ground to make flour and made into, eg bread). Being large seeds, however, the fruit and legume remains could also have been deposited as waste. The grape and damson/bullace seeds provide a small amount of evidence for the consumption of ‘luxury’ foods. The grapes would probably have been imported, although local cultivation is not impossible. Grape vines like a deep, well-drained soil that is not chalky, so perhaps cultivation is unlikely on clay. Damsons/bullaces may well have been grown in orchards or in hedgerows belonging to the hunting lodge. It has been suggested that an area of discoloured soil containing no features close to the well may have been orchards or gardens, and that several shallow ditches in the area may have been hedged (Fraser Brown, pers. comm.). Since a single possible box leaf (cf. *Buxus sempervirens*) was recovered from well sample 921, clipped box hedges may have been used, as was popular during the 16th century.

The remaining taxa represented in this feature were primarily weeds of disturbed ground, grassland and waysides, some of which indicated damp soils and others preferring dry, calcareous soils. They may represent plants growing around the well and/or hay or dung deposited in the well as waste after abandonment. The presence of a few seeds from plants that typically grow as arable weeds (eg shepherd’s needle (*Scandix pecten-veneris*); stinking chamomile (*Anthemis cotula*)) could mean that dung from grazing livestock had fallen into the well (with crop processing waste having been used as fodder), or that a little processing waste had been deposited. However, no cereal chaff was preserved so, if present, it was only in low concentrations. Stinking chamomile can also grow on wasteground. No true aquatic plants were represented although cladoceran ephyppia (water-flea eggcases, eg *Daphnia*) were frequent, and these are common in standing water. The well was either covered or too frequently used to allow plants such as duckweed to become established. After abandonment, it must have quickly become backfilled with woody material.

In contrast, the rectangular feature in the palaeochannel produced a wide range of aquatic and marshland plants, as might be expected from a deposit in this location. Free-floating aquatics such as duckweed (*Lemna* sp.) were scarce, but marginals such as sedges, (*Carex* spp.) water plantain (*Alisma plantago-aquatica*), water pepper (*Polygonum hydropiper*) and flote-grass (*Glyceria* sp.) were common. Other marshland plants included branched bur-reed (*Sparganium erectum*), rushes (*Juncus* sp.) and spike-rush (*Eleocharis* subg. *Palustres*). The remaining taxa were primarily herbs of grassland and disturbed places, although the disturbed element was not dominant. The numerically most frequent seed was a cinquefoil, probably creeping cinquefoil (*Potentilla* cf. *reptans*; 87 seeds). This creeping perennial is not often recovered in large numbers from archaeobotanical samples, although it is a common plant of rough ground, grassland and hedgebanks. Interestingly, Ellenberg (1988) places it in a plant community described as ‘pioneer swards of flooded and damp places’ (669; 3.72: Order *Agrostietalia stoloniferae*). The creeping root systems of plants such as creeping cinquefoil enable them to rapidly become established and to keep a foothold during flooding episodes. Other possible members of this group observed in sample 909 (but not identified to species level) were mint (*Mentha* sp.) and creeping buttercup (identified only to *Ranunclus repens/acris/bulbosus*). This suggests that the enigmatic rectangular feature was located in an area that was periodically flooded, a factor that could be important in understanding its function.
A single hop fruit (*Humulus lupulus*) was the only taxon of note. Along with a bramble seed (*Rubus* sect. *Glandulosus*), twigs, thorns, buds and leaf fragments, this taxon suggests that wet woodland existed along the palaeochannel in the vicinity of the feature. Unfortunately, no concentrations of plant material were recovered from the bottom of the feature to help determine its function, a common problem for features of this nature. Although hops can be used for brewing and dyeing, the presence of a single seed is inconclusive, and the location seems unsuitable for such activities.

The charred plant remains from this period were very similar to those from the medieval period, with all five cereals being recorded (although barley was not present in the three medieval samples). Peas and beans and possible cultivated vetch were relatively frequent, considering so few samples were examined (one 2-3 mm vetch/tare seed from sample 840 could have been from cultivated vetch). Stinking chamomile was a frequent arable weed in samples from both periods, as might be expected for crops grown on heavy, damp clay soils. The waterlogged remains provided a small amount of evidence for the consumption of ‘luxury’ foods, ie grapes and damsons. The remaining evidence from these features provided information about the local environment, which appeared to retain some scrub or woodland with marshy areas along the palaeochannel.

Summary

Little environmental evidence has been recovered from excavations in the Stansted area to suggest that woodland on the Boulder clay had undergone significant disturbance during the early prehistoric period. Although charred hazelnut shell fragments in Neolithic pit 353011 were likely to have been collected from local trees, the bread-type wheat grain may have been brought to the site. In any case, arable cultivation appears to have been very limited in the area up to the Late Iron Age. Two charred cereal deposits were recovered from Middle Bronze Age pits on the LTCP (BAAMP00) and M11 sites (BAALR00), but concentrations of charred plant remains were fairly low. Emmer wheat, spelt wheat and hulled barley were being grown on a small scale during the Bronze Age and Early Iron Age, but there was no evidence to confirm that this was taking place on the local heavy clay soils. More easily worked soils in the valley bottoms may have been used at this time.

By the Late Iron Age several samples from the M 11 (BAALR00) and the LTCP sites (BAACP00) produced much higher concentrations of charred cereal remains. Changes to the landscape, artefactual evidence and the environmental evidence all indicated that the level of settlement and agricultural development of the area increased from the LIA onwards. From the arable perspective, emmer, spelt and barley were still the principal crops during the LIA/ERB period, although oats may have been introduced as an energy-rich fodder crop. The high incidence of small-seeded leguminous weed seeds in these samples suggests that nitrogen depletion of the soil could have become a problem.

By the late Roman period this was no longer the case, even though large-scale spelt cultivation was occurring at the time. This suggests that manuring was taking place. Other improvements in crop husbandry may also have been adopted, such as improved drainage of damper areas and hand-weeding of fields, since the overall number of weed seeds, particularly wet-ground taxa, was much lower in the later samples. Stinking chamomile seeds, a weed of heavy clay soils, occurred in Mid-Roman and later samples, indicating the cultivation of boulder clay on the plateau. An increased range of fodder crops was probably being grown during the later RB period including both oats and rye. However, separation of the crops appears to have been much greater, since the spelt processing waste (which was by now being produced in large quantities) was very pure, with few contaminants such as weed seeds or relict crops. Spelt cultivation and large-scale processing was taking place on the site during the mid to late Romano-British period, necessitating the use of corn driers in order to process large quantities of grain at a time. This marks a distinct change from earlier periods, where cereals would have been stored in semi-processed spikelet form and been processed on a small scale, as required for cooking. It suggests that spelt wheat was being traded during the later Romano-British period rather than being solely grown for local use, as longevity in storage was obviously less important than ease of transport (clean grain is less bulky to transport but is more susceptible to insect and fungal attacks). Additional crops being grown were flax and peas, and a range of native fruits and hazelnuts were being collected from the hedgerows. Bread-type wheat, which was recovered in small quantities from the LIA onwards (as well as the single Neolithic grain), became more frequent in the later Romano-British

samples but was still a minor component. This, however, could be a gross under-representation, since free-threshing cereals do not require parching prior to dehusking, unlike emmer and spelt wheat.

By the Late Saxon period free-threshing bread-type wheat had become the dominant cereal grown, as is the case in most areas of the British Isles. However, only a small number of samples of this date have been excavated in the Stansted area, and in three samples from a burnt-down building on the LTCP site (BAAMP00) oats were dominant. A little rye and a few hulled wheat grains were also present amongst the charred remains. A radiocarbon date on one of the hulled wheat grains confirmed that this cereal (probably spelt wheat) continued to be grown into the Late Saxon period.

Information about the early medieval diet was greatly increased by the excavation of two cess deposits containing mineralised plant remains. The assemblages revealed the occupants to have had a fairly simple diet of cereals, legumes (peas and beans), native fruits and nuts (brambles, apples, damson/bullace, cherry/sloe, hazelnut), with opium poppy being used as a flavouring. Fruit remains were notably frequent in comparison with other faecal deposits examined by the author (eg Carruthers 2005). The small number of other medieval and post-medieval charred samples examined produced only one major change – the introduction of rivet-type wheat in addition to bread-type wheat. As in the Late Saxon period, rye and oats were being cultivated, though probably only for fodder, since their occurrences were low. Barley was only recovered from the Post-Medieval samples, so perhaps cultivation of this crop was abandoned for a while because of the unsuitability of the heavy clay soils. Peas and beans continued to be important, possibly being used in crop rotations, and cultivated vetch may have been grown during the Late Saxon to medieval periods, although this identification has not been confirmed. The only additional fruits that may have been imported or grown in orchards and gardens at the hunting lodge during the post-medieval period were grapes and damsons. Since only a few waterlogged samples were examined, all of which were fairly devoid of domestic waste, this lack of evidence for luxury goods could be due to the limitations of archaeobotanical preservation. It is interesting to note that both peas and beans were still being used at the hunting lodge, since legumes were often seen as ‘peasants food’. However, they may have been grown as fodder for livestock, game birds or for the staff.

It is interesting to see that, despite the difficulties of cultivating the Essex Boulder Clay, very few differences in the timing of the major crop species introductions were found in comparison with other sites across southern and central England. Once suitable ploughs had been developed to cope with the heavy, clay soils the landscape must have been rapidly transformed, particularly during the Late Iron Age and Romano-British periods. This may relate to the fact that, at this time, spelt wheat and bread wheat were the principal crops being used for human consumption, and out of all of the cereals these taxa were the best suited to heavy soils. Possible improvements in crop husbandry practices during the later Romano-British period, including manuring and weeding, must have lead to good yields being obtained from the boulder clay, since this area appears to have been deliberately selected for large scale spelt cultivation and processing earlier in the period than in most parts of the British Isles. Large deposits of spelt processing waste are more commonly found on late Romano-British sites, but in the Stansted area they occurred on some early and middle Romano-British sites (Table 34.2). The continued cultivation of spelt into the Late Saxon period is further evidence of its value as a crop on these soils. The only crop that appears to have suffered on the clay was barley, which was present in smaller quantities than usual in most periods (apart from the Iron Age) and was absent from the Late Saxon and medieval samples. As a result, other fodder crops such as oats and cultivated vetch may have been more important.

CHARRED AND MINERALISED PLANT REMAINS FROM THE SG SITE

Methods

Excavations were carried out by Framework Archaeology during 2003 in advance of construction work on the SG site. During the excavations soil samples were taken from a range of features for the recovery of environmental information. The samples were processed by Framework staff using standard methods of floatation. A 250 micron mesh was used to recover the flot and a 0.5 mm mesh was used to retain the residue.

In September 2003 the dried flots (and several residues) from 22 samples were assessed by the author for charred and mineralised plant remains. This led to the further analysis of eight samples, comprising an Early Neolithic tree-throw, a Middle/Late Iron Age pit and four Late Saxon features. This report discusses the results of the analysis.

Results

Lists of plant taxa recorded in the samples are presented in Table 34.6 Nomenclature and most of the habitat information follows Stace (1997). Other texts consulted in order to characterise the assemblages were Ellenberg (1988) and Hill *et al.* (1999).

Discussion

The charred plant remains from the SG site were not particularly well-preserved or plentiful, but they provided a few significant pieces of economic information that can be added to the accumulating environmental evidence from the Stansted area (Murphy 2004; Carruthers 2007). The results are described below, feature by feature, and then discussed in the context of other excavations in the area.

Early Neolithic tree-throw, 496001 (sample 6330, context 496006)

Although 38 litres of soil was processed from this feature, the flot contained very little charcoal and frequent modern roots. Unfortunately, the few, poorly preserved fragments of charred plant remains recovered from the flot were thought to be of suspect origin, since they included several cultivated flax seeds (*Linum usitatissimum*). Cultivated flax has been recorded from Neolithic features on other sites, including accelerator-dated flax from a Neolithic timber hall at Balbridie, Grampian (Fairweather and Ralston 1993). However, the oily seeds of flax often become soft, distorted and fragile when charred, so their occurrence is fairly sporadic in early prehistoric deposits. Their distribution tends to be restricted to well-preserved, primary charred deposits (like the burnt down building at Balbridie) or waterlogged features (such as those at Perry Oaks, Heathrow, Carruthers, 2006). The recovery of a very large deposit of charred flax seeds (744 seeds) at Stansted Southgate from a Late Saxon posthole 80 metres north-west of the tree-throw seems to be too much of a coincidence. Flax seeds may well have spread from the posthole into a nearby Late Saxon cess pit, but are unlikely to have contaminated the tree-throw *c* 80 metres away by similar means. It is more likely that contamination occurred during sampling or sample processing. Accelerator dating of the flax seeds from the tree-throw feature confirmed suspicions that the remains were Late Saxon in date (NZA-25461: 780-900 ± 30 AD).

The cereal grains were too poorly preserved to be identified to a specific cereal type, although a small fragment of free-threshing wheat rachis (*Triticum* sp.) was present. Free threshing wheat was fairly well represented in a posthole at Balbridie (Fairweather and Ralston 1993), so its presence in a Neolithic feature at Southgate is not impossible. However, free-threshing rachis fragments tend to be rare in these types of assemblages, so suspicions were once again raised. Because contamination was confirmed for the flax, the few poorly preserved possible cereal grains in the feature must also remain suspect. Therefore, no reliable evidence for cereal cultivation was recovered for the Neolithic period on the SG site.

Middle/Late Iron Age pit 504011

Sample 6331 – A sample of domestic refuse from pit 504011 (context 54013), contained a couple of emmer/spelt spikelet forks (*Triticum dicocum/spelta*) and occasional cereal grains, including barley (*Hordeum* sp.) and emmer/spelt wheat. The only weed represented was black bindweed (*Fallopia convolvulus*). This sparse assemblage is typical of low-level general domestic waste found on many Early/Middle Iron Age sites. By the LIA most sites in southern England begin to produce higher concentrations of charred waste, indicating an increase in arable production (see discussion below).

Late Saxon features

Late Saxon ditch 499020

The fill of a Late Saxon enclosure ditch 499020 (context 500031) produced frequent, poorly preserved cereal grains which had the typical rounded profile and vacuolated state of preservation of bread-type wheat (*Triticum aestivum*-type). A single free-threshing wheat (includes bread and rivet wheat) rachis fragment was also present. No hulled wheat remains were recovered from the 20 litre soil sample, as might be expected. By the Saxon period free-threshing wheats (in particular, bread-type wheat) had become the principal cereal grown in southern England. Although bread wheat is easier to process, produces well-raised loaves and grows well on clay soils, it is demanding of nutrients and is more susceptible to predators and spoilage. These factors will have affected crop husbandry practices and methods of grain storage, although such changes are not easy to detect in the charred plant assemblages.

The few weed seeds that were present were fairly large, heavy seeds such as black bindweed and cleavers (*Galium aparine*), and these are more often present as contaminants of processed grain rather than the light fine weeds and chaff in crop processing waste. Their soil preferences are wide, providing little information about crop ecology, although the two cited examples are both climbers, twining and scrambling their way to the top of the crop where they would have been harvested with the ears. This, of course, does not rule out the possibility of harvesting low on the stalk, as low-growing weed seeds may have been lost during processing. The presence of several sedge nutlets (*Carex* spp.) indicated that some damp soils were being cultivated. Since several hazelnut shell (*Corylus avellana*) fragments were recovered from the M/LIA and four of the Late Saxon features, it appears that wild food resources were available and being exploited throughout the centuries.

Posthole 505008, context 505008, sample 6318

A 10 litre sample from this posthole in the north-west corner of the site produced 744 charred flax (*Linum usitatissimum*) seeds and numerous flax seed fragments. No cereals were present in the flot but 119 seeds of lady's bedstraw (*Galium verum*) were recorded. This non-climbing, yellow flowered relative of goosegrass may have been growing as a weed with the flax crop, although it is more typical of grassland and hedgebanks. The plant has a variety of uses; its flowers were once used to curdle milk, it has medicinal uses (eg a drug extracted from the plant prevents blood from clotting) and the leaves and root produce yellow and red dyes. It is tempting to suggest that its occurrence with the flax seeds indicates use for dyeing, though why the seeds should both become charred and concentrated in a posthole is less obvious. Flax seeds also have other uses, being a good source of oil (linseed) and an effective laxative. Although, today, breeding programmes have led to the production of strains that are more suitable for one or other purpose, in the past this useful crop is likely to have been grown for a variety of purposes. The association of the seeds with a posthole suggests that the remains could represent debris from the rippling process, where a bundle of flax plants, having been left to dry out and turn brittle, is hooked over a post and a special rake-like tool is used to 'comb' through the bundle to remove the dried leaves and seed capsules. If harvested with the flax, the lady's bedstraw seeds would also have been removed during this operation. Alternatively, a rippling post could have been used to prepare other plants for a variety of purposes. The presence of a single opium poppy seed (*Papaver somniferum*) hints at the range of other plants with medicinal uses that may have been prepared in this area. The fact that these seeds are charred could relate to extraction of oil from the seed, since heat is used prior to pressing the oil from the seeds. Alternately, the material could have burnt *in situ*, having fallen around the post into the top of the posthole. The remaining taxa from this feature consisted of a few hazelnut shell fragments, a sedge nutlet, grass seed and a stinking mayweed (*Anthemis cotula*) achene, representing general background waste.

Cess pit 498020

Samples from each of the three main fills of this pit were examined. The upper fill (context 498018, sample 6312) produced several poorly preserved charred cereal grains including bread-type wheat and some emmer/spelt wheat grains. The identification of the hulled wheats was backed up by the recovery of an emmer/spelt glume base. It is unusual, but not unprecedented, to find small quantities of hulled wheats still being grown in the Saxon period. A radiocarbon date on an emmer/spelt grain from a Late

Saxon beamslot on the MTCP site confirmed that hulled wheats (probably spelt) were still being grown in the Stansted area during AD 960-1040 ± 30 (NZA-23235).

Another crop plant that is more typical of the Saxon period is flax (*Linum usitatissimum*), and a few seeds and seed fragments were found in each of the three fills sampled. Because posthole 505008 is relatively close to this feature, the flax seeds had probably spread from the processing area into the cess pit. A radiocarbon date from an indeterminate wheat grain (*Triticum* sp.) in the lower fill, sample 6317, produced a modern date (NZA-25460), demonstrating that some intrusive material was present in the feature.

The middle fill (sample 6313) contained a smaller but similar range of domestic burnt waste and a trace of mineralised cereal bran. The lowest, primary fill, however (sample 6317), was the main source of mineralised remains, having been deposited as human faecal waste. This deposit, therefore, provides direct evidence of the Saxo-Norman diet. Of course, being a single feature it is not possible to know whether the dietary information can be taken as typical of all of the occupants of the site. However, as discussed below, very similar results were obtained from an early medieval cess pit on the MTCP site.

The mineralised faecal material suggested that a narrow range of foods was being consumed. The identifiable remains included frequent cereal bran fragments, some legume seed coat fragments including pea remains (*Pisum sativum*), and a few fruit seeds including apple/pear (*Malus sylvestris/Pyrus communis*) and brambles (*Rubus* sect. *Glandulosus*). The cereal bran was often present in concreted lumps of faecal material, and straw, hay or rush stems were often embedded in the concretions. Straw and hay had probably been used as toilet paper or to dampen smells. The small amount of charred material present may also have been deposited for this latter purpose. The charred seeds included a few cereal grains and weed seeds.

Pit 494014, context 494015, sample 6314

This charcoal-rich fill produced grains from all four cereals (wheat, barley, oats and rye), with the dominant cereal being free-threshing bread-type wheat. Just a trace of chaff was present, but weed seeds and other types of burnt waste were fairly common. The character of the assemblage was one of mixed domestic waste, perhaps originating from a domestic hearth. Thus, processed cereals and legumes (cf. pea, Celtic bean; *Vicia faba* var. *minor*) spilt during preparations from cooking, fruit stones (sloe; *Prunus spinosa*) and nutshells (*Corylus avellana*) tossed into the fire from snacks, materials used for tinder and fuel such as hay (spike-rush, grasses, small weed vetches) and animal bedding/fodder (cf. cultivated vetch; *Vicia sativa* cf. ssp. *sativa*) were all represented. Cultivated vetch was not positively identified, as important identifying characters (the hila) were not preserved. The seeds were of the typical size and shape (often squared, *c* 3.5 to 4.5 mm diameter) of cultivated vetch, and the frequency of the seeds suggested they represented a crop rather than weeds. Two larger, fatter and more rounded leguminous seeds (again with no identifying hila) were thought to have probably been peas (*Pisum sativum*) and two distinctively large and oval Celtic beans (*Vicia faba* var. *minor*) were positively identified. Together with the unidentifiable fragments of large legume, these remains demonstrate that legumes were an important part of the Late Saxon diet, particularly since these crops are less likely to become preserved by charring and so are usually under-represented in the archaeobotanical record.

Conclusions and comparisons with other sites

In view of the flax date from the Early Neolithic tree-throw, there is as yet no reliable evidence for cereal cultivation on the heavy, clay soils during the early prehistoric period from any of the Stansted, or Heathrow (Carruthers 2006) sites. Disturbance of the forest was probably limited to sporadic small clearings and transitory activities. The few charred cereal grains and hazelnut shell fragments from a pit on the MTCP site (A120, Carruthers 2007) were present in what was probably a ritual context, so they may have been grown on lighter soils elsewhere and brought into the area as an offering.

The single M/LIA sample indicated that low-level emmer/spelt wheat and barley cultivation may have been occurring by this period, although, again, the grain could have been brought onto the site rather than cultivated locally.

It is interesting to see that hazelnut shell fragments were present in five of the seven M/LIA and Late Saxon samples analysed. This relatively high occurrence matches the evidence from other Stansted sites. Surviving areas of woodland and hedgerows were clearly valued as a source of supplementary wild foods.

The archaeobotanical evidence from the Late Saxon period was a little more informative, being partly derived from mineralised faecal material as well as charred waste. The charred evidence was typical of the period, providing evidence for the cultivation of all four main cereals (bread-type wheat, barley, oats, rye), peas, beans, cultivated vetch (possibly) and flax. Native hedgerow fruits and nuts were being gathered (hazelnuts, sloes, apple/pear, blackberries) and some plants may have been grown as garden herbs (opium poppy) for culinary and medicinal purposes. Opium poppy (*Papaver somniferum*) seeds can also be used as a flavouring and are a source of oil. It is interesting to see how similar the results were from Southgate to those from an early medieval cess pit from another Stansted site (pit 310136, MTCP). Cereal and legume-based foods were again dominant, although on the MTCP site concretions containing mixed grain and legume testa (seed coat) fragments were common, whilst at Southgate these were not observed. This may represent the consumption a particular type of bread or pottage made with both cereal and pea/bean flour – a mixture which is said to be more common in a low status diet (Tannahill 1975). In addition, fruit seeds were much more frequent and varied on the MTCP site, including evidence for possible orchard crops including damson or bullace. Bramble seeds were particularly frequent, perhaps reflecting seasonal differences in diet. Of course, brambles can easily be preserved for use throughout the year, but their ready availability in woodland margins, scrub and hedgerows during autumn makes consumption more likely at this time of year. Opium poppy was being grown by the occupants of both sites.

The suggested Late Saxon diet, therefore, was a fairly simple one of mainly cereal based foods such as bread and legumes, perhaps cooked with meat as a pottage. These staples were supplemented by fruits and nuts gathered from the hedgerows such as apples, blackberries and hazelnuts. A few easily-grown imported herbs may have been cultivated in gardens for medicinal purposes, such as opium poppy. In the more urban Mid-Saxon site at St Mary's Stadium, Southampton (Carruthers 2005) similar results were obtained from a much greater number of cess pits (at least 13 pits), with the addition of only a few, scarce luxury foods such as coriander, cf. dill, cf. fennel and grape. It should be remembered that the chances of recovering some foods in an identifiable state is fairly small, for example leaf vegetables, so the mineralised evidence, although more direct than charred evidence, still provides only part of the story. Luxury foods eaten on a very sporadic basis are less likely to be recovered, particularly if they were ground into powders, as in the case of many spices. However, fruits such as figs and grapes are commonly recovered from earlier (Roman) and later (medieval) cess pits, so their absence from the Stansted sites is significant. It is clear that, in comparison, the Saxon diet was fairly simple and strongly biased towards cereals, legumes and native fruits and nuts. This appears to have been a common story for sites in southern England.

Table 34.1: The MTCP site

KEY: Remains charred unless in [ ] brackets= mineralised; > more than (too numerous to count, estimated number) ; + = counted up to this number but fragments of < ½ seed not included
Rough estimates + = present; ++ = several; +++ = frequent; ++++ = numerous
Feature types : D = ditch; DT = ditch terminus; P = pit; PH = posthole
Habitat Preferences : A = arable; C = cultivated; D = distubed/waste; E = heath; G = grassland; H = hedgerow; M = marsh/bog; R = rivers/ditches/ponds; S = scrub; W = woods; Y = waysides/hedgerows; a = acidic soils; c = calcareous soils; n = nutrient-rich soils; o = open ground; d = damp soils; * = plant of economic value

Sample	2670	2241	2407	2408	2409	2434	2516	2520
Context	353012 353011	322018 322014	334016 334013	334014 334013	334015 334013	319139 319140	330146 330145	347046 347041
phase	Neo	MBA	R	R	R	R	R	R
Taxa Feature type	P	P	P	P	P	P	P	P
Cereals :								
Triticum aestivum-type (bread-type free threshing wheat grain)	1			Cf.1	Cf.3	Cf.1	3	Cf.4
Triticum dicoccum/spelta (emmer/spelt wheat grain)			51	430	325	>500	297	322
Triticum sp. (wheat grain NFI)				3		3	60	
Hordeum vulgare L. emend. (hulled barley grain)								
Hordeum sp. (indeterminate barley grain)								
Secale cereale L. (rye grain)					cf.1	23		4
Avena sp. (wild/cultivated oat grain)						4		5
Avena/Bromus sp. (oat/chess grain)				3	1		2	1
Indeterminate cereal grain	2	8	117+	671+	249+	>500	342	>500
Chaff :								
Triticum sp. (free-threshing wheat rachis frag.)								
Triticum spelta L. (spelt glume base)		1			3	23	44	>500
Triticum spelta L. (spelt spikelet fork)						1	5	>100
Triticum spelta L. (spelt rachis frag.)						1		
Triticum dicoccum Schübl. (emmer glume base)		1				cf.1		
Triticum dicoccum Schübl. (emmer spikelet fork)								cf.1
Triticum dicoccum / spelta (emmer / spelt glume base)		11	11+	30	38	135	114	>500
Triticum dicoccum / spelta (emmer / spelt spikelet fork)		7	1+	70	27	104	118	>100
Triticum dicoccum / spelta (emmer / spelt rachis frag.)								+
Avena sp (oat awn frag.)		+			+			+
Cereal sprout					+	++		++
Cereal-sized culm node							1	8
Cereal-sized culm base								
Weeds :								
Ranunculus repens/acris/bulbosus (buttercup achene) DG							2	2
Corylus avellana L. (hazel nut shell frag.) HSW*	103							
Polygonum aviculare L. (knotgrass achene) CD							1	
Fallopia convolvulus (L.) A.Love (black-bindweed achene) AD							2	
Rumex acetosella L. (sheep's sorrel achene) CEGas						1		
Rumex sp. (dock achene) CDG				1	2	4	10	4
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG							1	
Vicia/Lathyrus sp. (>.2mm, small seeded weed vetch/tare) CDG		1			1			

Vicia faba var. *minor* (Celtic bean) *								
Trifolium/Lotus sp. (clover/trefoil) DG								
Daucus carota L. (wild carrot mericarp) Gc*								cf.1
Plantago laceolata L.(ribwort plantain) Go								
Odontites vernus/Euphrasia sp. (red bartsia/eyebright) ADGY								
Sherardia arvensis L. (field madder nutlet) ADG								
Galium aparine L. (cleavers nutlet) CDH		1						1
Cirsium/Carduus sp. (thistle achene) ADG								
Anthemis cotula L. (stinking chamomile achene) ADhw								1
Eleocharis subg. *Palustres* (spike-rush nutlet) MPw							2	1
Carex sp. (trigonous sedge nutlet) MPw					1	2	1	2
Carex sp. (lenticular sedge nutlet) MPw		1				2		
Bromus sect. *Bromus* (chess caryopsis) ADG						cf.1		1
Poaceae *Poa*-type (small seeded grass caryopsis) CDG								1
Poaceae *Lolium*-type (long seeded grass caryopsis) CDG								
Grass-sized culm fragments						+++		
Sparganium erectum L. (branched bur-reed fruit) MPw								
Total charred remains:	106	31	180+	1209+	651+	>1306	1005	>2059
Sample size:	40	40	40	40	40	40	15	40
Fragments per litre:			4.5+		16.3+		67	

Table 34.1 (contd.): BAAMP00/MTC

Sample Context Feature	2709 319313 319313	2425 338015 338022	2428 337019 333072	2436 319148 319149	2437 319150 319151	2438 319153 319154	2439 319158 319159
phase	R	LR	LR	LR	LR	LR	LR
Taxa Feature type	D	K	D	G	G	G	G
Cereals :							
Triticum aestivum-type (bread-type free threshing wheat grain)		cf.1	1		cf.1		Cf.10
Tritium monococcum/dicoccum (einkorn/emmer grain)			1				
Triticum dicoccum/spelta (emmer/spelt wheat grain)	257	54	>500	47	95	18	>500
Triticum dicoccum/spelta (emmer/spelt wheat grain - sprouted)			++		++		
Triticum sp. (indeterminate wheat grain)	2	2		2			
Hordeum vulgare L. emend. (hulled barley grain)			3				
Hordeum sp. (indeterminate barley grain)	3		4				2
Secale cereale L. (rye grain)							
Avena sp. (wild/cultivated oat grain)	2		Cf.1		4		
Avena/Bromus sp. (oat/chess grain)				2			
Indeterminate cereal	>500	212+	>500	205	191	37	>500
Chaff :							
Triticum sp. (free-threshing wheat rachis frag.)							
Triticum spelta L. (spelt glume base)	3	28	>500	68	181	10	23
Triticum spelta L. (spelt spikelet fork)	1		>100	1	2		

Triticum spelta L. (spelt rachis frag)			+	1	1		1
Triticum dicoccum Schübl. (emmer glume base)	1		4				
Triticum dicoccum Schübl. (emmer spikelet fork)	1						
Triticum dicoccum / spelta (emmer / spelt glume base)	19	177	>500	>500	>500	107+	52+
Triticum dicoccum / spelta (emmer / spelt spikelet fork)	5	25	>100	>100	>100	33+	7+
Triticum dicoccum / spelta (emmer / spelt rachis frag.)		1					
Avena sp (oat awn frag.)	+	++	+++		+++	+	+
Detached cereal sprout			++		+++	+	
Cereal-sized culm node	3		1		1		
Cereal-sized culm base	1						
Weeds :							
Ranunculus repens/acris/bulbosus (buttercup achene) DG	2			2	1	1	1
Corylus avellana L. (hazel nut shell frag.) HSW*	37	1			1		
Montia fontana ssp. *chondrosperma* (Fenzl) Walters (blinks seed) GPw	1						
Polygonum aviculare L. (knotgrass achene) CD	1						
Fallopia convolvulus (L.) A.Love (black-bindweed achene) AD	1		11	1	2		
Rumex acetosella L. (sheep's sorrel achene) CEGas							
Rumex sp. (dock achene) CDG	64	1	63	4	10	3	6
Viola sp. (violet seed) DGH	1						
Punus spinosa L. (sloe stone) HSW*	2						
Rosaceae thorn (sloe/hawthorn-type thorn)	1						
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG	10	1					1
Vicia/Lathyrus sp. (>.2mm, small seeded weed vetch/tare) CDG	1						
Pisum sativum L. (pea) *		cf.2					
Large legume frag. (pea/bean/vetch) DG*		1					
Trifolium/Lotus sp. (clover/trefoil seed) DG	4						
Daucus carota L. (wild carrot mericarp) Gc*	cf.1		cf.2				
Prunella vulgaris L. (self-heal nutlet) DG	2						
Plantago laceolata L.(ribwort plantain) Go							
Odontites vernus/Euphrasia sp. (red bartsia/eyebright) ADGY	14		3				
Sherardia arvensis L. (field madder nutlet) ADG	9						
Galium aparine L. (cleavers nutlet) CDH			1				
Galium sp. (cleaver nutlet frag)	1						
Valerianella dentata (L.)Pollich. (narrow-fruited cornsalad fruit) AD	3						
Cirsium/Carduus sp. (thistle achene) CDGH	1		1				
Anthemis cotula L. (stinking chamomile achene) ADhw		1	2	1	2		
Tripleurospermum inodorum (L.)Sch.Bip. (scentless mayweed achene) CD	1		1				
Eleocharis subg. *Palustres* (spike-rush nutlet) MPd							
Carex sp. (trigonous sedge nutlet) MPd	6						
Carex sp. (lenticular sedge nutlet) MPd	1		1				
Danthonia decumbens (L.)DC (heath-grass caryopsis) EGas	1						
Bromus sect. *Bromus* (chess caryopsis) ADG	7	1	1		2	1	
Poaceae *Poa*-type (small seeded grass caryopsis) CDG	6		8			1	
Poaceae *Lolium*-type (long seeded grass caryopsis) CDG							

Arrhenatherum elatius var. *tuberosum* (Willid.)St Amans (onion couch tuber) CDG	4						
Grass-sized culm frags	+						
Mineralized worm cocoon	[1]						
Total charred remains:	>981	508+	>2309	>934	>1094	211+	>1103
Sample size:	27	30	40	20	37	24	40
Fragments per litre:	>36.3	16.9+	>57.7	>46.7	>29.6	8.8+	

Table 34.1 (contd.): BAAMP00/MTC

Sample Context Feature	2004 309032 302020	2005 309033 302020	2019 315009 302020	2068 307012 302020	2737 310139 310136	2738 310140 310136	2741 366004 366001	2211 322008 322007	2212 315052 315051
phase	EM	EM	EM	EM	EM	EM	M	?M	M
Taxa Feature type	B	B	B	B	P	P	P	P	P
Cereals :									
Triticum aestivum-type (bread-type free threshing wheat grain)	7	10	4		Cf.5	1	22	510	202
Triticum dicoccum/spelta (emmer/spelt wheat grain)			11						
Triticum sp. (wheat grain NFI)					1				
Hordeum vulgare (hulled barley grain)									
Secale cereale L. (rye grain)		cf.2	cf.1			cf.[3]		7	
Avena sp. (wild/cultivated oat grain)	154	357	6	129				11	1
Avena/Bromus sp. (oat/chess grain)				3				3	
Indeterminate cereals	236	384	44	6	6		6	583	139
Chaff :									
Triticum aestivum-type (bread-type wheat rachis frag.)								2	
Triticum turgidum-type (rivet-type wheat rachis)								2	
Triticum sp. (free-threshing wheat rachis frag.)			1				6	16	4
Triticum dicoccum / spelta (emmer / spelt glume base)			1						
Avena sp (oat awn frag.)			+						
Cereal bran fragments					[+++]	[+++]			
Cereal-sized culm node							20	3	1
Cereal-sized culm base							5	1	
Straw/rush/sedge stem fragments					[+]	[+++]			
Weeds :									
Ranunculus repens/acris/bulbosus (buttercup achene) DG		3	1			[3]		2	
Papaver somniferum L. (opium poppy					[1]				

seed) D*									
Urtica dioica L. (stinging nettle achene) CDn						[1]			
Corylus avellana L. (hazel nut shell frag.) HSW*	1	5	1		2			3	1
Atriplex patula/prostrata (orache seed) CDn							43		
Chenopodiaceae embryo						[6]	5		
Polygonum aviculare L. (knotgrass achene) CD						[1]	54		
Fallopia convolvulus (L.) A.Love (black-bindweed achene) AD				1			14		
Rumex sp. (dock achene) CDG		1	1	5	[1]	[16]	7		1
Brassica/Sinapis sp. (mustard, charlock etc. seed) CD*					[1]	[1]			
Rubus sect. *Glandulosus* (bramble seed) HSW*					[299]	[32]		1	
Rubus sp. (bramble/raspberry embryo) HSW*						[51]			
Malus sylvestris (L.)Mill. (crab apple seed) HSW*					[1]				
Malus/Pyrus sp. (apple/pear embryo) HSW*					[2]	[14]			
Potentilla/Fragaria vesca (tormentil/strawberry embryo) GH*						[2]			
Prunus domestica cf. ssp. institia (cf. damson, bullace embryo) *HSW					[23]	[11]			
Prunus avium/spinosa L. (cherry/sloe embryo) HSW*					[6]	[14]			
Prunus sp. (cherry/sloe/plum/damson seed fragment) HSW*					[11]	[15]			
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG	2	6		6	1			1	
Vicia/Lathyrus sp. (>.2mm, small seeded weed vetch/tare) CDG								13	1
Vicia faba var *minor* L. (whole Celtic bean) *								6	
Vicia faba L. (bean hilum & testa fragment)					[1]				
Pisum sativum L. (whole pea) *						[1]			
Pisum sativum L. (pea hilum & testa fragment) *						[3]			
Legume (pea/bean) testa frags					[++]	[+++]			
Legume testa & cereal bran fragments concreted together					[5]	[30]			

Vicia/Pisum sp. (large legume frag)								10	
Legume pod fragment								1	
Trifolium/Lotus sp. (clover/trefoil) DG							2		
Aethusa cynapium L. (fool's parsley mericarp) CD						[1]	3		
Scandix pecten-veneris L. (shepherd's needle mericarp) AD							7		
Galeopsis tetrahit L. (common hemp-nettle nutlet) ADWod							1		
Stachys sylvatica L. (hedge woundwort nutlet) DHW							2		
Odontites vernus/Euphrasia sp. (red bartsia/eyebright) ADGY							12	1	
Galium aparine L. (cleavers) CDH	3	1	1						
Sambucus nigra L. (elderberry seed) HSWn							1		
Cirsium/Carduus sp. (thistle achene) CDG						[2]	1		
Anthemis cotula L. (stinking chamomile achene) ADhw					3		38	1	
Lapsana communis L. (nipplewort achene) CDH				1					
Asteraceae embryo						[1]			
Eleocharis subg. *Palustres* (spike-rush nutlet) MPd	1								

Table 34.1 (contd.): BAAMP00/MTC

Sample Context Feature	2004 309032 302020	2005 309033 302020	2019 315009 302020	2068 307012 302020	2737 310139 310136	2738 310140 310136	2741 366004 366001	2211 322008 322007	2212 315052 315051
phase	EM	EM	EM	EM	EM	EM	M	?M	M
Taxa Feature type	B	B	B	B	P	P	P	P	P
Sparganium erectum L. (branched bur-reed fruit) PMw	1	1							
Carex sp. (trigonous sedge nutlet) MPw			1		[7]		8	2	
Carex sp. (lenticular sedge nutlet) MPw	1	1							
Bromus sect. *Bromus* (chess caryopsis) ADG	9	14		6		[4]		13	4
Poaceae various (small seeded grass caryopsis) CDG						[7]	4	1	
Worm cocoon					[2]	[2]			
Nodule					[2]				
Insect/Arthropod frags						[+++]			
Total charred remains:	415	785	73	157	18[362]	1[221]	262	1193	354
Sample size:	20	10	37	20	40	23	30	32	40
Fragments per litre:	20.8	78.5	2.0	7.9	9.5	9.7	8.7	37.3	8.9

Table 34.2: The M11 site

Sample Context Feature	6140 423050 423049	6211 436092 436091	6117 430019 430039	6131 439014 439013
phase	MBA	EIA	M/LIA	LIA
Taxa Feature type	P	P	RG	D
Cereals :				
Triticum dicoccum/spelta (emmer/spelt wheat grain)	10	6	89	40
Triticum sp. (indeterminate wheat grain)			1	
Hordeum vulgare L. emend. (hulled barley grain)			4	
Hordeum sp. (indeterminate barley grain)	1	5	19	4
Avena sp. (wild/cultivated oat grain)	cf.1		9	
Avena/Bromus sp. (oat/chess grain)	4		17	
Indeterminate cereals	60	11	>500	99
Chaff :				
Triticum spelta L. (spelt glume base)				6
Triticum spelta L. (spelt spikelet fork)	1			1
Triticum dicoccum Schübl. (emmer glume base)	1			12
Triticum dicoccum Schübl (emmer spikelet fork)				9
Triticum dicoccum / spelta (emmer / spelt glume base)	3	1	2	46
Triticum dicoccum / spelta (emmer / spelt spikelet fork)	20	1	4	31
*Hordeu*m sp. (barley rachis frag.)			4	1
Avena sp (oat awn frag.)	++		++	++
Weeds :				
Corylus avellana L. (hazel nut shell frag.) HSW*	5	3	13	
Chenopodium album L. (fat hen seed) CDn			9	
Montia fontana ssp. *chondrosperma* (Fenzl) Walters (blinks seed) GPw		1	1	
Persicaria maculosa/lapathifolia (redshank/pale persicaria achene) CDo			10	
Polygonum aviculare L. (knotgrass achene) CD			1	
Fallopia convolvulus (L.) A.Love (black-bindweed achene) AD	1		3	
Rumex acetosella L. (sheep's sorrel achene) CEGas			2	
Rumex sp. (dock achene) CDG			29	4
Thlaspi arvense L. (field penny-cress seed) AD				1
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG	3		33	
Vicia/Lathyrus sp. (>.2mm, small seeded weed vetch/tare) CDG	2			
Trifolium/Lotus sp. (clover/trefoil seed) DG			3	
cf. *Aethusa cynapium* L. (fool's parsley mericarp) CD			1	
Prunella vulgaris L. (self-heal nutlet) DG				1
Galeopsis tetrahit L. (common hemp-nettle nutlet) ADWod			1	
Plantago laceolata L.(ribwort plantain) Go			4	
Odontites vernus/Euphrasia sp. (red bartsia/eyebright) ADGY	3		7	
Galium aparine L. (cleavers) CDH	27	3		
Valerianella dentata (L.)Pollich. (narrow-fruited cornsalad fruit) AD	1		2	
Lapsana communis L. (nipplewort achene) CDH	Cf.1			
Tripleurospermum inodorum (L.)Sch.Bip. (scentless mayweed achene) CD			1	3
Asteraeae embryos				3
Eleocharis subg. *Palustres* (spike-rush nutlet) MPw			1	
Carex sp. (trigonous sedge nutlet) MPw			1	
Bromus sect. *Bromus* (chess caryopsis) ADG			22	1
Poaceae *Poa*-type (small seeded grass caryopsis) CDG	1		18	
Poaceae *Lolium*-type (long seeded grass caryopsis) CDG			cf.2	
Total charred remains:	145	31	>813	262
Sample size:	40	30	(50%) 31	5
Fragments per litre:	3.6	1.0	>52.5	52.4

Table 34.3: The LTCP and LBR sites

Sample Context Feature	476 107067 109169	297 138015 109212	324 150003 102071	371 136013 136045	258 129025 109214	296 129032 109214	LBR 4013 207021 207013
phase	LIA	LIA/ER	LIA/ER	LIA/ER	ER	ER	R
Taxa Feature type	D	D	D	P	D	D	D
Cereals :							
Triticum aestivum-type (bread-type free threshing wheat grain)				cf.8	5	1	3
Triticum compactum-type (compact-type free threshing wheat grain)					1	5	
Triticum dicoccum/spelta (emmer/spelt wheat grain)	18	34	92	151	>500	132	>500
Triticum sp. (indeterminate wheat grain)			2	10			
Hordeum vulgare L. emend. (hulled barley grain)		8	5		11	5	
Hordeum sp. (indeterminate barley grain)	16	4	14	1		4	1
Secale cereale L. (rye grain)					cf.3		Cf.3
Avena sp. (wild/cultivated oat grain)		cf.2	1 & cf2	2	2		Cf.2
Avena/Bromus sp. (oat/chess grain)	1		26	7	27	8	2
Indeterminate cereals	49	75	280+	54	>500	149	>500
Chaff :							
Triticum sp. (free-threshing wheat rachis frag.)			1		2	2	1
Triticum spelta L. (spelt glume base)	1	1	38	1	271	55	>500
Triticum spelta L. (spelt spikelet fork)					6	2	>100
Triticum spelta L. (spelt rachis frag.)					8	2	
Triticum dicoccum Schübl. (emmer glume base)	1					Cf.1	Cf.8
Triticum dicoccum / spelta (emmer / spelt glume base)	16	7	92	12	72	63	>500
Triticum dicoccum / spelta (emmer / spelt spikelet fork)	10	4	12		39	25	>100
Triticum dicoccum / spelta (emmer / spelt rachis frag.)			1		2	1	
Hordeum sp. (barley rachis frag)			1		2	19	
Avena sp (oat awn frag.)		++	+++			+	
Detached cereal sprout					+	+	+
Cereal-sized culm node	6				11	1	+
Cereal-sized culm base	2				8	1	
Weeds :							
Ranunculus repens/acris/bulbosus (buttercup achene) DG	1		1	3	5	1	
Ranunculus parviflorus L. (small-flowered buttercup achene) o					1	2	
Corylus avellana L. (hazel nut shell frag.) HSW*		18	1		17	1	
Chenopodium album L. (fat hen seed) CDn			2		3		
C. polyspermum L. (many-seeded goosefoot seed) CD							3
Atriplex patula/prostrata (orache seed) CDn					2		8
Montia fontana ssp. *chondrosperma* (Fenzl) Walters (blinks seed) GPw		1	1	2	10	4	
Agrostemma githago L. (corn cockle, capsule frag.) AD					7	3	
Stellaria media (L.)Vill. (common chickweed seed) Con		3		1	1	1	
S. graminea L. (lesser stitchwort seed) Gd					1		
Lychnis flos-cuculi L. (ragged-robin seed) GMw		1					
Polygonum aviculare L. (knotgrass achene) CD			9	3	33	1	3
Persicaria maculosa/lapathifolia (redshank/pale persicaria achene) CDo	1						
Fallopia convolvulus (L.) A.Love (black-bindweed achene) AD		2	1	1	2		38
Rumex acetosella L. (sheep's sorrel achene) CEGas			2	3	19	7	3
Rumex sp. (dock achene) CDG	1	13	26	7	69	15	155
Viola sp. (violet seed) DGH							cf.1
Crataegus monogyna Jacq. (hawthorn stone frag.) HSW*					2		
Prunus spinosa L. (sloe stone) HSW*					1	1a	
Rosa sp. (rose stone) HSW*						1	
Pisum sativum L. (pea) *					5	cf.1	
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG	7	29	24	2	31	74	1
Vicia/Lathyrus sp. (>.2mm, small seeded weed vetch/tare) CDG					28	6	
Trifolium/Lotus sp. (clover/trefoil seed) DG			1	9	17	20	1

Legume pod fragment						1	
Linum usitatissimum L. (cultivated flax seed) *					1		
Conium maculatum L. (hemlock mericarp) GDw						Cf.1	
Daucus carota L. (wild carrot mericarp) Gc*					3		
Hyoscyamus niger L. (henbane seed) Dn					2		
Lithospermum arvense L. (field gromwell seed) AD				5			
Plantago lanceolata L.(plantain seed) Go			1	1			
Odontites vernus/Euphrasia sp. (red bartsia/eyebright) ADGY			7	9	1	23	
Rhinanthus sp. (yellow-rattle seed) ADG				3	5		
Sherardia arvensis L. (field madder nutlet) ADG		1	1		4	3	
Galium aparine L. (cleavers nutlet) CDH	2			4	5	5	
G. verum L. (lady's bedstraw nutlet) Gcd					1		
Valerianella dentata (L.)Pollich. (narrow-fruited cornsalad fruit) AD		1		2		7	
Lapsana communis L. (nipplewort achene) CDH					1		
Centaurea sp. (knapweed achene) ADG							1 & 5f
Picris sp. (oxtongue achene) CDoc							Cf.1
Anthemis cotula L. (stinking chamomile achene) ADhw							3

Sample Context Feature	476 107067 109169	297 138015 109212	324 150003 102071	371 136013 136045	258 129025 109214	296 129032 109214	LBR 4013 207021 207013
phase	LIA	LIA/ER	LIA/ER	LIA/ER	ER	ER	R
Taxa (contd.) Feature type	D	D	D	P	D	D	D
Leucanthemum vulgare Lam. (oxeye daisy achene) Gn					2		
Tripleurospermum inodorum (L.)Sch.Bip. (scentless mayweed achene) CD		4	2	33	12	20	2
Eleocharis subg. *Palustres* (spike-rush nutlet) MPw		3	1	10	1	1	
Carex sp. (trigonous sedge nutlet) MPw			5	8	7	4	
Carex sp. (lenticular sedge nutlet) MPw			1	3	4	1	
Arrhenatherum elatius var. *tuberosum* (Willid.)St Amans (onion couch tuber) CDG				1	2		
Bromus sect. *Bromus* (chess caryopsis) ADG	30	1	34	32	119	41	12
Danthonia decumbens (L.)DC (heath-grass caryopsis) EGas			1		1		
Poaceae *Poa*-type (small seeded grass caryopsis) CDG			16	6	16	11	24
Poaceae *Lolium*-type (long seeded grass caryopsis) CDG		1	2	59	119	36	42
? Liliaceae					1		
Total charred remains:	162	213	706+	453	>2031	768	2523
Sample size:	12	40	40	35	40	40	36
Fragments per litre:	13.5	5.3	17.7+	12.9	>50	19.2	70.1

Table 34.4: The LTCP phase 3 hunting lodge

Sample Context Feature	840 467028 459026	841 467030 467032	920 461027 461038
phase	PM	PM	PM
Taxa Feature type	H	H	W
Cereals :			
Triticum aestivum/turgidum –type (bread/rivet-type free threshing wheat grain)	699	3	19
Hordeum vulgare L.emend. (hulled barley grain)	42		15
Secale cereale L. (rye grain)	3		
Triticum/Secale cereale (wheat/rye grain)			2
Avena sp. (wild/cultivated oat grain)	3	cf.1	7
Avena/Bromus sp. (oat/chess grain)	2		
Indeterminate cereals	265	4	71
Chaff :			
Triticum aestivum-type (bread-type wheat rachis frag.)	3	1	
T. turgidum-type (rivet-type wheat rachis frag.)	3		23
cf. *T. turgidum*-type (cf. rivet-type wheat rachis frag.)	21		
Triticum sp. (free-threshing wheat rachis frag.)	380		89
Hordeum sp. (barley rachis frag)	15		
Secale cereale L. (rye rachis frag.)	5		
Cereal-sized culm node	4		4
Cereal-sized culm base	2		
Weeds :			
Polygonum aviculare L. (knotgrass achene) CD	1		
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG	11		
Vicia/Lathyrus sp. (>.2mm, small seeded weed vetch/tare) CDG	1		
Vicia faba (Celtic/broad bean frag.) *			1
Pisum sativum L. (pea) *	1	cf.2	
Trifolium/Lotus sp. (clover/trefoil seed) DG			1
Anthemis cotula L. (stinking chamomile achene) ADhw	2		10
Lolium temulentum (darnel caryopsis)		1	
Total charred remains:	1463	12	242
Sample size (litres soil):	40	40	1
Fragments per litre:	36.6	0.3	242

KEY
Feature type: B = beamslot; D = ditch; G = gully; H = hearth; K = kiln; P = pit; RG = ring gully; W = well
Habitat preferences: * = cultivated plant; A = arable; C = cultivated; D = disturbed/waste ground; E = heath; G = grassland; H = hedgerow; M = marsh/bog; P = ponds/ditches/rivers; S = scrub; W = woodland; Y = waysides
Soil preferences: a = acidic; c = calcareous; d = dry; o = open; s = sandy; w = damp/wet
+ = occasional; ++ = several; +++ = frequent; ++++ = numerous
[ ] = mineralized; no brackets = charred
cf. = uncertain identification

Table 34.5: The waterlogged plant remains

Site	MTCP BAAMP00	MTCP BAAMP00	MTCP BAAMP00	M11 BAALR00	LTCP BAACP01	LTCP BAACP01
Sample	**2677/2684**	**2677/2685**	**2677/2687**	**6223**	**909**	**921**
Context	**316123**	**316123**	**316120**	**431042**	**464037**	**461035**
depth	**0.47m**		**0.63m**			
Feature type	**RD**	**RD**	**RD**	**430084**	**pit**	**well**
Phase / **Taxa**	**BA**	**BA**	**BA**	**LBA**	**PM**	**PM**
cf. *Triticum dicoccum/spelta* (cf. emmer/spelt glume base) *				1		
Ranunculus acris/bulbosus/repens (buttercup achene) DG		3		10	34	6
R. subg. *Batrachium* (crowfoot achenes) BP	256	>500	29	70	4	1
R. sceleratus L. (celery-leaved buttercup achene) MP					2	
Humulus lupulus L. (hop achene) HSF*					1	
Urtica dioica L. (stinging nettle achene) CDn	10	22	7	>500	14	51
Urtica urens L. (small nettle achene) CDn						5
Alnus glutinosa L. (alder seed) WSF			1			
Chenopodium bonus-henricus L. (Good King Henry seed) WGn						1
Chenopodium album L. (fat-hen seed) CDn				13	7	1
C. polyspermum L. (many-seeded goosefoot seed) CD				5		
Atriplex patula/prostrata (orache seed) CDn				3	8	
Moehringia trinervia (L.)Clairv. (three-nerved sandwort seed) HW				20		
Agrostemma githago L. (corn cockle seed) A						1f
Stellaria media (L.) Villars (common chickweed seed) CD				80	4	
S. graminea L. (lesser stitchwort seed) Gd				1		3
Silene vulgaris Garke (bladder campion seed) DGo					1	
Fallopia convolvulus (L.)A.Love (black bindweed achene) CD					1	1
Rumex acetosella L. (sheep's sorrel achene) GECas					2	
R. conglomeratus Murray (clustered dock achene) woBP					3	
Rumex sp. (dock achene) CDG	3	25	1	69	26	3
Persicaria lapathifolia (L.)Gray (pale persicaria achene) CDd				1	1	1
Persicaria maculosa Gray (redshank nutlet) CDo				1	1	
Polygonum aviculare (knotgrass achene) CD				3	7	6
*P. hydropiper (*L.)Spach (water-pepper achene) Pwh					5	
Viola sp. (violet seed) GHW	5	1	1		1	
Alliaria pertiolata (M.Bieb.)Cavara & Grande (garlic mustard seed) DHy				1		
Raphanus raphanistrum L. (wild radish seed) CD						6
Raphanus raphanistrum L. (wild radish capsule frag.) CD						1
Rubus sect. *Glandulosus* (bramble seed) DHSW*	6	6		14	1	
Potentilla cf. *reptans* L. (cf. creeping cinquefoil achene) DHGo					87	
Potentilla sp. (cinquefoil achene) DGMY	1		4			
Agrimonia eupatoria L. (agrimony achene) GH						1
Rosa sp. (rose seed) HSW				2		
Rosa /Rubus sp. (rose/bramble type thorn) HSW		2		7	+	++
Prunus domestica ssp. *inititia* (L.)Bonnier & Layens (bullace/damson stone) *						3
Prunus sp. (sloe stone fragments) HSW			1	1		2f
Prunus/Crataegus sp. (sloe /hawthorn type thorn) HSW		1		3	+	++
Crataegus monogyna Jacq. (hawthorn fruit stone) HSW		1		6&5f		4i
Pisum sativum L. (garden pea frag.) *						1f
Medicago lupulina L. (black medick fruit) GD						1
Cornus sanguinea L. (dogwood seed) HSWl				2		

cf. *Buxus sempervirens* L. (cf. box leaf) WSHc						1
Frangula alnus Mill. (alder buckthorn seed frag.) MSWo				1&2f		
Vitis vinifera L. (grape pip) *						2
Linum usitatissimum (cultivated flax capsule frags) *				3		
Linum catharticum L. (fairy flax seed) Gcs			1			
Acer sp. (maple key frag.) HSW	Cf.1			1		
Aethusa cynapium L. (fool's parsley mericarp) CD				3		
Apium nodoflorum (L.)Lag. (fool's watercress mericarp) MPw					6	
Umbellifer cf. *Bupleurum rotundiflorum* L. (cf. thorow-wax mericarp) Ac						1
Conium maculatum L. (hemlock mericarp) DPYw						3
Daucus carota L. (wild carrot mericarp) Gc*	1	1		cf.1 & {1}		1
Chaerophyllum temulum L. (rough chrvil mericarp) GHWo				6		1
Anthriscus sylvestris (L.)Hoffm. (cow parsley mericarp) GHWo						141
Scandix pecten-veneris L. (shepherd's needle mericarp) AD						4
Lycopus europaeus L. (gypsywort nutlet) FGwPB	14	14	3		4	
Prunella vulgaris L. (selfheal nutlet) GDWo		1	1	1	6	
Ballota nigra L. (black horehound nutlet) HYD		2				
Lamium sp. (dead-nettle nutlet) CDY				3		
cf.*Marrubium vulgare* L. (cf. white horehound nutlet) GDo	2		1			
Galeopsis tetrahit L. (common hemp-nettle nutlet) ADWod				3	1	
Stachys sp. (woundwort nutlet) GHEWM	1			2		1
Mentha sp. (mint nutlet) GBM	58	33	3		4	1
Callitriche sp. (water-starwort fruit) P	1	2	3	10		
Plantago laceolata L.(ribwort plantain seed) Go				3	6	2
Hypericum sp.(St John's wort seed) G	2	6				
Sambucus nigra L. (elder seed) DHSW	16	5		10		
Valerianella dentata (L.) Pollich (narrow-fruited corn-salad seed) AD						1
Valeriana dioica L. (marsh valerian fruit) MF					1	
Bidens cernua L. (nodding bur-marigold achene) PM		2				
Bidens sp. (bur-marigold achene) PM		2				
Arctium lappa L. (greater burdock achene) DWoY					cf.1f	1
Carduus/Cirsium sp. (thistle achene) GDY	3	3	2	2	4	
Lapsana communis L. (nipplewort achene) DHWo				2	1	1
Leontodon autumnalis L. (autumn hawkbit achene) G		1			1	
Picris echioides L. (bristly oxtongue achene) Dc						1
Sonchus oleraceus L. (smooth sow-thistle achene) CDY						1
Sonchus asper (L.)Hill (prickly sow-thistle achene) CDY				1	3	
Anthemis cotula L. (stinking mayweed achene) ADhd					13	7
Taraxacum sp. (dandelion achene) CDG				1		
Alisma plantago-aquatica L. (water plantain achene) P		20			6	
Arum maculatum L. (lords and ladies seed) HWc				cf.1		
Lemna sp. (duckweed fruit) P	4	21	1	15	1	
Juncus sp. (rush seed) MPd	++	+++	++	+	++	
Eleocharis subg. *Palustres* (spike-rush nutlet) MPd					4	
Carex sp. (trigonous sedge nutlet) MPd				1	29	2
Carex sp. (lenticular sedge nutlet) MPd	12	25	1	2	3	
Glyceria sp. (sweet-grass caryopsis) P					6	
Poaceae (small seeded grass caryopsis) CDG				10	8	1
Sparganium erectum L. (branched bur-reed fruit) PM					1	
Characeae (stonewort algae)	++	++				
Cladoceran ephyppia (water-flea eggcases eg *Daphnia*)				++	++	+++
Total remains:	396 (1584)	>699	60	>902	319	271

		(>5592)		(>7216)		
Sample size	1kg	1kg	1kg	1kg	1kg	1kg
% of flot sorted	25%	12.5%	100%	12.5%	100%	100%

KEY :
All remains are waterlogged unless in { } brackets = charred
Recorded in bulk sample, not quantified : + = occasional ; ++ = several ; +++ = frequent;
NFI = not further identified ; f = fragment of seed; i = immature seed
Feature Types : RD = ring ditch; RDT = ring ditch terminus; RD1 = ring ditch primary fill; RD2 = ring ditch secondary fill; W = well pit;
Habitat Preferences: A = arable; B = river banks etc.; C = cultivated; D = disturbed/wasteground; E = heaths; F = fens; G = grassland; H = hedgerows; M = marsh/bog; P = ponds, rivers, ditches; S = scrub; W = woods; Y = waysides
Soil preferences: a = acidic; c = calcareous; d =dry; n = nutrient-rich; o = open; s = sandy; w = wet/damp
Sum of items - Total number of remains counted (number of items in 1kg sample, estimated if <100% sorted)

Table 34.6: The charred and mineralised plant remains from the SG site

Sample Context	6330 496006	6314 49405	6316 500031	6331 504013	6312 498018	6313 498019	6317 498021	6318 505008
phase	Neo?	IA	LIRB	LIRB	S-N?	S-N?	S-N?	S-N?
Taxa Feature type	T496001	P494014	ED499020	P504011	P498020			PH
Cereals :								
Triticum aestivum-type (bread-type free threshing wheat grain)		33	34		1	1		
Triticum dicoccum/spelta (emmer/spelt wheat grain)				6	4			
Triticum sp. (wheat grain NFI)							1	
Hordeum sp. (indeterminate barley grain)		4		4				
Secale cereale L. (rye grain)		cf.4						
Secale/Triticum sp. (rye/wheat grain)		8						
Avena sp. (wild/cultivated oat grain)		2						
Avena/Bromus sp. (oat/chess grain)		12						
Indeterminate cereals	2	94	107	30	12		2	
Chaff :								
Triticum sp. (free-threshing wheat rachis frag.)	1	2	1					
Triticum dicoccum / spelta (emmer / spelt glume base)					1			
Triticum dicoccum / spelta (emmer/spelt spikelet fork)				2				
Cereal bran fragments & concretions with bran						[+]	[+++]	
Concretions with straw & bran							[+]	
Straw/rush/sedge stem fragments							[++]	
Weeds :								
Ranunculus repens/acris/bulbosus (buttercup achene) DG			2		1	2		
Papaver somniferum (opium poppy seed) D*								1
Papaver sp. (poppy seed) CD		1						
Urtica dioica L. (stinging nettle achene) CDn							1	
Corylus avellana L. (hazel nut shell frag.) HSW*		7	5	1	1			4
Fallopia convolvulus (L.) A.Love (black-bindweed achene) AD			1	1				
Rumex sp. (dock achene) CDG		2	6		2		2	
Rubus sect. *Glandulosus* (bramble seed testa) HSW*						{2}	{3}	
Rubus sp. (bramble/raspberry embryo) HSW*							[1]	
Malus/Pyrus sp. (apple/pear embryo) HSW*							[3+2fg]	
Prunus spinosa L. (sloe fruit & stone frag.) HSW*		cf. 1						
Vicia/Lathyrus sp. (<=2mm, small seeded weed vetch/tare) CDG		1			1			
Vicia/Lathyrus sp. (2-3mm, small seeded weed vetch/tare) CDG		11						

Vicia/Lathyrus sp. (3-4mm, small seeded weed vetch/tare) CDG		4						
Vicia faba var *minor* L. (Celtic bean) *		2						
Vicia sativa ssp *sativa* (cultivated vetch seed) *		cf. 10						
Pisum sativum L. (whole pea) *		cf.2						
Pisum sativum L. (pea hilum & testa fragment) *							[1]	
Legume (pea/bean) testa frags							[24]	
Legume testa & cereal bran fragments concreted together							[3]	
Vicia/Pisum sp. (large legume frag)		10						
Trifolium/Lotus/Medicago sp. (clover/trefoil/medick) DG					1			
Linum usitatissimum L. (cultivated flax seed) *	5+7fg				1	1+1fg	cf.1fg	744
Umbellifer NFI		1						
Odontites vernus/Euphrasia sp. (red bartsia/eyebright) ADGY					1			
Galium aparine L. (cleavers nutlet) CDH		4	2		1			
Anthemis cotula L. (stinking chamomile achene) ADhw							1	1
Lapsana communis L. (nipplewort achene) CDH							1	
Asteraceae embryo							[1]	
Eleocharis subg. *Palustres* (spike-rush nutlet) MPd		1						
Carex sp. (trigonous sedge nutlet) MPw			1			1	1	1
Carex sp. (lenticular sedge nutlet) MPw			4				1	
Bromus sect. *Bromus* (chess caryopsis) ADG		1					18	
Poaceae various (small seeded grass caryopsis) CDG		1					5	1
Mineralised nodule							[1]	
Millipede segments							[5]	
Total charred remains:	**15**	**218**	**163**	**44**	**27**	**9**	**34[44]**	**871**
Sample size (litres) :	**38**	**40**	**20**	**40**	**40**	**33**	**43**	**10**
Fragments per litre:	**0.4**	**5.5**	**8.2**	**1.1**	**0.7**	**0.3**	**0.8[1]**	**87.1**

KEY
All remains charred apart from { } = uncharred, possibly partly mineralised ; [ ] = mineralised
+ = present ; ++ = several ; +++ = frequent ; ++++ = numerous
Feature types : ED = enclosure ditch; P = pit; PH = posthole; T = tree throw ; fg = fragment
Habitat Preferences : A = arable; C = cultivated; D = distubed/waste; E = heath; G = grassland; H = hedgerow; M = marsh/bog; R = rivers/ditches/ponds; S = scrub; W = woods; Y = waysides/hedgerows; a = acidic soils; c = calcareous soils; d = dry soils; n = nutrient-rich soils; o = open ground; w = wet/damp soils; * = plant of economic value; cf. = uncertain ID

Table 34.7: Comparisons between the IA/ERB and later Romano-British samples at Stansted

Sites	LTCP and M11	M11 and LTCP	MTCP and LTCP and LBR	MTCP
Period	LIA/ERB	ERB	C2nd-C3rd	LRB
Number of samples	3	4	4	11
Assemblage types	gss	ggss	gsss	gggsssssccc
Average frags per litre (concentrated remains counted as 50fpl)	39.5	25.7	27.1	20.4
Barley (no. samples present/total samples)	3/3	3/4	4/4	2/11
Bread-type wheat + cf. bread wheat (no. samples present/total samples)	0/3	2/4	3/4	8/11
Emmer + cf. emmer (no. samples glume bases present/total samples)	2/3	0/4	3/4	3/11
peas and cf. pea (seed number)	0	0	6	2
hazelnut shell (samples present/total samples) + some reasonable quantities present	0.33+	0.5+	0.75+	0.18
Sheep's sorrel + heath grass - acidic soil indicators (seeds per sample)	1	2	8	+
Small-seeded legumes eg clover, vetch, tare (seeds per sample)	13	14	47	+
Wet ground taxa (spike-rush, sedges, blinks) (seeds per sample)	1	9	6	1
Chess (seeds per sample)	18	17	45	1
docks (seeds per sample)	11	11	76	10
Stinking chamomile – damp, clay soils (seed number)	0	0	3	7

Assemblage types: g = high grain, probably charred as processed grain deposit; s = high grain and chaff, probably charred spikelets; c= high chaff, probably spikelet processing waste

Table 34.8: Comparisons between the Stansted and A120 sites during the IA and RB periods

No. of samples with:	BAALR	BAACP	Dune	BAAMP	Strood	Rayne	BAACP	BAAMP	LBR	BAAMP	Strood	Rayne
	LIA/ERB	LIA/ERB	EIA-ERB	ERB	ERB	E/MRB	C2-C3	C2-C3	C2-C3	LRB	M-LRB	RB+LRB
Cereal types	SEBo	SeBof	sebo	Sf	Se	Se	SeboF	Sebo	Seborf	SeboR	Sebf	Sebf
Cereal processing waste					3	3				3	11	4
Grain-dominated assemblages	1	2	2					1		3		
Spikelets probably represented	1	2	1	1			3			5	1	
sprouted grain or detached sprouts present					1	3	3		1	6	12	4
Total no. of samples	2	4	10	1	6	4	3	1	1	11	29	4

Cereals: s=spelt; e=emmer; b=barley; o=oats; r=rye; f=free-threshing, bread-type wheat;

lower case=present; UPPER CASE=frequent; BOLD =abundant : numbers given are number of samples where present

CHAPTER 35

Charcoal

by Rowena Gale

35 Charcoal

Rowena Gale

The excavations at Stansted produced over 400 samples of charcoal, mostly from the LTCP, MTCP and M11 sites. About 220 were considered suitable for analysis and, from these, 67 samples were selected for full analysis, representing 42 contexts from the following periods:

Middle Bronze Age – 7 contexts
Late Bronze Age – 6 contexts
Early Iron Age – 3 contexts
Middle Iron Age – 1 context
Late Iron Age – 2 contexts
Late Iron Age/early Romano-British – 8 contexts
Early Romano-British – 2 contexts
Romano-British 2nd – 3rd century AD - 2 contexts
Late Romano-British – 5 contexts
Post-medieval – 2 contexts
Unphased – 5 contexts

Charcoal was examined from a range of context types including Bronze Age ditch, pit and posthole fills and a burnt mound; Iron Age fills of pits, ditches and a hearth; Late Iron Age/early Romano-British cremations, postholes and pits; Romano-British fills of ditches, pits, hearth and kiln; and post-medieval pit and ditch fills. In addition, charcoal was examined from four unphased hearth contexts to provide *in situ* evidence of fuel selection/ preference.

The overall analysis was undertaken to:

1. Provide environmental evidence, particularly for the prehistoric period for which few comparable data are currently available for this region of Essex
2. Determine the use woodland resources and managed woodland
3. Evaluate the type and character of the fuel used for pyre construction in the Late Iron Age/early Romano-British periods.
4. Assess the character of the charcoal associated with the Late Bronze Age burnt mound and ritual pit 423143
5. To indicate the selection and use of wood species to fuel domestic and industrial hearths

Methodology

Bulk soil samples were processed by flotation and sieving. The resulting flots and residues were scanned under low magnification and the charcoal separated from plant macrofossils. Most fragments were relatively small in size although some measured up to10 mm or more in cross-section. A few samples contained intact segments of narrow roundwood. Charcoal fragments measuring >2 mm in radial cross-section were considered for species identification. The charcoal-rich sample 2408 was 50% sub-sampled prior to identification.

The condition of the charcoal varied from firm and well-preserved to poor and friable and, sometimes, vitrified (a condition brought about by exposure to temperatures in excess of 800^{o}C, Prior and Alvin 1983). The samples were prepared using standard methods (Gale and Cutler 2000). The anatomical structures were examined using incident light on a Nikon Labophot-2 compound microscope at magnifications up to x400 and matched to prepared reference slides of modern wood. When possible, the maturity of the wood was assessed (ie heartwood/sapwood) and stem diameters recorded (it should be noted that charred stems may be reduced in volume by up to 40%).

<u>Results</u>

A summary of the results is presented in Table 35.1. Classification follows that of *Flora Europaea* (Tutin *et al.* 1964-80). Group names are given when anatomical differences between related genera are too slight to allow secure identification to genus level. These include members of the Pomoideae (*Crataegus, Malus, Pyrus* and *Sorbus*) and Salicaceae (*Salix* and *Populus*). When a genus is represented by a single species in the British flora, it is named as the most likely origin of the wood, given the provenance and period, but it should be noted that it is rarely possible to name individual species from wood features and exotic species of trees and shrubs were introduced to Britain from an early period (Godwin 1956; Mitchell 1974). The anatomical structure of the charcoal was consistent with the following taxa or groups of taxa:

Aceraceae. *Acer campestre* L., field maple
Betulaceae. *Alnus glutinosa* (L.) Gaertner, European alder; *Carpinus betulus* L., hornbeam
Corylaceae. *Corylus avellana* L., hazel
Fagaceae. *Quercus* sp., oak
Oleaceae. *Fraxinus excelsior* L., ash
Rhamnaceae. *Rhamnus cathartica* L., purging buckthorn
Rosaceae. Subfamilies:
Pomoideae, which includes *Crataegus* sp., hawthorn; *Malus* sp., apple;
Pyrus sp., pear; *Sorbus* spp., rowan, service tree and whitebeam. These taxa are anatomically similar; one or more taxa may be represented in the charcoal.
Prunoideae. *Prunus spinosa* L., blackthorn.
Salicaceae. *Salix* sp., willow, and *Populus* sp., poplar. In most respects these taxa are anatomically similar.
Ulmaceae. *Ulmus* sp., elm

Middle Bronze Age

A substantial settlement of post-built roundhouses was founded above Pincey Brook on the MTCP site. A large barrow monument and ring ditch 324078 were sited north-east of the settlement. Cremated bone was present in the silty infill of the ring ditch but since cremation pyres did not appear to have been burnt within the monument, it is probable that the bone was redeposited here. Charcoal samples 2642 and 2647 from the infill on the north-eastern aspect of the ring ditch 320111 contained degraded charcoal, including some partially vitrified fragments. The taxa identified included hazel (*Corylus avellana*), the hawthorn/ *Sorbus* group (Pomoideae) and probably oak

(*Quercus* sp.) (Table 35.1). Although the charcoal may represent pyre fuel, alternative origins can not be ruled out.

The waterlogged remains of worked wood from carpentry and structural use, were also recovered from the basal and secondary fills of the ring ditch 324078 and were identified as elm (*Ulmus* sp.), field maple (*Acer campestre*), alder (*Alnus glutinosa*) and oak (*Quercus* sp.) (Allen 2005). These included wood chips, off-cuts and stakes.

Pit 470040, located in the LTCP site, was sealed by the Late Bronze Age burnt mound. Charcoal in samples 911, 912 and 913, from fills 470042, 470044 and 470046, was identified as hazel (*Corylus avellana*), the hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), oak (*Quercus* sp.) and ash (*Fraxinus excelsior*) and alder (*Alnus glutinosa*) (Table 35.1). Charcoal 856 from the fill of posthole 470001, from the same area, consisted mainly of the hawthorn/ *Sorbus* group (Pomoideae), but also oak (*Quercus* sp.), elm (*Ulmus* sp.) and ash (*Fraxinus excelsior*). Sample 851 from the upper fill of pit 470033 included oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and elm (*Ulmus* sp.). The origin of the charcoal is unknown.

Late Bronze Age

Settlement appears to have been more dispersed during the Late Bronze Age, although numerous pits at the M11 site and the LTCP site attest to local activity. A complex of pits recorded on the northwest of the M11 site included pits 423143 and 436060. The former contained flint and a placed pottery vessel; associated charcoal 6160 included oak (*Quercus* sp.), the hawthorn/*Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*). The second pit appeared to have been back-filled in one episode; here the charcoal 6172 was more abundant and included a wider range of taxa: field maple (*Acer campestre*), hazel (*Corylus avellana*), ash (*Fraxinus excelsior*), the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and oak (*Quercus* sp.). The origin of the charcoal in these pits is unknown, although pit 423143 clearly had ritual connotations.

Pits were also a feature of the LTCP site. Charcoal samples 824 and 825 were examined from the primary and secondary fills of pit 467002. Although there was no evidence of *in situ* burning the pit was sited within the footprint of the roundhouse in an appropriate position for a hearth; the charcoal may, therefore, relate to domestic fuel debris. The taxa identified included oak (*Quercus* sp.), blackthorn (*Prunus spinosa*), the hawthorn/ *Sorbus* group (Pomoideae), purging buckthorn (*Rhamnus cathartica*) and hazel (*Corylus avellana*).

At the southern edge of the LTCP site a burnt mound was located alongside the northern bank of the stream. This overlay and sealed the Middle Bronze Age pit 470040. At least one area of *in situ* burning was recorded. The mound had accumulated over a period of time and was composed of charcoally silt and fire-cracked stones. Charcoal from layers (464008) and (464010), within the burnt mound, consisted predominantly of the hawthorn/ *Sorbus* group (Pomoideae) and oak (*Quercus* sp.) but also included blackthorn (*Prunus spinosa*), willow (*Salix* sp.) or poplar (*Populus* sp.), elm (*Ulmus* sp.) and *cf.* hazel (*Corylus avellana*).

Early Iron Age

Traces of permanent settlement were sparse although a number of pits attested to continuing occupation of the area. Pits were recorded on the north-west edge of the M11 site, in an area in which pit construction was already established. Some of these contained charcoal. Sample 6211 from the upper fill of pit 436091, in which pottery and struck flint were abundant, included predominantly field maple (*Acer campestre*) and oak (*Quercus* sp.) but also the hawthorn/*Sorbus* group (Pomoideae), hazel (*Corylus avellana*) and elm (*Ulmus* sp.). Sample 6163 from the lower fill of pit 423108 included oak (*Quercus* sp.). hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and *cf.* hazel (*Corylus avellana*). Similar species, with the addition of field maple (*Acer campestre*) and purging buckthorn (*Rhamnus cathartica*), were identified from sample 6212 from the upper fill of pit 436099. The origin of the charcoal is unknown but could relate to either domestic or agricultural activities.

Middle/Late Iron Age

The remains of dwelling houses at the M11 and LTCP sites attested to permanent occupation. At the M11 site, a single post-built roundhouse was recorded adjacent to an earlier boundary ditch. A possible hearth feature 430042 with *in situ* burning was located within the ring ditch, close to the northwest side of the structure. Associated charcoal 6180) may thus represent domestic fuel residues; small slivers of charcoal were identified as the hawthorn/*Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*).

Late Iron Age

This period saw radical changes in land use to accommodate increased levels of stock management (eg, the creation of droveways and land clearance) and the further development of settlements with associated mortuary sites located upslope. Burials within the cemeteries were mostly cremation deposits, while inhumations were comparatively rare. There was no evidence to suggest that cremation pyres were sited within the cemetery.

Sample 6131 (context 439014) was recovered from the fill of ditch 439013. The sample was composed predominantly of narrow roundwood from blackthorn (*Prunus spinosa*) but also included oak (*Quercus* sp.) and ash (*Fraxinus excelsior*). The abundance of blackthorn could be indicate of hedgerow debris.

Charcoal in sample 6210 obtained from the fill of ditch 424035 consisted of small fragments from the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), oak (*Quercus* sp.), ash (*Fraxinus excelsior*), willow (*Salix* sp.) or poplar (*Populus* sp.) and purging buckthorn (*Rhamnus cathartica*).

Late Iron Age/early Romano-British period

The transition of the Late Iron Age into the early Romano-British period was not clear-cut and thus some features are loosely attributed to this period. Charcoal was examined from cremation burials on the LTCP and MTCP sites. Although this material almost certainly represents pyre fuel, some may have originated from funerary furniture (eg, the bier) or grave goods placed on the pyre

In the LTCP site, cremation burial 113072 contained human bone from an adult of unknown sex, charcoal and the remains of an urn. The cremation was excavated in 5 spits. Associated charcoal (samples 377-379 and 382-383) suggests that the pyre was built principally from oak (*Quercus* sp.) but also incorporated ash (*Fraxinus excelsior*) and shrubbier species such as hazel (*Corylus avellana*), the hawthorn/ *Sorbus* group (Pomoideae) and willow (*Salix* sp.) or poplar (*Populus* sp.). Similar species were present in sample 384 from the backfill of the feature, context 113074.

Cremation burial 143075 was sited some distance north-west of feature 113072. The burial included two urns, one inside the other, and human bone from a female aged between 25 and 45. The burial was excavated in east and west sectors with three spits in each. Charcoal fragments (samples 529-534) were small but consistently indicated the exclusive use oak, probably mostly fairly narrow roundwood.

Charcoal was examined from two further features from this site. Firstly the steep-sided pit 135039, which did not appear to be related to any other feature and was of uncertain function. The primary fill included a large dump of charcoal in the northern (deepest) sector, context 135040. Sample 417 consisted almost entirely of oak (*Quercus* sp.), mostly juvenile wood, although blackthorn (*Prunus spinosa*) was also present. Secondly, posthole 108089, which was cut into an earlier ditch feature. Since this was initially thought to be a cremation burial, the feature was excavated in spits. Samples 352, 353 and 354 consisted predominantly of oak (*Quercus* sp.) and ash (*Fraxinus excelsior*), although blackthorn (*Prunus spinosa*) was minimally present in sample 353 (see Table 35.1). This wood was mostly fairly juvenile and included a high proportion of narrow roundwood. The origin of the charcoal is unknown.

In the MTCP site, charcoal was recovered from adjacent cremation burials 330020 and 332009, situated slightly southwest of the Bronze Age barrow monument. The first, an unurned cremation burial of a female aged about 35, was excavated in three spits. Associated charcoal in sample 2323 was sparse and degraded but indicated that the pyre was constructed from oak (*Quercus* sp.), ash (*Fraxinus excelsior*) and field maple (*Acer campestre*). Cremation 332009 contained the remains of a male aged 40+, abraded decorated pottery sherds, ash and charcoal. The feature was excavated in nine spits and although the charcoal was relatively frequent it was very fragmented. Oak (*Quercus* sp.) and field maple (*Acer campestre*) proved to be the dominant taxa, with sporadic occurrences of ash (*Fraxinus excelsior*), hazel (*Corylus avellana*), the hawthorn/ *Sorbus* group (Pomoideae) and possibly willow (*Salix* sp.) or poplar (*Populus* sp.).

Sample 6117 (context 430019) was recovered from the fill of ring gully 430016 on the M11 site. The charcoal, probably domestic hearth debris, consisted mainly of narrow roundwood from ash (*Fraxinus excelsior*) but also included oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*).

Early Romano-British period

During the Romano-British period the area became the focus of extensive settlement and intensive land-use for agricultural purposes, although some areas may have been industrial.

A small sample of charcoal 255 from the secondary fill of ditch 110073, sited in the south-east corner of the LTCP site included oak (*Quercus* sp.), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*) and field maple (*Acer campestre*).

Hearth feature 150028, on the same site, cut into early Romano-British ditch 150024; the function of the hearth is unknown but was tentatively assigned as industrial or agricultural. The charcoal consisted of oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae) and ash (*Fraxinus excelsior*). If from a non-domestic context, there was no indication of species selection related to function.

Romano-British 2nd – 3rd century

A ditch fill (context 121078) in the linear feature 109196 in the LTCP site produced Romano-British pottery and an unusually well preserved assemblage of charcoal (372). The latter included a high proportion of narrow roundwood from shrubby hawthorn/ *Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*). Small amounts of oak (*Quercus* sp.), field maple (*Acer campestre*) and willow (*Salix* sp.) or poplar (*Populus* sp.) were also present. The inclusion of pottery suggests a domestic origin for the charcoal.

Context 138027, the fill of a linear feature 138024, located on the east side of the LTCP site, included numerous pot sherds and a quantity of well preserved charcoal (sample 399) composed mainly of narrow roundwood. The taxa identified included oak (*Quercus* sp.), field maple (*Acer campestre*), the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and willow (*Salix* sp.) or poplar (*Populus* sp.).

Late Romano-British period

The MTCP site appears to have supported industrial/ agricultural activities throughout the Romano-British period, including domestic iron-working. A small quantity of charcoal was recovered from kiln 338009, which was interpreted as a corn-drier. Fuel debris in samples 2423 and 2324 from the final firing of the kiln included oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae) and willow (*Salix* sp.) or poplar (*Populus* sp.). Oak (*Quercus* sp.) largewood and a small amount of willow (*Salix* sp.)/poplar (*Populus* sp.) were also recorded from a large sample of rather comminuted but well-preserved fuel debris from the basal fill of a charcoal-rich pit 334013, adjacent to, and probably associated with the use of the kiln. From the same area, a deposit of daub and burnt clay, possibly from a hearth base, was dumped in a neighbouring pit (context 319139); associated charcoal (sample 2434) was identified as oak (*Quercus* sp.) and hazel (*Corylus avellana*).

A large pit 347041, probably a waterhole, was sited close to the smithy. Sample 2520, mostly consisted of narrow roundwood ranging from 10-15 mm in (charred) diameter, although oak (*Quercus* sp.) largewood was also present. The taxa identified included hazel (*Corylus avellana*), oak (*Quercus* sp.), ash (*Fraxinus excelsior*) and field maple (*Acer campestre*). Some of the roundwood appeared to be from fast-grown stems.

Post-medieval period

A hunting lodge was constructed within a rectangular enclosure in the LTCP site. A second structure was erected close by and cobbled areas provided hard standing. Samples 831 and 839, from the fill of enclosure ditch 466020, were similar in character and contained a wide range of taxa: oak (*Quercus* sp.), hornbeam (*Carpinus* sp.) (mostly narrow roundwood), field maple (*Acer campestre*) (including roundwood), ash (*Fraxinus excelsior*), the hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), willow (*Salix* sp.) or poplar (*Populus* sp.) and *cf.* hazel (*Corylus avellana*). The origin of the charcoal is unknown although dumped fuel debris from activities associated with the hunting lodge seems likely.

Unphased

Several hearths were located in an open area on the LTCP site. The charcoal-rich sample 409, from hearth feature 110129, consisted entirely of oak (*Quercus* sp.) largewood. Similar evidence was obtained from samples 426, 429 and 437, from hearth contexts 152022 and 150041, and from samples 515 and 520, from hearth deposit 106088. The consistent and exclusive use of oak in these hearths may reflect the requirement of a particular property offered by this type of fuel.

Discussion

This report includes the analysis of charcoal recovered from pits, ditches, mounds, cremation burials, hearths and kilns dating from the Middle Bronze Age to the post-medieval period, from the M11, the MTCP and the LTCP sites.

The second and first millennium BC

Environmental evidence

The site was located on a relatively flat plateau some 92-108 m aOD in an area of heavy clay, with watercourses/ streams running close to some of the excavated sites, eg, Pincey Brook at the base of the LTCP site. Waterlogging appears to have occurred regularly. An initial assessment of the pollen suggested that during the Early Bronze Age the area was well-wooded, particularly with alder, hazel, lime (*Tilia* sp.), willow, oak, elm and pine (*Pinus* sp.). The difficulty of cultivating the unyielding soils on the plateau almost certainly resulted in the persistence of woodland in this area, possibly until the medieval period.

Evidence of domestic settlement dates from the Middle Bronze Age, when agricultural clearance, predominantly for pastoral farming, significantly reduced woodland cover. The fuel requirements of the settlement would have been obtained from local stands of woodland or scrub, hedgerow trees and hedgerows. Fuel provision would have been influenced by:

1. The practical aspects of fuel-gathering, eg, accessibility
2. The quality and burning properties of the wood
3. The allocation of certain timber trees or coppice to fulfil construction, hurdle-making and other requirements

Thus, although a rough indication of woodland composition can be assessed from deposits of fuel debris, the interpretation of such must take into account the bias towards economic uses and supply. For a number of reasons (eg differential preservation and fragmentation rates of charcoal) the accurate assessment of species dominance in a charcoal assemblage is notoriously difficult. For the purposes of this report, the overall dominance of species is based on the frequency of charcoal fragments per species in each sample and the overall occurrence of species in the total number of samples examined. On this basis, oak, the hawthorn group and blackthorn probably had a wider distribution in the landscape than, for example, ash, elm, maple, alder, willow or poplar and hazel (Table 35.1). Evidence from the remains of worked wood (chippings, off-cuts and timbers), obtained from Middle Bronze Age contexts in the barrow monument 324078, was indicative of on-site wood-working, using elm (*Ulmus* sp.), field maple (*Acer campestre*), alder (*Alnus glutinosa*) and oak (*Quercus* sp.) (Allen 2005). It is interesting to compare the different application of wood resources when supplying fuel as opposed to carpentry or wood-working needs and, although these results do not necessarily negate the earlier suggestion that oak, blackthorn and the hawthorn group were dominant in the locality, they do underline the dangers of environmental reconstruction using a restricted set of data.

The species named from the charcoal analysis mostly comply with those identified from the pollen assessment and the final pollen analysis (Wiltshire 2002; Huckerby *et al*. CD Chapter 31), although, interestingly, neither lime, birch (*Betula* sp.) nor pine (all of which were represented by pollen) occurred in the charcoal. In view of the importance of lime in the prehistoric period as a source of bast fibre and leafy fodder (Edlin 1949), and consequently the by-product of narrow roundwood for firewood, the absence of lime in the fuel deposits is rather surprising. By the Middle Bronze Age, however, lime was probably relatively rare at the site and Wiltshire (2002) suggests that, on the Stansted Plateau, the trees were confined to woodland on damp soil close to Pincey Brook – perhaps outside the catchment area for fuel collection. Birch provides high-energy, if fast-burning, fuel and its absence in the charcoal may be indicative of its general paucity at the site. Pine pollen is produced in great abundance and, being wind-dispersed, it can travel long distances. Thus, despite the frequency of small amounts of pine pollen at the site, it is possible that pine was not growing in the immediate vicinity. The absence of pine in the charcoal samples, however, may be more to do with the tendency of the resinous wood to spit when burning than its distribution in the neighbourhood. Bracken (*Pteridium aquilinum*) appears to have grown fairly freely in the open grassland (Wiltshire 2002) and although, when dried, it provides a hot fast-burning fuel, there was no evidence of its use in the fuel debris examined.

The pollen record suggests that both alder and hazel underwent a marked decline during the Middle Bronze Age (Wiltshire 2005; Huckerby *et al*., CD Chapter 31). The reason for this is not clear, although regular coppicing (perhaps to supply young stems for hurdle-making or basketry) would have reduced pollen production. In the Late Bronze Age, an area adjacent to the brook on the LTCP site (potentially an ideal habitat for alder) was used extensively for activities which resulted in the formation of a burnt mound. The paucity of both alder and hazel in fuel deposits associated with the burnt mound supports the suggestion that these species failed to recover from deforestation during the Middle Bronze Age.

It is possible that some cleared areas reverted to thorn scrub, as suggested by the high ratio of charcoal from the hawthorn group and blackthorn, although a good deal of this material may relate to the cutting/ pruning of hedges used to define livestock enclosures. Hedges seem especially relevant in the landscape during this period, in which there was little evidence of ditched enclosures. It has also been suggested, that thorny scrub may have colonised the trampled soils around abandoned waterholes (Robinson, pers. comm.).

The low density of settlement and the focus on pastoral farming at Stansted in the Bronze Age and Early-Middle Iron Age undoubtedly contributed to the survival and diversity of the arboreal taxa associated with the prehistoric period. A fairly comparable range of species was recorded from prehistoric and Romano-British contexts at Thorley, sited about 3 miles southwest of Stansted, where, despite the paucity of charcoal available, the taxa identified included maple, ash, the hawthorn group, oak, purging buckthorn, blackthorn, elder (*Sambucus nigra*) and gorse (*Ulex* sp.)/broom (*Cytisus scoparius*) (Gale, in prep). It is interesting, therefore, to compare these landscapes with that at Grange Lane, a Middle Bronze Age – Late Iron Age site on the A120 Roadscheme, just south-east of Stansted, where the emphasis was on cereal production (Challinor, per. com). The pollen record for Grange Lane indicates that the landscape was predominantly open grassland during this period, with the sparse woodland supporting only a narrow range of taxa: oak, pine, hazel and alder.

<u>Cremations, burnt mounds and placed deposits</u>

Bronze Age

A Middle Bronze Age barrow monument, sited north-east of the settlement in the MTCP area, provided early evidence of funerary ritual. Finds at the monument were sparse and charcoal recovered from the ring ditch 320111 could not be securely attributed as pyre fuel. The sample consisted of shrubby species including hazel, the hawthorn group and probably oak. Although we have no comparable material from the same period, this type of fuel is similar to that identified from later non-ritual contexts, suggesting that no special importance attached to the species in the ring ditch.

A number of pits and postholes sited close to Pincey Brook (LTCP site) were sealed by a Late Bronze Age burnt mound. The origin of charcoal in these features, 470023, 470040 and 470041, is uncertain and could relate to either the general dumping of fuel debris or from the overlying burnt mound. The taxa identified were comparable to deposits in the burnt mound and included mostly oak, the hawthorn group and blackthorn but also alder, hazel, ash and elm (Table 35.1).

The Late Bronze Age burnt mound marked the site of intensive activity. The area appeared to have been in use over a considerable period of time and the refuse from this activity overlay local pits and postholes, and possibly seeped into the underlying features. Fuel debris from the burnt mound indicated the frequent use of oak, the hawthorn group and blackthorn, and somewhat less use of ash, elm, hazel and alder.

A group of paired pits located in the northwest part of the M11 site contained structured/ placed deposits. Pottery vessels were placed in one of each pair of pits; the second pit contained only sherds. Carbonised bone, charcoal and fired clay were associated with both pits in the pair. Charcoal 6160 was examined from pit 423143, which contained a placed vessel, and also from pit 436060 (sample 6172) sited some distance away. Pit 436060, which was probably for ritual use but did not contain any significant artefacts, appeared to have been back-filled in a single episode. Only small amounts of charcoal were available from these pits: oak, the hawthorn group and blackthorn were common to both pits. In addition, pit 436060 contained ash, hazel and maple. The function/ origin of the charcoal is unknown but the use of multiple species in these features suggests that no special/ ritual selection applied to the fuel.

Iron Age

Following a period of more dispersed occupation in the Early Iron Age, groups of settlement were established during the Late Iron Age, often associated with cemeteries.

Pyre fuels

Cremation appears to have been preferred to inhumation, and the cremated remains, often including a certain amount of burnt pyre fuel (charcoal), were interred either in urns or as loose deposits. The pyre sites appear to have been located elsewhere.

Charcoal was examined from two Late Iron Age/ Romano-British urned cremation burials (113072 and 143075) in the cemetery uphill of the settlement at the LTCP site. 143075 appeared to have been constructed almost entirely of oak, employing mostly juvenile wood and narrow roundwood. Charcoal from cremation 113072 was too fragmented to assess the maturity of the wood but, here again, oak formed the dominant component but was mixed with ash, willow/poplar, hazel and the hawthorn group. Both burials were of adults; 143075 was female aged, between 25 and 45. The (apparently) exclusive use of oak in burial 113072 may be significant.

The cremation burials on the MTCP site were also assigned a Late Iron Age/early Romano-British date. Charcoal from this site was examined from unurned cremation burials 330020 (35 year old female) and 332009 (40+ year old male). Here the pyre fuel was less well preserved and it was more difficult to detect the presence of narrow roundwood. The pyres for each had been constructed using wood from multiple species, predominantly oak, field maple and ash but also hazel, the hawthorn group and willow/ poplar. The only apparent difference between the pyre woods from these burials and those from the LTCP site being the common use of maple at the MTCP site, perhaps reflecting a wider distribution of maple in this area.

Experimental research on pyre structures has demonstrated that approximately one tonne of wood is required to consume an adult human body (McKinley 1994). Traditional methods of construction employed the use of substantial billets/ poles of wood to form a rectangular platform. Thus the frequency of narrow roundwood, especially of oak and ash, associated with the pyres from the LTCP site at Stansted is unusual, since clearly stout poles/ branches would afford far greater support to the body and produce a longer-lasting fire. This use could imply a lack of suitable largewood and a greater dependency on coppiced stems from managed woodland.

The dominant use of oak and ash at Stansted correlates with evidence from a group of Romano-British burials at Strood Hall, a nearby site included in the A120 (Challinor 2007), but here the frequency of oak heartwood suggested a more widespread use of largewood.

Domestic fuel

The function of the Bronze Age pit 467002 sited within the footprint of a roundhouse at the LTCP site was undetermined but was provisionally interpreted as a hearth feature. If correct, the charcoal therein would represent domestic fuel debris; if incorrect, dumped domestic hearth debris is still possible. Samples 824 and 825 indicated the use of oak, the hawthorn group, blackthorn, hazel and purging buckthorn.

A group of Early Iron Age pits was recorded at the north-western edge of M11 site. Charcoal was examined from the fills of pits 433108, 436091 and 436099. There was no evidence of associated industry or domestic occupation but since the pits also contained pottery sherds and flint, it is possible that the charcoal derived from some type of domestic activity. The fuel included numerous species: oak, maple, ash, elm, the hawthorn group, blackthorn, purging buckthorn and hazel. From the same area, more convincing evidence of domestic fuel was obtained from a hearth feature 430042, sited within a Middle/Late Iron Age roundhouse; the small sample obtained indicated the use of shrubby species: the hawthorn group and blackthorn.

Fuel debris from undetermined sources

The use of multiple species was also recorded from deposits in a Late Iron Age ditch 424035 on the M11 site.

Summary

In general, the taxa identified from the charcoal correlate with the pollen record. Charcoal deposits suggest that, from the Middle Bronze Age, oak formed the dominant woodland. Other taxa named included ash, elm, field maple, alder and shrubby species including the hawthorn group, blackthorn, willow and purging buckthorn. There was little evidence to implicate the use of coppiced woodland at this time. The high ratio of the hawthorn group and blackthorn throughout the samples could suggest that hedges were commonplace in the landscape, although burning scrub wood in the hearth would result in charcoal of similar character. The longevity of this type of woodland is attributed to the difficulty of cultivating the heavy clay soils and contemporary agricultural practices, eg the low density of arable land.

Charcoal was examined from ritual (burnt mounds, placed deposits and pyre fuel) and domestic contexts (a hearth and pits). The similarity of species from these contexts suggests that little or no differential selection related to the gathering of firewood for these activities. Although there appears to have been some overall species preference (eg oak occurred most frequently), fuel collection was probably based on availability and access.

Although it was not possible to verify the use of coppiced wood from the charcoal available, it is worth noting that narrow roundwood from a range of species, including timber trees such as oak and ash, was increasingly common in contexts post-dating the Early Iron Age. This more or less coincided with radical changes in land use and increasing emphasis on arable production dating from the Late Iron Age/early

Romano-British period, and could imply a corresponding reduction in woodland and a greater dependence on woodland management.

Romano-British period

Environmental evidence

This period saw the major re-organisation of land boundaries and, by the late second or third centuries, domestic settlement was concentrated on the MTCP site. Mixed agriculture intensified and, although speculative, circumstantial evidence suggests that most, if not all, woodland was managed. The range of woodland species available for fuel, however, seems little changed from the prehistoric period (Wiltshire 2002; Huckerby *et al*. CD Chapter 31). The absence of elm, alder and purging buckthorn in charcoal deposits from the Late Iron Age onwards may not be significant, since these were only sparsely represented in earlier contexts.

Industrial fuel

Although its function is unknown, the early Romano-British hearth 150028, located in the LTCP site, was probably associated with industrial use. Charcoal residues collected from this feature indicated the predominant use of oak and ash.

By the Romano-British period, part of the MTCP area was dedicated to industrial activities, which included metal-working (probably on a domestic scale). The late Romano-British pit 347041, possibly a waterhole sited next to, and used by, the smithy, contained hammerscale, iron-working waste, and charcoal. The charcoal, almost certainly industrial fuel debris, consisted predominantly of narrow roundwood (<15mm in diameter) from hazel, ash, oak and field maple. The inclusion of coppiced material verified that the charcoal-making industry operated in managed woodland (charcoal fuel was an essential requisite of iron-working).

The function of the late Romano-British kiln 338009, also in the MTCP site, was provisionally attributed to corn-drying. Associated fuel debris from the kiln and flue channel (contexts 338010 and 338011) was sparse but indicated the use of oak, the hawthorn group and willow or poplar. A much larger sample, obtained from the basal fill of an adjacent pit 334013**,** consisted almost entirely of fragments of oak largewood. Charcoal from pits 319140 and 334013 may also be related to industrial activities. Both pits were sited close to the kiln, 319140 also contained dumped daub and burnt clay, possibly from a hearth base. The charcoal was identified as oak, hazel and willow/ poplar (Table 35.1).

Fuel debris from undetermined sources

A bulk sample from ditch 109196 on the LTCP site dates from the 2nd-3rd centuries. It yielded a high ratio of charred narrow roundwood, mostly from blackthorn and the hawthorn group but also oak, field maple and willow or poplar. The similarity of this deposit to that from context 138027, sited slightly further east in the same ditch, suggests common origins for this material, perhaps dumped waste from domestic hearths.

Medieval and post-medieval periods

Environmental evidence

Palynological evidence for the medieval period was sparse but indicative of an open landscape on acidic soils; tree/ shrub species included alder, birch, hazel, holly (*Ilex aquifolium*), pine, oak, willow and heather (Ericaceae) (Wiltshire 2002). Evidence from the charcoal added the following species: ash (possibly coppiced), blackthorn and the hawthorn group.

During the post-medieval period the site was used for gaming and hunting and it is probable that the acreage of local woodland was increased. The pollen record indicates the development of a species-rich woodland including field maple, alder, birch, hazel, ash, pine, oak, beech (*Fagus* sp.), hornbeam (*Carpinus* sp.), elm, willow and yew (*Taxus* sp.). Beech, hornbeam and (evergreen) yew form substantial trees, none of which were recorded from earlier periods. It is feasible that they were introduced at this time to enhance the character of the woodland for the purposes of hunting and also to provide a more diverse range of timber and wood. Woodland management would have been central to the maintenance and stocking of a working estate such as this; the arboreal element probably included coppice, pollards and standard trees.

Fuel debris from domestic sources

Deposits of charcoal in the fill of the post-medieval enclosure ditch 466020 (LTCP site) can almost certainly be attributed to fuel debris from activities associated with the hunting lodge. The taxa identified included field maple, hornbeam, ash, oak, willow, the hawthorn group and *cf*. hazel. The frequency of hornbeam roundwood implies the presence of coppiced or pollarded trees.

Samples from unphased deposits

Charcoal was examined from several hearth contexts and, although undated at present, the provenance of the samples, ie from *in situ* contexts, were potentially of value since these could be verified as containing fuel debris from a single source or event. The hearths were located in the LTCP site. The charcoal-rich sample 409, from hearth feature 110129, consisted entirely of oak largewood. Similar evidence was obtained from samples 426, 429> and 437, from hearth contexts 152022 and 150041, and from samples 515 and 520 from hearth 106088. In the absence of artefactual material the function of the hearths remains unknown but the selection of a single species fuel may be significant and stands in contrast to the multiple species present in samples examined from pits, ditches and other features at this site.

Conclusion

This report includes the identification of charcoal from a range of features, dating from the Middle Bronze Age to the post-medieval period. Although the origin of the charcoal is not always known, the species identified indicates access to a diverse range of trees and shrubs that must have grown in close proximity to the site throughout this period. It is suggested that oak formed the dominant component of woodland and that thorn hedges and/or scrub were probably common in the landscape. In the post-medieval period, land was afforested to allow hunting. Although coppicing was probably practiced from an early period, there was scant evidence of such in charcoal examined prior to the Late Iron Age/early Romano-British period.

Charcoal debris associated with placed deposits (eg, Late Bronze Age pits) more or less conformed to that from non-ritual contexts, ie, Bronze Age ditch and pit fills and the burnt mound, thereby negating ritual aspects of species selection. Similarly, pyre debris from three Late Iron Age/early Romano-British cremations also included multiple species, although predominantly oak, ash and maple (probably related to structural requirements rather than ritual funerary customs). Cremation 143075 (that of an adult female), however, was probably fired exclusively with oak.

Industrial deposits, provisionally attributed to a Romano-British corn-dryer, indicated a preference for oak largewood, whereas narrow roundwood recovered from deposits of contemporary iron-working and smithing waste in pit F347041 demonstrated the use of narrow roundwood from multiple species. Industrial origins are suggested for the abundant deposits of oak from a group of unphased hearth contexts in the LTCP site.

Table 35.1: Charcoal from the M11, LTCP and MTCP sites

Key. h = heartwood; r = roundwood (diameter <20 mm); s = sapwood (diameter unknown); u = undetermined maturity (*Quercus* only)

The number of fragments identified is indicated

Sample	**Context**	**Description**	***Acer***	***Alnus***	***Carpinus***	***Corylus***	***Fraxinus***	**Pomoideae**	***Prunus***	***Quercus***	***Rhamnus***	***Populus/ Salix***	***Ulmus***
Middle Bronze Age													
BAAMP 00													
2642	320120	Secondary fill of ring ditch F320111	-	-	-	-	-	-	-	*cf.* 3	-	-	-
2647	320117	Fill of ring ditch F320111	-	-	-	11	-	1	-	-	-	-	-
BAACP 01													
851	470034	Upper fill of pit F470033	-	-	-	-	-	15	1	3h, 6s	-	-	1
856	470002	Fill of posthole F470001	-	-	-	-	1	77	-	3h	-	-	1
911	470042	Fills of pit	-	2	-	-	-	2	11	2u	-	-	-
912	470044	F470040	-	*cf.* 1	-	*cf.* 1	1	-	-	*cf.* 2	-	-	-
913	470046		-	-	-	3	-	5	2	5h, 1s	-	-	-
Late Bronze Age													
BAACP 00													
824	467003	Fill of pit	-	-	-	3	-	8	3	2s	2	-	-
825	467004	F467002	-	-	-	-	-	45	4	3u	-	-	-
BAACP 01													
832	464010	Burnt mound	-	-	-	-	-	10	1	1r, 8s	-	-	-
834		layer	-	-	-	-	-	27	-	2h, 10s	-	1	-
837			-	-	-	*cf.* 1	-	15	2	2h, 1s	-	-	1
838	464008	Burnt mound	-	-	-	-	-	21	-	3h, 5s	-	-	-
835		layer	-	-	-	-	-	11	5	1h, 1s	-	-	-
836			-	-	-	*cf.* 1	4	4	2	2s	-	-	-
BAALR 00													
6160	423142	Fill of pit F423143	-	-	-	-	-	10	2	3s	-	-	-
6172	436061	Fill of pit F436060	2	-	-	1	2	12	2	3s	-	-	-

Early Iron Age													
BAALR 00													
6163	423159	Lower fill of pit F423108	-	-	-	*cf.* 2	-	3	5	2s	-	-	-
6211	436092	Fill of pit F436091	27	-	-	8	2	16	-	26h, 8s	-	-	1
6212	436100	Upper fill of pit F436099	10	-	-	*3*	-	8	2	3h	3	-	-
Middle ?Late Iron Age													
BAALR 00													
6180	430041	Hearth F430042	-	-	-	-	-	7	4	-	-	-	-
Late Iron Age													
BAALR 00													
6131	439014	Fill of ditch F439013	-	-	-	-	1	-	23r	1r	-	-	-
6210	431028	Ditch fill F424035	-	-	-	-	1	11	4	1h	2	1	-
Late Iron Age/ Early Romano-British													
BAACP 00													
352	108091	Posthole, spit 1	-	-	-	-	41r	-	-	2s	-	-	-
353		Posthole, spit 2	-	-	-	-	10	-	1	15s	-	-	-
354		Posthole, spit 3	-	-	-	-	9	-	-	10s	-	-	-
377	113073	Crem. burial F113072 spit 1	-	-	-	-	-	-	-	11h, 29s	-	1	-
378		Crem. burial F113072 Spit 2	-	-	-	-	28r	-	-	7h, 19s	-	-	-
379		Crem. burial F113072 Spit 3	-	-	-	2	1	-	-	35s, 7u	-	-	-
382		Crem. burial F113072	-	-	-	-	-	1	-	4h, 31s	-	3	-

		Spit 4											
383		Crem. burial F113072 Spit 5	-	-	-	*cf.* 1	-	-	-	1h, 27s	-	2	-
384	113074	Crem. burial F113072 Backfill	-	-	-	5	3	-	-	25s, 5u	-	1	-
417	135040	Fill of pit F135039	-	-	-	-	-	-	1r	8h, 25s, 3r	-	-	-
529	143077	Crem. burial F143075 Spit 1 east	-	-	-	-	-	-	-	79s	-	-	-
530		Crem. burial F143075 Spit 2 east	-	-	-	-	-	-	-	27s	-	-	-
531		Crem. burial F143075 Spit 3 east	-	-	-	-	-	-	-	2s	-	-	-
532		Crem. burial F143075 Spit 1 west	-	-	-	-	-	-	-	6s	-	-	-
533		Crem. burial F143075 Spit 2 west	-	-	-	-	-	-	-	14h, 8s	-	-	-
534		Crem. burial F143075 Spit 3 west	-	-	-	-	-	-	-	27s	-	-	-
BAALR 00													
6117	430019	Fill of ring gully F430016											
BAAMP 00													
2323	330021	Crem. burial F330020 Spit 2	-	-	-	-	-	-	-	*cf.* 2	-	-	-
		Crem. burial F330020	1	-	-	-	2	-	-	-	-	-	-

		Spit 3											
		Crem. burial F330020 Spit 4	-	-	-	-	5	-	-	4	-	-	-
2828	332010	Crem. Burial F332009 Spit 1	2	-	-	-	1	1	-	1s	-	-	-
2829		Crem. Burial F332009 Spit 2	2	-	-	-	3	-	-	14h, 4s	-	*cf.* 1	-
2830		Crem. Burial F332009 Spit 3	7	-	-	1	6	-	-	2s, 7u	-	-	-
2831		Crem. Burial F332009 Spit 4	16	-	-	-	-	2	-	3s, 14u	-	-	-
2832		Crem. Burial F332009 Spit 5	11	-	-	-	1	1	-	8h, 6u	-	-	-
2833		Crem. Burial F332009 Spit 6	12	-	-	-	-	-	-	5s	-	-	-
2834		Crem. Burial F332009 Spit 7	1	-	-	-	-	-	-	25s, 3u	-	-	-
2835		Crem. Burial F332009 Spit 8	-	-	-	-	-	-	-	2s, 1u	-	-	-
2836		Crem. Burial F332009 Spit 9	1	-	-	-	-	-	-	4s	-	-	-
Early Romano-British													
BAACP 00													
255	110075	Secondary fill of ditch F110073	1	-	-	2	-	-	4	5s, 7u	-	-	-
387	150026	Fill of hearth	-	-	-	-	2	29	-	19h, 1s	-	-	-

		F150028											
Roman 2nd – 3rd Century AD													
BAACP 00													
372	121078	Fill of ditch F109196	2	-	-	-	-	64r	21	5s, 1r	-	2	-
399	138027	Fill of ditch F138024	8r	-	-	-	-	11r	6r	3h,3s,6r	-	2	-
Late Romano-British													
BAAMP 00													
2408	334014	Basal fill of pit F34013	-	-	-	-	-	-	-	46h, 21s	-	3	-
2423	338010	Kiln deposit F338009	-	-	-	-	-	1	-	6h, 11s	-	2	-
2424	338011	Flue channel of kiln F338009	-	-	-	-	-	-	-	1s	-	-	-
2434	319139	Fill of pit F319140	-	-	-	21	-	-	-	18h, 32s	-	-	-
2520	347046	Fill of pit F347041	1r	-	-	15r	9r	-	-	3h,1s,5r	-	-	-
Post- medieval													
BAACP 01													
831	472007	Fill of ditch	3	-	21r	*cf.* 3	2	4	1	1r, 2u	-	-	-
839	466023	F466020	8	-	14	*cf.* 9	12h + s	9	1	5h	-	1	-
Unphased													
BAACP 00													
409	110130	Hearth deposit F110129	-	-	-	-	-	-	-	114h	-	-	-
426	152022	Hearth deposit	-	-	-	-	-	-	-	4u	-	-	-
429		F152021	-	-	-	-	-	-	-	23h, 3s	-	-	-
437	150041	Hearth deposit F138058	-	-	-	-	-	-	-	7h	-	-	-
515	106069	Hearth deposit	-	-	-	-	-	-	-	59h, 2s	-	-	-
520	106086	F106088	-	-	-	-	-	-	-	58h	-	-	-

CHAPTER 36

Insect remains

by Mark Robinson

36 Insect remains

Mark Robinson

Excavation on the MTCP site (BAAMP00) discovered a Middle Bronze Age ring ditch which surrounded the much eroded remains of a round barrow. The ditch contained waterlogged organic sediment above the primary silting. There are examples known of round barrows in the Fenlands of East Anglia which were engulfed in peat as a result of a rising water table long after their abandonment. However, it is most unusual for a barrow ditch to contain waterlogged sediments likely to have been contemporaneous with the use of the monument. Therefore, extensive bulk sampling was undertaken for waterlogged biological remains, including insects. Assessment identified those samples with good potential for full analysis and showed a general similarity between the range of insects present in those samples with better preservation. It was therefore decided to analyse a single sample from context 320117, feature 324078, in detail. The waterlogged sediments were provisionally dated to the Middle Bronze Age.

Methods

A sample of 10 litres was washed over onto a 0.25 mm mesh to recover organic material. The organic fraction was subjected to paraffin flotation to extract insect remains. The paraffin flot was washed in detergent and sorted in water with the aid of a binocular microscope for insect fragments. Specimens were identified by comparison with reference material at magnifications of up to x100.

Results

The results are given in Table 36.1 for Coleoptera (beetles) and Table 36.2 for other insects. The tables record the minimum number of individuals represented by the fragments identified from the samples. Nomenclature follows Kloet and Hincks (1977). The Coleoptera have been analysed by species group in Figure 36.1 after Robinson (1991, 278-81).

The origin of the assemblages and conditions in the ditch

The organic deposit in the ditch accumulated under water. The insects from it could be divided into aquatic and marginal species which lived in the ditch and terrestrial species which had entered the ditch from the surrounding landscape. There was no evidence that human activity, for example the dumping of refuse, had imported insects to the ditch. The assumption advanced in Robinson (1991, 316) has been followed that of the order of 50% of the terrestrial Coleoptera that reached the deposits by natural agencies had their origin within 50 m of the ring ditch.

Water beetles comprised around 20% of the total Coleoptera. They were all species characteristic of smaller bodies of stagnant water. *Helophorus* cf. *brevipalpis* was the most abundant but there were several examples of *Hydrobius fuscipes*, which tends to favour stagnant water above a bed of organic debris. The occurrence of six individuals of the minute weevil *Tanysphyrus lemnae* suggested that its host plant, *Lemna* sp. (duckweed), covered the surface of the water in the ring ditch. Cyperaceae (sedges), the host plants of *Plateumaris sericea*, perhaps grew in the ditch although it is possible that this leaf beetle had flown in from vegetation alongside the nearby river channel. Some of the aquatic beetles were amphibious species, such as *Coelostoma orbiculare* and these, along with a few beetles of wet mud or dead waterside vegetation, such as *Lesteva longoelytrata* and *Platystethus cornutus* gp., probably lived on the sides of the ring ditch. However, there were few insects of marsh habitats, suggesting an abrupt transition to the terrestrial environment.

The setting of the ring ditch

The terrestrial insects were almost entirely species which can occur in, or are dependent upon, grassland habitats. The wood and tree-dependent beetles of Species Group 4 only comprised 1% of the terrestrial Coleoptera (Fig. 36.1), suggesting a very open landscape. The only members of this group present were *Melanotus erythropus*, which occurs in very rotten wood and *Grynobius planus*, which bores into drier dead wood.

Members of Species Group 11, chafer and elaterid beetles with larvae which feed on the roots of grassland plants, were particularly abundant, comprising 21% of the terrestrial Coleoptera. This value was particularly high for an archaeological assemblage. The most numerous species were *Phyllopertha horticola* and *Agrypnus murinus* but other members of this community included *Hoplia philanthus*, *Agriotes lineatus* and *A. sputator*. The high percentage of this species group was perhaps because grassland extended to the very edge of the ring ditch. The strong presence of *A. murinus* would suggest well-drained permanent turf. Grassland vegetation was also implied by the majority of the leaf beetles and various of the weevils. The leaf beetles *Hydrothassa glabra* and *Crepidodera ferruginea* respectively feed on *Ranunculus* spp. (buttercups) and grasses. Together they comprised 5% of the terrestrial Coleoptera. The vetch and clover-feeding weevils of the genera *Apion* and *Sitona*, which make up Species Group 3, were, at 3% of the terrestrial Coleoptera, not sufficiently numerous as to indicate the presence of meadowland or tall uncut grass but at an appropriate abundance for pastureland. Weevils which feed on *Plantago lanceolata* (ribwort plantain), another grassland plant, such as *Ceuthorhynchidius troglodytes*, were also present. The most numerous species of ground beetle, *Calathus fuscipes* and *C. melanocephalus*, favour grassland habitats, unless very closely grazed, while various of the rove beetles, such as *Xantholinus linearis* or *longiventris* and *Staphylinus olens*, often occur in grassland. One of the species of ground beetle, *Pterostichus niger*, is now more usually associated with woodland habitats than grassland in Southern England. (Under the cooler and more humid conditions of Northern England, it readily occurs in grassland). However, it appears to have been living in grassland at Silbury Hill during the Neolithic (Robinson 1997, 43) and at Runnymede during the Late Bronze Age (Robinson 1991, 322). The ants included workers of *Lasius flavus* gp., the mound-building yellow ant of grassland.

The occurrence of dung beetles showed that the grassland was being grazed. The scarabaeoid dung beetles of Species Group 2, which feed on the droppings of medium-to-large-sized mammals, especially domestic animals on pasture, comprised 12% of the terrestrial Coleoptera. Such a value would be typical for pasture away from an area in which stock was concentrated (Robinson 1991, 278-80). The majority of these beetles were *Aphodius* cf. *sphacelatus* but other species of *Aphodius*, *Geotrupes* sp. and *Onthophagus* spp. were also present. There was a single example of *O. taurus*, which is now extinct in Britain, although it does still occur in the Channel Islands and parts of mainland Europe, including Belgium and Northern France (Jessop 1986, 26; Paulian 1959, 88-9). There are several Neolithic and Bronze Age records of *O. taurus* from England (Robinson 1991, 320; Robinson 1992). Its former occurrence in Britain could have been a reflection of climatic conditions being slightly warmer than those of the mid 20th century AD or could have been due to pasture on fertile, well-drained soils being less likely to experience episodes of deep cultivation than at present (its larvae develop in subterranean tunnels stocked with dung). Beetles of more general foul organic material including dung, which belong to Species Group 7, were, at 4.5% of the terrestrial Coleoptera, about as abundant as might have been expected given the proportion of Species Group 2. The most numerous member of this group was *Megasternum obscurum*.

The insects did not suggest any other major habitats in the vicinity of the ring ditch. There was a single specimen of *Heterogaster urticae*, a bug which feeds on *Urtica dioica* (stinging nettle). However, the leaf beetles and weevils which tend to be associated with weeds of arable land and disturbed ground, such as *Phyllotreta* spp. and various Ceuthorhynchinae, were poorly represented. There were no woodworm beetles (Species Group 10) to suggest the proximity of timber structures and other insects associated with human habitation were absent.

Conclusions

The insects suggest that the barrow ring ditch held stagnant water covered with duckweed and was set amidst pasture being grazed by domestic animals. Human settlement appeared to have been absent from the vicinity of the barrow. Although there was a single example of the extinct scarabaeid dung beetle *Onthophagus taurus*, the beetle assemblage did not contain the high proportion of individuals of the genus *Onthophagus* that characterises some assemblages from towards the end of the Middle Bronze Age (Robinson 2006). The terrestrial component of the insect assemblages shows some similarity to the assemblage of Late Neolithic date from beneath Silbury Hill, Wiltshire (Robinson 1997). Despite their disparity in size, both were ceremonial monuments set amidst grassland whereas most other insect assemblages which have been studied of Neolithic to Bronze Age date have been from fen peats, palaeochannel sediments or settlement sites.

Table 36.1: Coleoptera from the Bronze Age Ring Ditch on the MTCP site (BAAMP00)

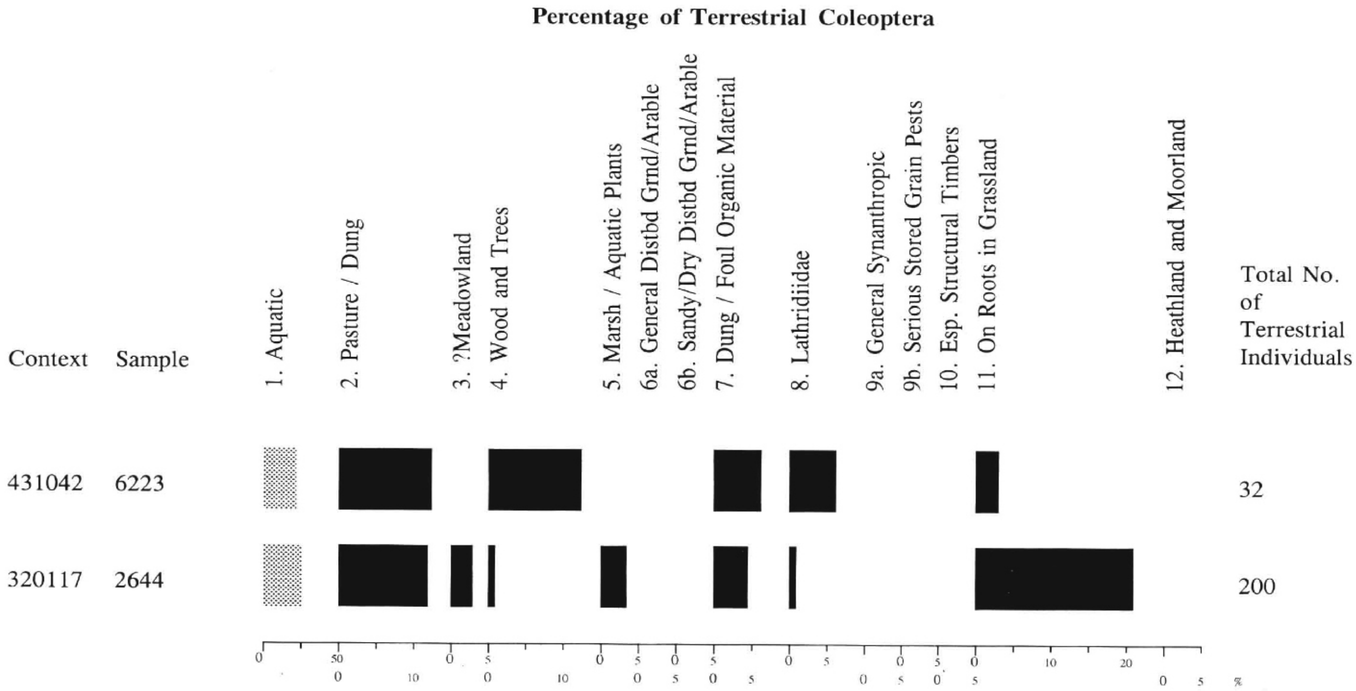
Context 320117 Sample 2644 Sample vol (litres) 10	Min no of individuals	Species Group
Carabus violaceus L.	1	
Loricera pilicornis (F.)	1	
Clivina collaris (Hbst.) or *fossor* (L.)	1	
Trechus obtusus Er. or *quadristriatus* (Schr.)	2	
Bembidion lampros (Hbst.) or *properans* (Step.)	1	
B. guttula (F.)	2	
Pterostichus anthracinus (Pz.)	1	
P. cupreus (L.)	1	
P. niger (Sch.)	1	
P. melanarius (Ill.) or *niger* (Sch.)	1	
P. nigrita (Pk.)	1	
P. cupreus (L.) or *versicolor* (Sturm)	1	
Calathus fuscipes (Gz.)	4	
C. melanocephalus (L.)	6	
Agonum sp.	1	
Amara spp.	3	
Dromius linearis (Ol.)	1	
Haliplus sp.	1	1
Hydroporus sp.	1	1
Agabus bipustulatus (L.)	3	1
Agabus sp. (not *bipustulatus*)	1	1
Colymbetes fuscus (L.)	1	1
Dytiscus sp.	1	1
Helophorus aquaticus (L.)	3	1
Helophorus spp. (*brevipalpis* size)	27	1
Coelostoma orbiculare (F.)	1	1
Sphaeridium bipustulatum F.	1	
S. lunatum F. or *scarabaeoides* (L.)	1	
Cercyon spp.	1	7
Megasternum obscurum (Marsh.)	5	7
Hydrobius fuscipes (L.)	3	1
Histerinae indet.	1	
Ochthebius cf. *minimus* (F.)	6	1
Hydraena testacea Curt.	1	1
Hydraena sp. (not *testacea*)	1	1
Ptenidium sp.	2	
Nicrophorus humator (Gled.)	1	

Context 320117 Sample 2644 Sample vol (litres) 10	Min no of individuals	Species Group
Silpha tristis Ill.	1	
Lesteva longoelytrata (Gz.)	3	
Carpelimus cf. *corticinus* (Grav.)	1	
Platystethus cornutus gp.	1	
Anotylus rugosus (F.)	1	7
A. sculpturatus gp.	2	7
Stenus spp.	5	
Lathrobium sp.	1	
Rugilus sp.	1	
Xantholinus linearis (Ol.) or *longiventris* Heer	4	
Philonthus spp.	3	
Staphylinus aeneocephalus Deg. or *fortunatarum* (Wol.)	1	
S. olens Müll.	1	
Tachyporus spp.	1	
Tachinus spp.	2	
Aleocharinae gen. et sp. Indet.	4	
Geotrupes sp.	1	2
Aphodius ater (Deg.)	1	2
A. pusillus (Hbst.)	1	2
A. rufipes (L.)	1	2
A. cf. *sphacelatus* (Pz.)	9	2
Aphodius sp.	1	2
Onthophagus ovatus (L.)	3	2
O. taurus (Schreb.)	1	2
Onthophagus sp. (not *nutans, ovatus* or *taurus*)	1	2
Hoplia philanthus (Fues.)	5	11
Phyllopertha horticola (L.)	18	11
Cetonia aurata (L.)	1	
Byrrhus sp.	2	
Dryops sp.	1	1
Melanotus erythropus (Gm.)	1	4
Agrypnus murinus (L.)	8	11
Athous haemorrhoidalis (F.)	2	11
Actenicerus sjaelandicus (Müll.)	1	
Agriotes lineatus (L.)	5	11
A. sputator (L.)	3	11
Agriotes spp.	1	11
Cantharis sp.	1	
Grynobius planus (F.)	1	4
Cryptophagidae gen. et sp. indet. (not Atomariinae)	1	
Atomaria spp.	3	
Olibrus sp.	2	
Coccinella septempunctata L.	1	
Corticariinae gen. et sp. indet.	2	8
Plateumaris sericea (L.)	1	5
Chrysolina cf. *graminis* (L.)	1	
Gastrophysa viridula (Deg.)	2	
Hydrothassa glabra (Hbst.)	5	

Context 320117 Sample 2644 Sample vol (litres) 10	Min no of individuals	Species Group
Phyllotreta vittula Redt.	2	
Longitarsus spp.	4	
Altica sp.	1	
Crepidodera ferruginea (Scop.)	5	
Chaetocnema concinna (Marsh.)	1	
Chaetocnema sp. (not *concinna*)	1	
Apion spp.	2	3
Phyllobius sp.	3	
Barypeithes araneiformis (Schr.)	1	
Strophosomus sp.	1	
Barynotus sp.	2	
Sitona sulcifrons (Thun.)	1	3
Sitona sp.	3	3
Hypera punctata (F.)	2	
Hypera sp. (not *punctata*)	1	
Tanysphyrus lemnae (Pk.)	6	5
Ceuthorhynchidius troglodytes (F.)	1	
Ceuthorhynchinae gen. et sp. indet.	1	
Anthonomus cf. *rubi* (Hbst.)	1	
Tychius sp.	1	
Mecinus pyraster (Hbst.)	1	
Total	251	

Table 36.2: Stansted Bronze Age Ring Ditch other insects on the MTCP site (BAAMP00)

Context 320117 Sample 2644 Sample vol (litres) 10	
Forficula auricularia (L.)	1
Heterogaster urticae (F.)	1
Aphrodes bicinctus (Schr.)	3
Aphrodes sp.	2
Myrmica rubra (L.) or *ruginodis* Nyl. - female	1
Myrmica rubra (L.) or *ruginodis* Nyl. - worker	3
Lasius flavus gp. – worker	4
L. niger – worker	3
Hymenoptera indet. (not Formicidae)	2
Diptera indet. – puparium	1

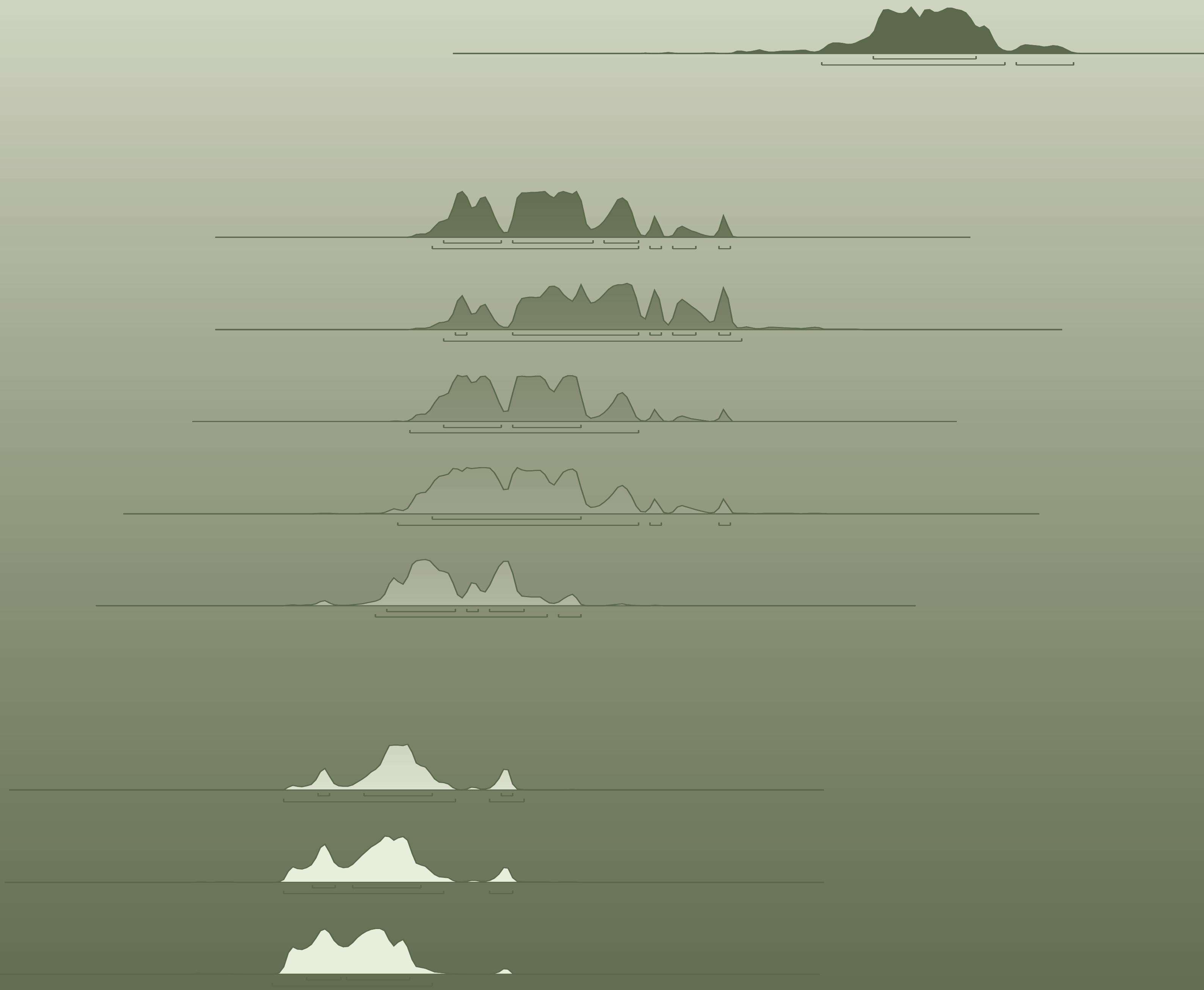


Species groups expressed as a percentage of the total terrestrial Coleoptera (ie aquatics excluded). Not all the terrestrial Coleoptera have been classified into groups.

Figure 36.1: Species Groups of Coleoptera from Bronze Age Ring Ditch 324078 and Late Bronze Age Waterhole 430084

CHAPTER 37

Radiocarbon dating



by Fraser Brown

37 Radiocarbon dating

Fraser Brown

A programme of radiocarbon dating was employed at Stansted to establish an absolute chronology with which to study the archaeological remains excavated. A phased strategy was devised and undertaken during post-excavation analysis, targeting features and deposits that seemed most significant from the results of finds, environmental and stratigraphic analysis. It was hoped that it would be possible to refine the artefact typologies; date environmental sequences; and phase features and deposits for which there was no other dating evidence. A range of different feature types and contexts were dated over a wide spatial and temporal distribution, and efforts were made to ensure that the materials sampled were likely to be the same date as the deposits in which they occurred. Where it was possible to do so, determinations were retrieved in sequence from well stratified deposits. These sequences allow the dating of changes in the character of deposition and practice over time and help determine the duration over which deposition took place.

In total 38 radiocarbon samples were processed, the results of which are displayed in Table 37.1. The majority of the samples (all those prefixed with 'NZA') were processed by the Rafter Radiocarbon Laboratory, Institute of Geological and Nuclear Sciences, New Zealand but two samples of cremated bone were processed by the Oxford Radiocarbon Accelerator Unit. All the samples were measured using Accelerator Mass Spectrometry (AMS). Unless otherwise stated, all the calibrated date ranges quoted in this vol have been given to 95% confidence and have been calibrated using a computer program (Oxcal (v3.9), Bronk Ramsey 2003) and the datasets published by Stuiver (1998), Stuiver and Pearson (1986) and Pearson and Stuiver (1986). The date ranges in Table 37.1 and elsewhere in this vol have been calculated using the maximum intercept method (Stuiver and Reimer 1986), and are a 'short hand' way of referring to the date of each sample. The date ranges displayed diagrammatically throughout the volume are more accurate representations of the probability distributions. Where the text in these diagrams occurs in *italics*, OxCal has been used to mathematically model the ranges.

The vast majority of the samples (28) were charred plant remains; four were waterlogged wood; two were cremated bone; one was from an articulated human skeleton; two were from partially articulated animal skeletons and one was a disarticulated cow bone. The charred plant remains comprised cereal grains, hazelnut shells or pieces of small diameter roundwood, so the 'old wood effect' (Bowman 1995, 15 and 51) should not be a problem. By choosing samples from well stratified and sealed deposits where the formation process was understood, every effort has been made to reduce the risk of sampling charred remains from secondary contexts or that are intrusive or residual but a slight possibility always remains that this is the case. In two instances, the results conflicted with the expected date of a feature suggested by the finds evidence. Sample NZA-25460 was from the bottom of a cess pit that was almost certainly late Saxon but returned a modern date, suggesting that some contamination of the sample had occurred (NZA-26251 another sample from this deposit did provide a late Saxon date). Sample NZA-25461 was from flax seeds in the top of a tree-throw containing Neolithic flint and pottery but provided a late

Saxon date, and probably results from contamination during processing rather than residuality.

Two of the samples of waterlogged wood (NZA-23240 and NZA-23243) were posts in the same waterhole but were dated centuries apart, so it is likely that they related to different phases of use in this feature. One sample (NZA-23237) was from a large worked oak timber in the basal deposit of a ring ditch, which also contained bark chippings (NZA-23242). It is likely that the bark chippings most closely date the deposit and the slightly earlier date obtained from the timber may reflect its previous use in a structure or the length of time it remained growing as a tree.

Disarticulated bone was generally excluded from the radiocarbon programme, however, a disarticulated cow bone (NZA-23282) was processed. This was to determine the date of a pit, that may have been either Bronze Age or Neolithic (it was in the MTCP Bronze Age settlement but contained Neolithic pottery), and, as such, short term residuality was not an issue. The samples from cremated bone and the articulated animal and human bone probably closely date the time of their burial or deposition but the possibility that the cremated bone was stored for a period of time prior to its deposition still exists. A partially articulated deer skeleton (sample NZA-23750), one of several occurring near the base of a waterhole, was dated to the medieval period. However, the waterhole contained only Iron Age and Romano-British pottery, and the pollen sample taken from this feature was considered to be atypical for the medieval period (Huckerby *et al.*, CD Chapter 31). The pottery is likely to be residual, deriving from earlier deposits eroding into the waterhole, which is dated by the deer carcasses within it.

The radiocarbon date range for Stansted spanned the Early Neolithic to early post-medieval periods (excluding the single modern date); the maximum date range being 3760 cal BC - cal AD 1640. The majority (20) of these dates were within the conventional Bronze Age period (Needham 1996) but this was largely an artefact of the sampling strategy, which specifically targeted features of this period. Two dates were Early Neolithic; one date was Late Neolithic/Early Bronze Age; two dates were Late Bronze Age/Early Iron Age; two dates were Iron Age; one date was Romano-British; five dates were late Saxon; one date was late medieval; and two dates were late medieval/early post-medieval.

With the exception of the Neolithic, Bronze Age and early medieval periods, artefacts such as pottery and coins were considered to be more useful than radiocarbon dating for precisely dating features and deposits within their periods. For this reason it was decided to limit the number of radiocarbon samples processed from the Iron Age, Romano-British, medieval and post-medieval periods, so that resources could be concentrated elsewhere, where they had the potential to be more useful. However, some features, such as an Iron Age inhumation, were sampled in order to ensure precise dating, and certain other features were sampled to provide controls on artefact typologies.

The paucity of Neolithic radiocarbon dates reflects the general rarity of features of this period but the few dates obtained were successful in establishing the presence at Stansted of hunter gathererer communities early in the period. The Bronze Age radiocarbon dating series has provided a good chronology for the colonisation of the landscape by sedentary farmers, demonstrating that this occurred at the end of the Early Bronze Age. It has allowed a detailed reconstruction of the Bronze Age settlement history at Stansted, particularly for the MTCP site, where it has been possible to demonstrate the interrelationship of a nucleated settlement with other features in its immediate hinterland, and that this settlement was broadly contemporary with other Bronze Age settlements in the wider landscape. The Bronze Age dates have helped develop ceramic typologies for Stansted, which will prove useful for the region in general and which may make an important contribution to national studies. The late Saxon radiocarbon dates from SG and the MTCP site formed a tight cluster, indicating the existence of a settlement here prior to the Norman Conquest. The late medieval and early post-medieval dates all occurred in features within the bounds of a deer park on the Stansted Estate, and are contemporary with its later use.

Generally, the radiocarbon dates from Stansted do not warrant in-depth analysis here, as they have little more to tell us other than the date of the deposits from which they were sampled, and this has already been considered within the stratigraphic narrative (see Chapters 3-10). The exception is the Bronze Age period, where some analysis of the dates informs a detailed understanding of the settlement on the MTCP site; by discussing the interpretation of the dates, it is hoped to clarify the rationale behind the phasing of the settlement.

An absolute chronology for the Bronze Age

A series of 20 radiocarbon determinations dating to the Bronze Age were obtained from the Stansted landscape (MTCP, FLB, LTCP, and M11 sites; excluding two transitional Late Bronze Age/Early Iron Age dates). Figure 37.1 shows all 20 dates in chronological order. They span a period of between 450 and 850 years (the maximum possible date range being 1690 cal BC - 830 cal BC; the minimum date range being 1510 cal BC - 1050 cal BC), potentially ranging from the end of the conventional Early Bronze Age to the end of the Late Bronze Age (Needham 1996). This absolute chronology provides a framework with which to study the archaeological remains excavated.

The determinations have a wide spatial distribution, occurring on both the east and west of the airport but the majority (14) came from the MTCP site, with most of these coming from the features within the Bronze Age settlement. The distribution of the determinations reflects the availability of suitable materials and contexts for dating. Datable material is only available today because those inhabiting the Stansted landscape in the past had adopted a suite of cultural practices that involved the deposition of material in a manner that meant it survived to be dated. The spatial distribution of the determinations therefore bears a direct relationship to the intensity of the Bronze Age inhabitation of the landscape.

Some of these practices (for example the construction of funerary monuments and deposition of burnt mounds) are commonly associated with both the Early and the Middle Bronze Age but others are usually associated with the Middle Bronze Age alone (for example digging waterholes and erecting permanent dwellings in settlements). At Stansted, the radiocarbon dates from a burnt mound and the ring ditch of a funerary monument, both associated with watercourses, date to the very end of the Early Bronze Age and seemingly continue into the Middle Bronze Age. The settlement features appear slightly later, however, suggesting that the permanent settlement of the Stansted landscape happened at the beginning of the Middle Bronze Age.

Yet, this distinction may be too rigid, as all these practices could have been broadly synchronous; especially considering the ambiguity of the radiocarbon date ranges and the fact that it is the disuse deposits within the earliest waterholes that have been dated. It is possible that the practices of monument construction and deposition in watercourses were related in some way to the settling of the landscape. This is reflected in the phasing of Bronze Age activity at Stansted. Three phases have been defined on the basis of stratigraphic and radiocarbon evidence and can be equated with the ceramic typology outlined by Leivers (see CD Chapter 17). Radiocarbon Phase 1 is equivalent to Leivers' Ceramic Period 1; Phase 2 is equivalent to Ceramic Periods 2 and 3; and Phase 3 corresponds to the introduction of transitional Middle Bronze Age/Late Bronze age ceramics. The funerary monument, burnt mound and earliest settlement features have all been assigned to Phase 1 (Figs 37.2 - 37.4). This phase spans a maximum of 300 years, from *c* 1700 cal BC to *c* 1400 cal BC.

Within the settlement on the MTCP site, a second, later phase (Phase 2) of house construction and waterhole digging replaced the first. This can be radiometrically dated and seems to correspond with developments in ceramic technology and has thus been extended across the landscape (Figs 37.2 - 37.4). Phase 2 spans 200 years, possibly less, starting *c* 1400 cal BC and ending at *c* 1200 cal BC. It is notable that although the ring ditch of the funerary monument was silting up at this time, the monument appears to still have been in use. The settlement on the MTCP site was largely abandoned at the end of Phase 2 but a number of other features in the wider landscape provided later radiocarbon dates, as did a pit within the area of the abandoned settlement (all assigned to Phase 3; Figs 37.2 and 37.3). Phase 3, although probably much shorter, lasted no more than 350 years from *c* 1200 cal BC to *c* 850 cal BC, with the pit in the settlement being somewhat later than the other features in this phase. With the exception of a pit on the SCS site, which may in fact on the basis of pottery evidence be Early Iron Age (Fig. 37.4; Havis and Brooks 2004, 24), no other features in the wider Stansted landscape have yielded contemporaneous dates but other evidence implies activity at this time.

It is worth noting that because the radiocarbon technique can only provide probabilistic date ranges, it can imply that a phase of activity lasted longer than it necessarily did. While there was undoubtedly several hundred years of Bronze Age activity at Stansted, large periods of time could have separated the isolated events for which evidence exists; there may have actually been more disjuncture than Figure 37.2 perhaps suggests. In the case of the MTCP settlement, we have a good sequence of dates informed by archaeological evidence that suggests continuous occupation. We may, therefore, interpret the radiocarbon evidence, and perhaps prefer to believe that the settlement was more likely occupied for somewhere between 200-300 years in total, rather than the 500 years that is possible; the actual duration of each structural phase being around 100-150 years. This assertion is explored in more detail below.

Dating the MTCP settlement

In the section above, two phases have been inferred for the occupation of the settlement on the MTCP site. This is largely based on the evidence from radiocarbon samples retrieved from pits and waterholes as, unfortunately, no material suitable for radiocarbon dating was retrieved from any of the settlement structures. As such, the case for two structural phases has largely been made on stratigraphic and morphological grounds, and it is only through interpretation than these structural phases can be equated with the radiocarbon phases. The suggested model is corroborated to some extent by the results of the pottery analysis but there exist few instances where it is possible to phase features within the Bronze Age on the basis of ceramic evidence alone, and the features where it is possible to do this are generally pits and waterholes rather than structural features. Therefore, a degree of uncertainty hovers over the structural sequence within the settlement and it difficult to prove which, if any, of the structures are contemporaneous. The interpretation advanced here is one of several possible scenarios but it is felt that it holds up well given the available evidence.

It is suggested that ***Roundhouses 1-4*** were broadly contemporary and belonged to the first phase of structural activity within the settlement (the stratigraphic grounds for asserting this are set out in Volume 1). Three radiocarbon dates (Table 37.2; Fig. 37.2) were retrieved from settlement features, which are thought to date this first phase of activity (Table 37.2). Two of these were obtained from charcoal in the disuse fills of waterholes (323001 and 302043) and one from a basal fill of a pit (314079) that appears to be associated with ***Roundhouse 1***. The calibrated date ranges show close agreement and, if anything, the date from the basal fill in the pit is slightly earlier than the dates from the backfills in the two waterholes, which is what might be expected if all the features were open and in use at the same time.

It is considered unlikely that these features predate the roundhouses because: -

- the waterholes and pit occurred either within or adjacent to the settlement enclosure
- there is evidence from finds and soil micromorphology that the waterholes and pit were associated with nearby settlement activity
- the existence of a settlement in close proximity would surely be a precondition for digging the waterholes (none of this date were found elsewhere in the landscape).

In addition to the waterholes described above, another waterhole (***309075***) was associated with the settlement and, as well as an abundant artefactual assemblage, this produced three well stratified radiocarbon dates relating to its disuse (Table 37.3; Fig. 37.2). Although there is some overlap in the date ranges, and it cannot be ruled out that the waterhole was already in existence during Phase 1, the radiocarbon dates suggest that it was associated, along with two pits that were also sampled for radiocarbon (Table 37.3; Fig. 37.2), with a later phase of activity at the settlement (Phase 2) during which ***Roundhouses 5-9*** were constructed.

It is worth noting that a boundary ditch (***Boundary 4***) associated with the settlement cut through deposits within pit 303015 and must be later than it, suggesting some activity after the backfilling of the pit. This serves as a reminder that Phase 2 may encompass more than one sub-phase and all the structures need not be contemporary.

Modelling the radiocarbon dates for the settlement on the MTCP site

The unmodelled date ranges for the settlement on the MTCP site (Fig. 37.2), are quite broad and, although they seem to divide into two successive phases, it remains possible that the phases overlap. By using a computer package (OxCal 3.9 (Bronk Ramsey 2003)) with a view to determining how well the radiocarbon evidence supports two phases of activity, it is possible to model the likely order of all the dated features and events (Fig. 37.5 and Table 37.4) and estimate the potential interval separating them (Fig. 37.8). (In modelling this order, the known stratigraphic sequence of the three dates within waterhole 309075 was entered into OxCal but no other assumptions were made. There was no statistically significant variation with the radiocarbon dating sequence (A=95.3%).

When considering the probable chronological order of the features (Table 37.4), it seems extremely unlikely that the silting and backfilling of waterhole 309075 took place before the Phase 1 features were backfilled and it is possible that pit 303015 pre-dated the deliberate backfilling of waterhole 309075 but perhaps not its initial silting. When considered separately, it is possible that, in all instances, the features might overlap but the probability distributions make it less likely that the Phase 1 waterholes overlap with waterhole 309075 and, although the pits could overlap with either the Phase 1 waterholes or waterhole 309075, the latter is perhaps more likely (Fig. 37.6). This suggests that two successive phases to the settlement are likely, indeed probable.

A stratigraphic model of the radiocarbon dates from the settlement on the MTCP site

In order to refine the dating of the settlement it is possible to model the radiocarbon dates on the basis of the archaeological evidence. It must be emphasised that the model is an interpretation but one based upon an empirical understanding of the stratigraphy. A number of assumptions have been made in the model: -

1. that waterholes 323001 and 302043 and pit 314079 belong to one early phase of activity (Phase 1) and the dates relate to the end of this phase

2. that this predates a later phase of activity comprising pits 316032 and 303015 and waterhole 309075 and it is the end of this phase that has been dated

3. that the sequence in waterhole 309075 can be understood as an initial silt followed by a series of rapidly deposited dumps, with the earliest radiocarbon date sampling the silts and the latest two sampling the dumps (see stratigraphic analysis outlined below)

The dated deposits in the waterhole comprise a series of dumps, interspersed by deposits of silt. The silt deposits are not thick and comparison with the deposits in other deep, waterlogged features at Stansted might suggest that they did not take overly long to accumulate. The dumped deposits, especially in the middle part of the sequence from which the two later dates were derived, were probably deposited in fairly quick succession, and the material in them is likely to be redeposited midden material. This may explain why the date in the upper part of the sequence is apparently older than the date in the lower part of the sequence: either the deposits were deposited within a short time of each other and the discrepancy in date can be explained by the error margin of the radiocarbon method; or the upper sample is indeed older than the lower sample but the carbonised material had been stored elsewhere prior to deposition, and the later material was deposited before the earlier material. This latter situation might be expected if it was the upper part of a midden that was removed for redeposition before the lower part.

There was no statistically significant variation in the modelled radiocarbon dates (A=112.8%), suggesting that the model is plausible (Figs 37.7 and 37.8). By interpreting the probability distributions and erring towards a shorter estimate, it would seem likely that Phase 1 dated somewhere between 1500 cal BC - 1400 cal BC; Phase 2 dated somewhere between 1400 cal BC - 1200 cal BC; and the settlement was likely to have been occupied for around 130 - 290 years.

Table 37.1: A summary of radiocarbon dates from Stansted

Context Number	Cut Number	Site	Laboratory Code	Radiocarbon Age (BP)	δ ¹³ C (‰)	Calibrated Date Range (1σ)	Calibrated Date Range (2σ)	Material	Feature
106069	106068	LTCP	NZA-23231	1244±30	-24.6	AD 690 - AD 860	AD 680 - AD 890	*Quercus* sapwood	Hearth
107057	107058	LTCP	Oxford-OxA-15551	1851±28	-20.5	AD 125 - AD 220	AD 80 - AD 240	Cremated bone	Cremation burial
110090	110084	LTCP	NZA-23280	2087±35	-20.1	170 BC - 46 BC	200 BC - AD 10	Right human tibia	Inhumation burial
116009	116013	LTCP	NZA-23230	3126±30	-23.7	1440 BC - 1320 BC	1500 BC - 1310 BC	*Hordeum*	Pit
116028	116029	LTCP	NZA-23281	365±40	-22.5	AD 1460 - AD 1630	AD 1440 - AD 1640	Horse femur	Pond
134066	134059	LTCP	NZA-23750	497±30	-22.8	AD 1414 - AD 1437	AD 1330 - AD 1450	Articulated deer bone	Deer skeleton in waterhole
302005	302001	MTCP	NZA-23234	3146±30	-25.2	1490 BC - 1320 BC	1520 BC - 1310 BC	Maloideae	Waterhole
303017	303015	MTCP	NZA-25412	3043±30	-23.9	1380 BC - 1260 BC	1410 BC - 1210 BC	*Hordeum* grain	Pit
309085	309075	MTCP	NZA-20915	3030±30	-23.77	1380 BC - 1210 BC	1390 BC - 1130 BC	Hazelnut shell and twigs	Waterhole
309108	309075	MTCP	NZA-20914	3006±35	-24.2	1370 BC - 1130 BC	1360 BC - 1120 BC	Maloideae twig	Waterhole
309118	309075	MTCP	NZA-20917	3053±40	-27.18	1390 BC - 1260 BC	1420 BC - 1130 BC	*Prunus*	Waterhole
314090	314079	MTCP	NZA-25413	3182±35	-25.4	1500 BC - 1410 BC	1530 BC - 1390 BC	Maloideae charcoal	Pit
314206	314205	MTCP	NZA-23749	399±30	-26.3	AD 1440 - AD 1620	AD 1430 - AD 1630	Charcoal	Burnt tree-throw
315009	315008	MTCP	NZA-23235	1022±30	-23.5	AD 988 - AD 1024	AD 900 - AD 1160	*Triticum spelta/dicoccoides*	Beamslot in building
316034	316032	MTCP	NZA-23282	3108±35	-21.9	1430 BC - 1310 BC	1440 BC - 1260 BC	Right cattle calcaneum	Pit
316114	316118	MTCP	NZA-20919	2925±35	-27.19	1220 BC - 1040 BC	1260 BC - 1000 BC	*Prunus spinosa*	Pit
320060	320046	MTCP	NZA-20916	2813±35	-25.42	1005 BC - 915 BC	1050 BC - 830 BC	*Prunus spinosa*	Pit
320132	320131	MTCP	NZA-23242	3241±30	-27	1525 BC - 1445 BC	1610 BC - 1430 BC	Bark chippings	Ring ditch
320133	320131	MTCP	NZA-23237	3309±30	-26.1	1620 BC - 1520 BC	1690 BC - 1510 BC	*Quercus* large worked timber	Ring ditch
320137	320131	MTCP	NZA-20961	3105±35	-24.86	1430 BC - 1310 BC	1440 BC - 1260 BC	*Prunus*	Ring ditch
323003	323001	MTCP	NZA-23236	3162±35	-23.7	1495 BC - 1400 BC	1520 BC - 1320 BC	Cereal grain	Waterhole
323036	323037	MTCP	NZA-20918	4883±35	-25.36	3700 BC - 3640 BC	3760 BC - 3540 BC	*Corylus* charcoal	Pit
334064	334059	MTCP	Oxford-OxA-15389	2937±30	-22.8	1260 BC - 1050 BC	1260 BC - 1010 BC	Cremated medium mammal bone	Cremation burial
353012	353011	MTCP	NZA-20960	4741±35	-24.41	3640 BC - 3380 BC	3640 BC - 3370 BC	Hazelnut shell	Pit
408015	408013	FLB	NZA-20962	3053±30	-25.3	1380 BC - 1260 BC	1410 BC - 1210 BC	Hazelnut shell	Waterhole
420069	420068	M11	NZA-23238	3947±35	-24.9	2550 BC - 2350 BC	2570 BC - 2300 BC	cf Maloideae	Tree-throw
423158	423113	M11	NZA-23239	2490±30	-25.9	770 BC - 520 BC	790 BC - 410 BC	Maloideae	Pit
426034	434076	M11	NZA-23243	3204±30	-26.4	1515 BC - 1435 BC	1530 BC - 1410 BC	*Quercus* roundwood	Waterhole
431035	434076	M11	NZA-23244	3051±30	-26.3	1380 BC - 1260 BC	1410 BC - 1210 BC	*Acer campestre*	Waterhole
435077	435074	M11	NZA-23241	2255±40	-22.4	390 BC - 210 BC	400 BC - 200 BC	cereal grain	Ditch
436092	436091	M11	NZA-23240	2528±35	-23.8	800 BC - 540 BC	800 BC - 520 BC	*Acer campestre*	Pit
464010	464010	LTCP	NZA-23232	3252±30	-24.5	1600 BC - 1450 BC	1620 BC - 1430 BC	*Prunus* charcoal	Burnt mound
470042	470040	LTCP	NZA-23233	3283±35	-24.8	1615 BC - 1515 BC	1690 BC - 1450 BC	*Prunus*	Pit below burnt mound

Context Number	**Cut Number**	**Site**	**Laboratory Code**	**Radiocarbon Age (BP)**	**δ [13] C (‰)**	**Calibrated Date Range (1σ)**	**Calibrated Date Range (2σ)**	**Material**	**Feature**
494015	494014	SG04	NZA-25414	1101±45	-26.8	AD 890 - AD 995	AD 780 - AD 1030	*Corylus* charcoal	Pit
496006	496001	SG04	NZA-25461	1175±30	-26.4	AD 780 - AD 900	AD 770 - AD 970	Flax seeds	Tree-throw
498021	498020	SG04	NZA-26251	1219±30	-26.2	AD 760 - AD 890	AD 770 - AD 900	cf Maloideae	Pit
498021	498020	SG04	NZA-25460	255±35	-23.1	AD 1520 - AD 1800	AD 1510 - AD 1950	*Triticum* sp. Grain	Pit
500031	500030	SG04	NZA-25415	1054±30	-22.4	AD 900 - AD 1020	AD 890 - AD 1030	*Triticum aevistum* grain	Ditch

From Bronk Ramsay 2003 OxCalv3.9 www.rlaha.ox.ac.uk

Table 37.2: Phase 1 radiocarbon dates

Feature	Type	Material	Lab code	Radiocarbon date BP and error factor	Calendrical date cal BC (2σ)
314079	Pit	Maloideae charcoal	NZA-25413	3182±35	1530-1390
323001	Waterhole	Charred cereal grain	NZA-23236	3162±35	1520-1320
302043	Waterhole	Maloideae charcoal	NZA-23234	3146±30	1520-1310

Table 37.3: Phase 2 radiocarbon dates

Feature		Type		Material	Lab code	Radiocarbon date BP and error factor	Calendrical date cal BC (2σ)
316032		Pit		Cattle bone	NZA-23282	3108±35	1440-1260
303015		Pit		*Hordeum* grain	NZA-25412	3043±30	1410-1210
Waterhole 309075							
Feature	**Deposit**	**Deposit type**	**Relative position in sequence**	**Material**	**Lab code**	**Radiocarbon date BP and error factor**	**Calendrical date cal BC (2σ)**
309075	**309081**	Erosion and silts	Lowest	Maloideae twig	NZA-20917	3053±40	1420-1130
309075	**309099**	Silty backfill	Middle	*Prunus* stone	NZA-20914	3006±35	1390-1130
309075	**309127**	Charcoal-rich backfill	Highest	Hazelnut shell and twig	NZA-20915	3030±30	1360-1120

Table 37.4: Probable chronological order of dated deposits of features within the settlement (percentage probabilities in chart show the likelihood that the dated sample from the feature in the Y axis predates the dated sample from the feature in the X axis)

	Pit 314079	Waterhole 323001	Waterhole 302043	Pit 316032	Waterhole 309075 (lowest deposit)	Pit 303015	Waterhole 309075 (middle deposit)	Waterhole 309075 (highest deposit)
Pit 314079	-	63.4%	76.7%	94.4%	98.0%	99.3%	99.7	100.0%
Waterhole 323001	36.6%	-	63.9%	87.6%	94.1%	97.4%	98.7%	99.8%
Waterhole 302043	23.3%	36.1%	-	79.1%	88.9%	95.3%	97.7%	99.5%
Pit 316032	5.6%	12.4%	20.9%	-	63.9%	80.4%	89.6%	97.4%
Waterhole 309075 (lowest deposit)	2.0%	5.9%	11.1%	36.1%	-	72.3%	100.0%	100.0%
Pit 303015	0.7%	2.6%	4.7%	19.6%	27.7%	-	62.6%	83.8%
Waterhole 309075 (middle deposit)	0.3%	1.3%	2.3%	10.4%	0.0%	37.4%	-	100.0%
Waterhole 309075 (highest deposit)	0.0%	0.2%	0.5%	2.6%	0.0%	0.16.2%	0.0%	-

Overall agreement 95.3%

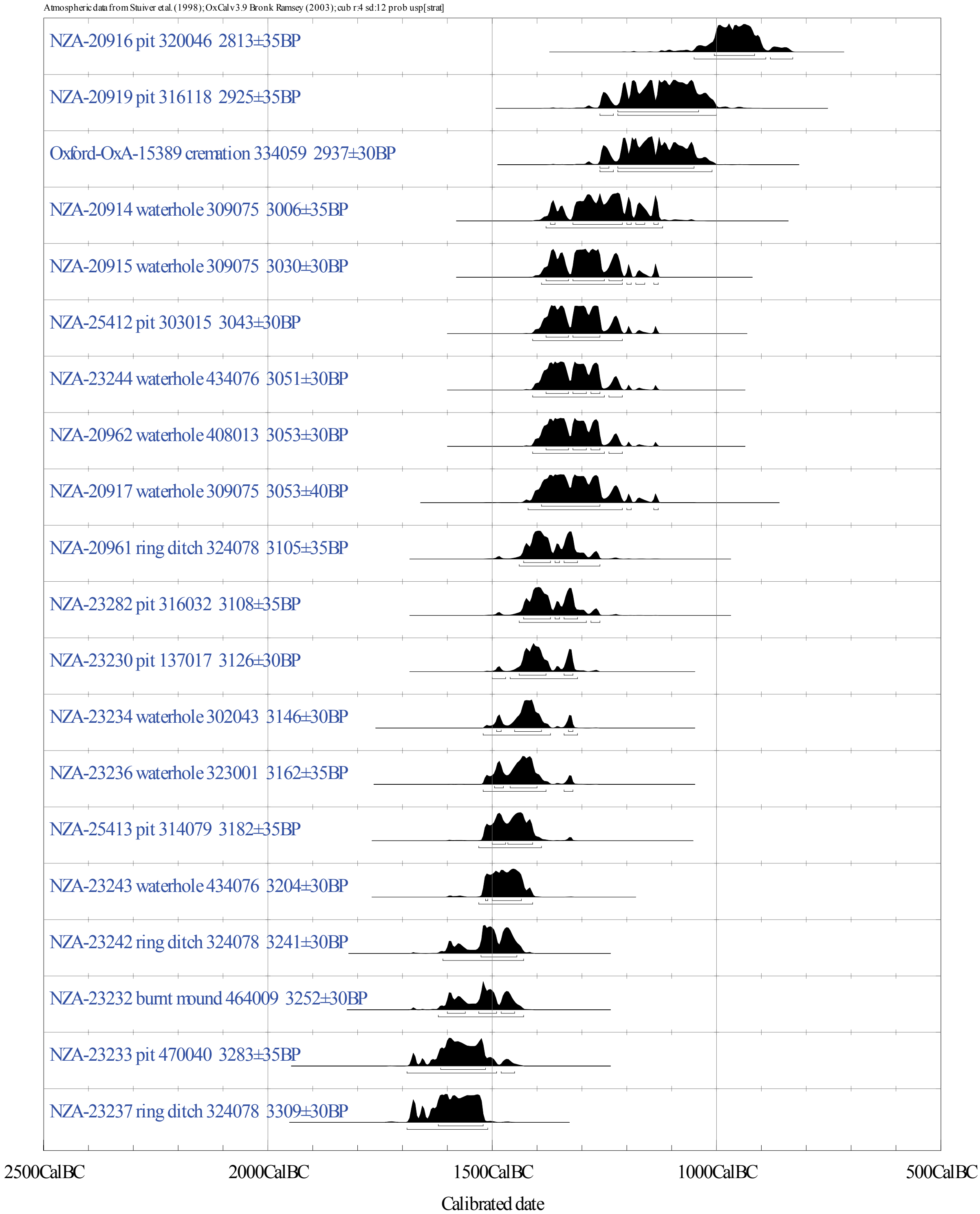


Figure 37.1: All of the Bronze Age radiocarbon dates from Stansted

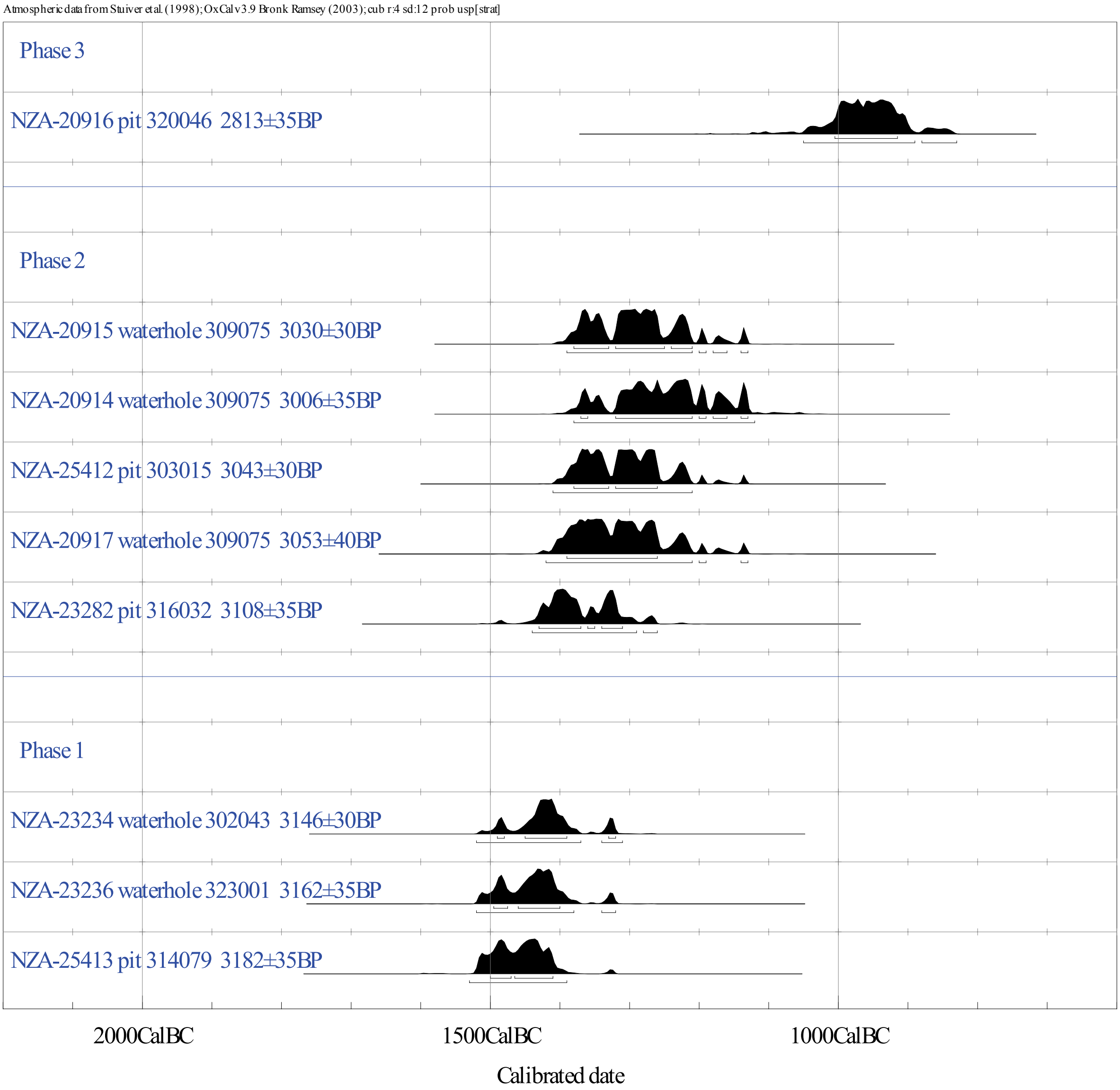


Figure 37.2: Bronze Age radiocarbon dates from the MTCP settlement

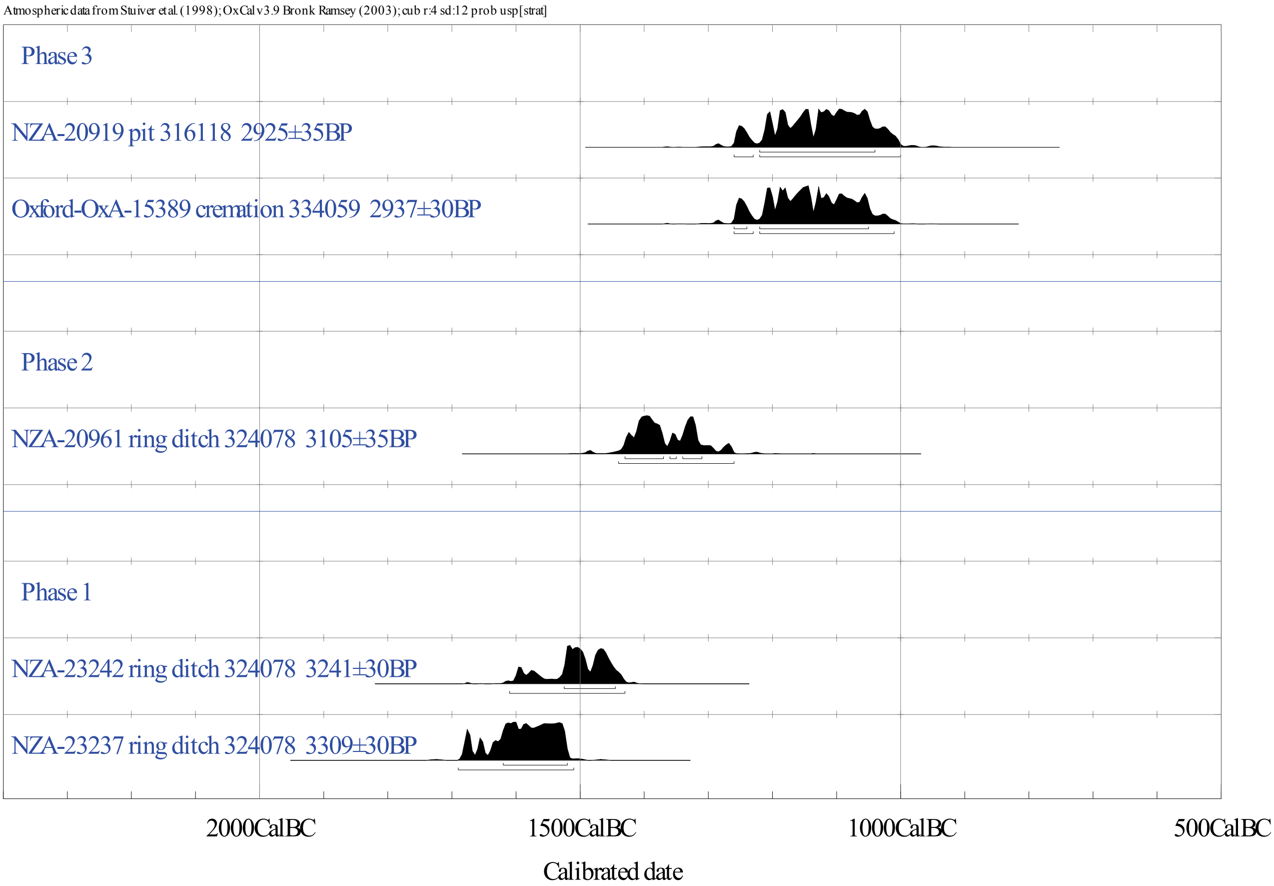


Figure 37.3: Bronze Age radiocarbon dates from the MTCP landscape

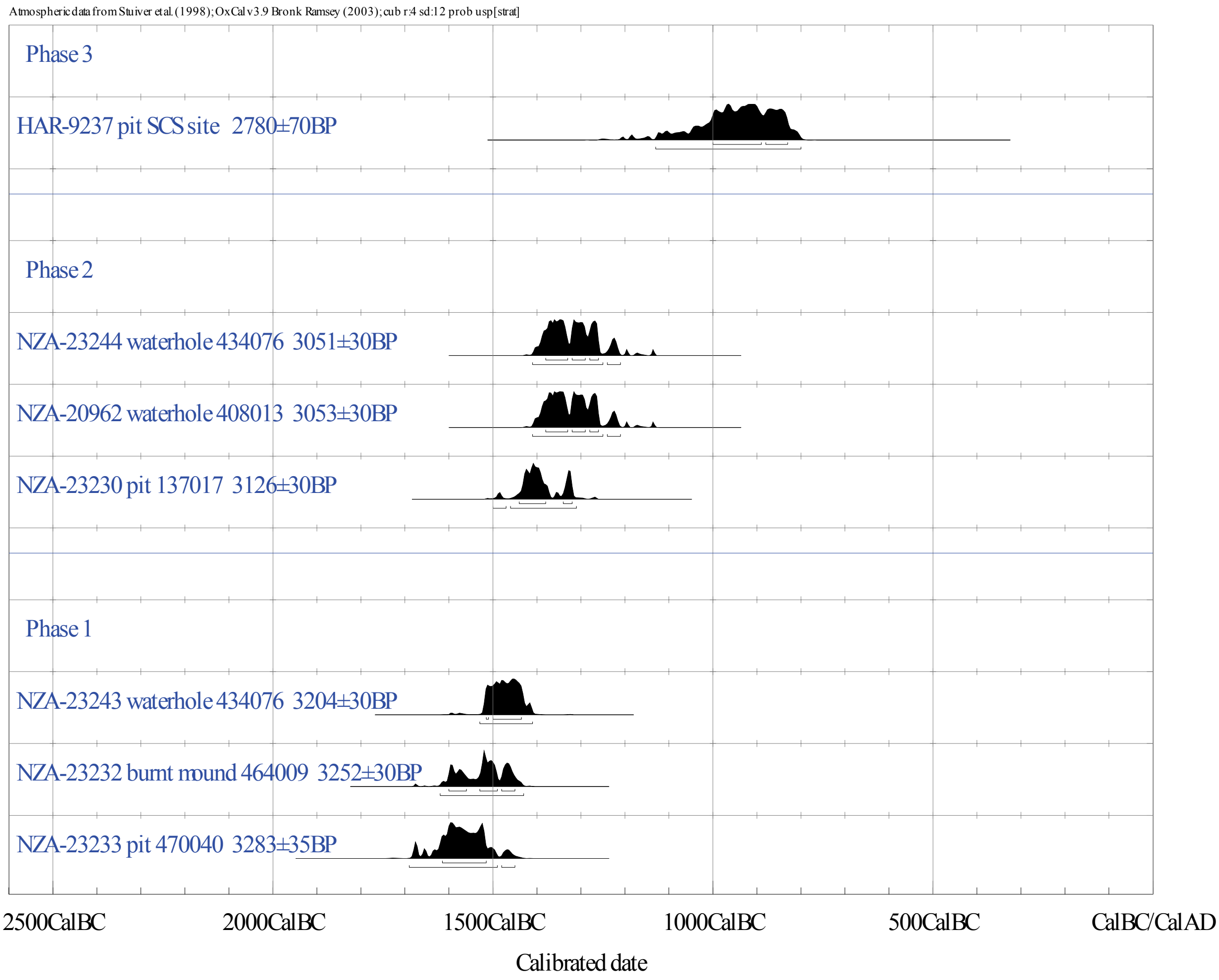


Figure 37.4: Bronze Age radiocarbon dates from the wider Stansted landscape

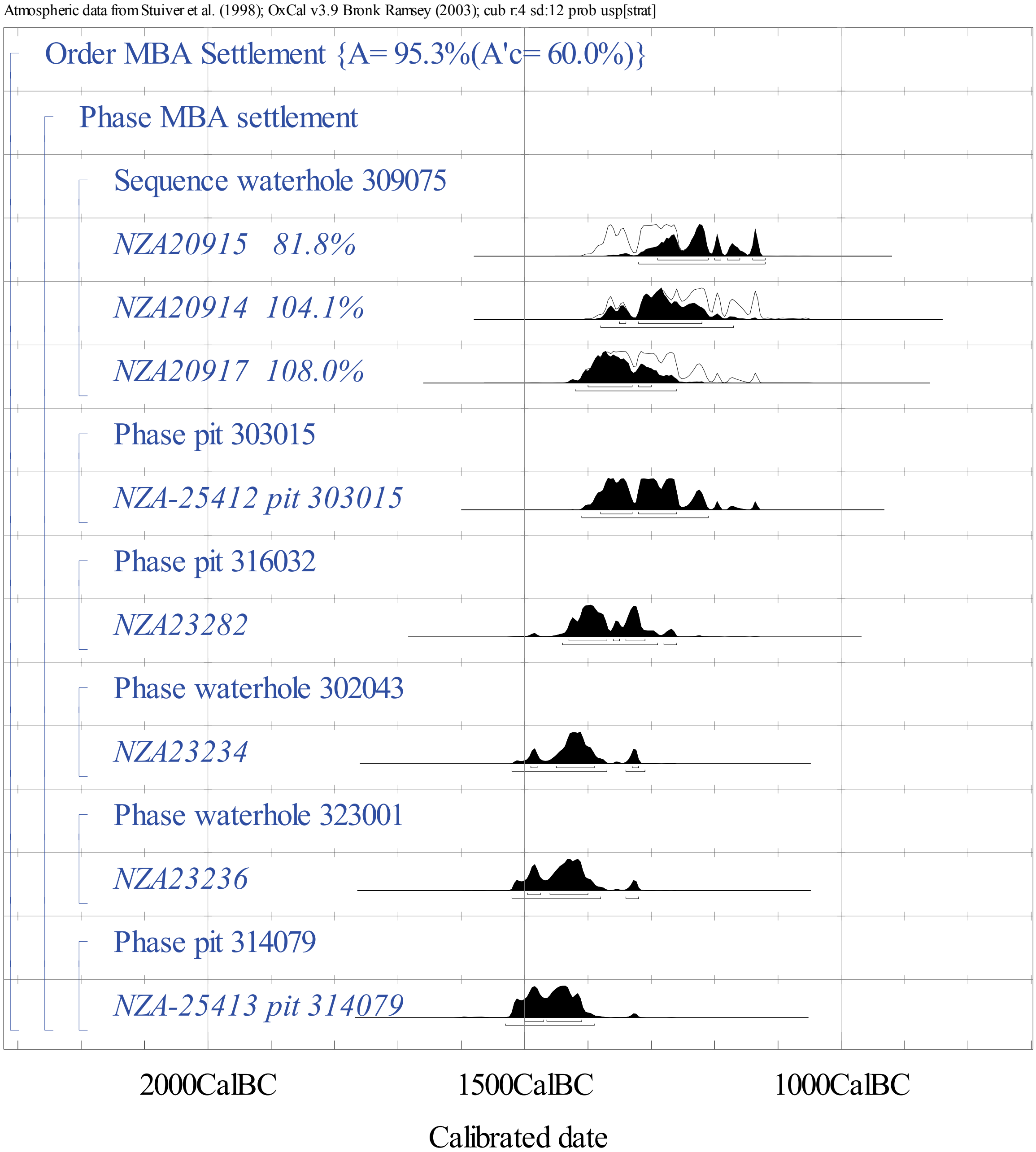


Figure 37.5: The radiocarbon dates associated with pit 316032 and waterholes 323001, 302043 and 309075. Where two distributions have been plotted (the three samples from waterhole 309075): the one in outline is the result of a simple radiocarbon calibration and the solid one takes into account the stratigraphic sequence

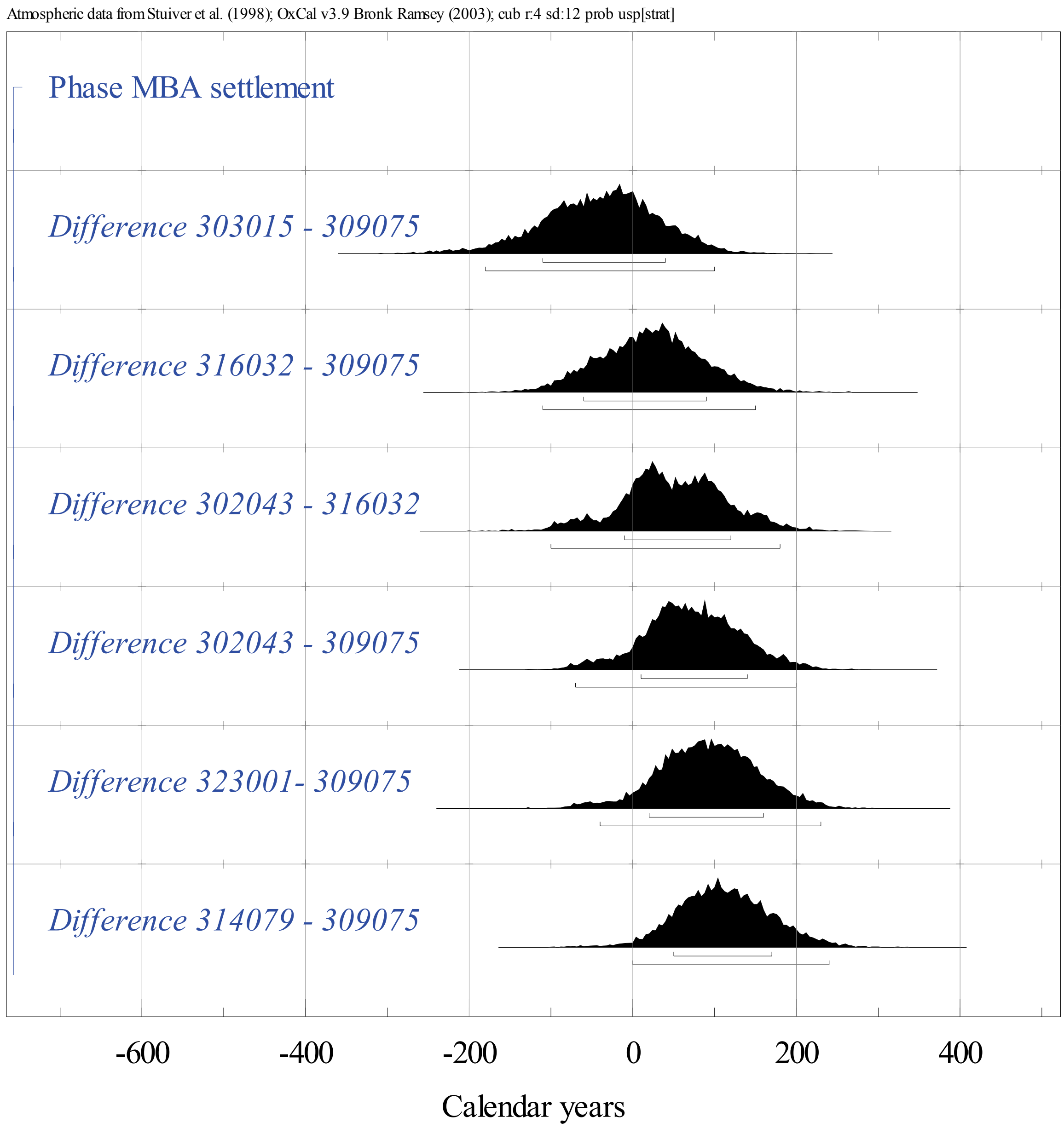


Figure 37.6: Potential intervals between dated features (negative distributions indicate a potential overlap)

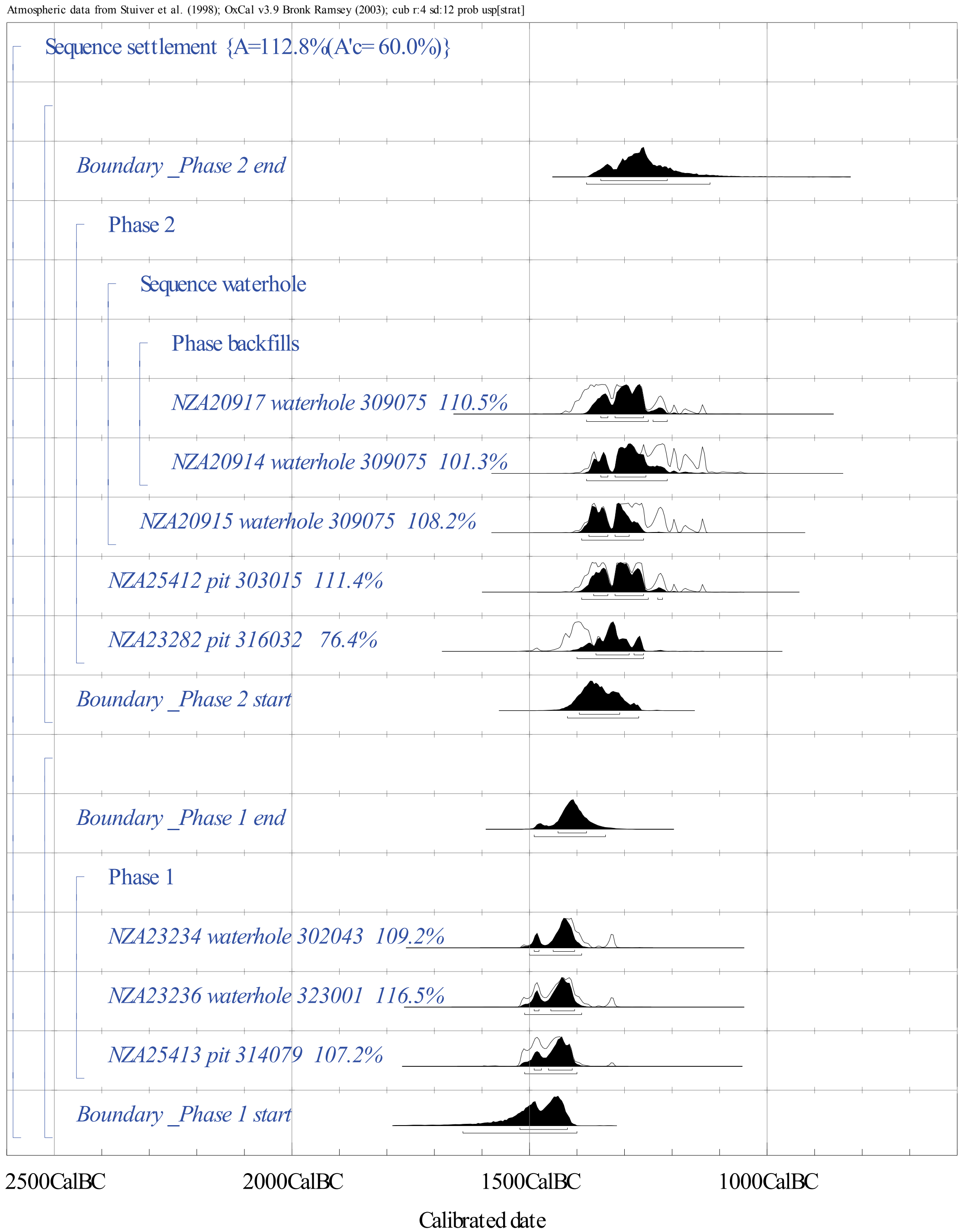


Figure 37.7: The modelled distributions for the radiocarbon dates from the settlement on the MTCP site based on an interpretation of the stratigraphy

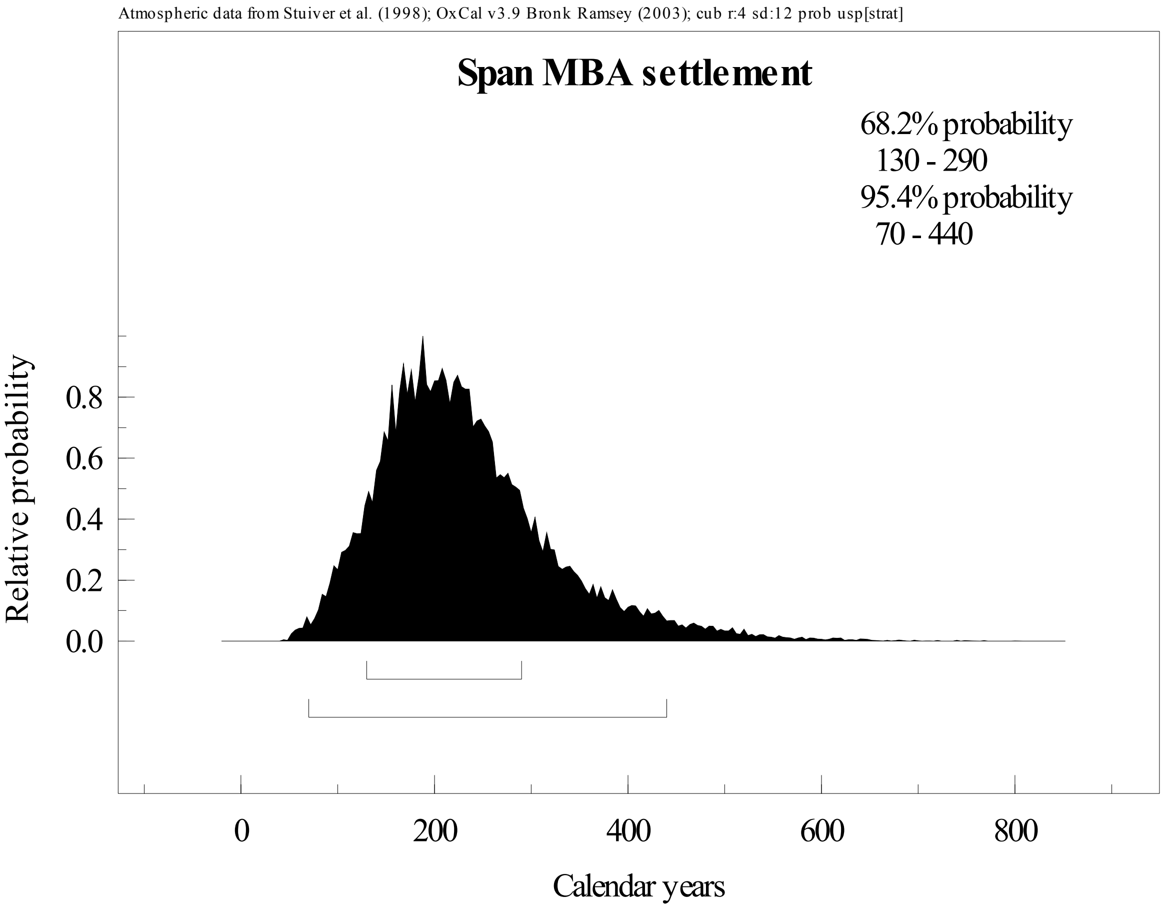
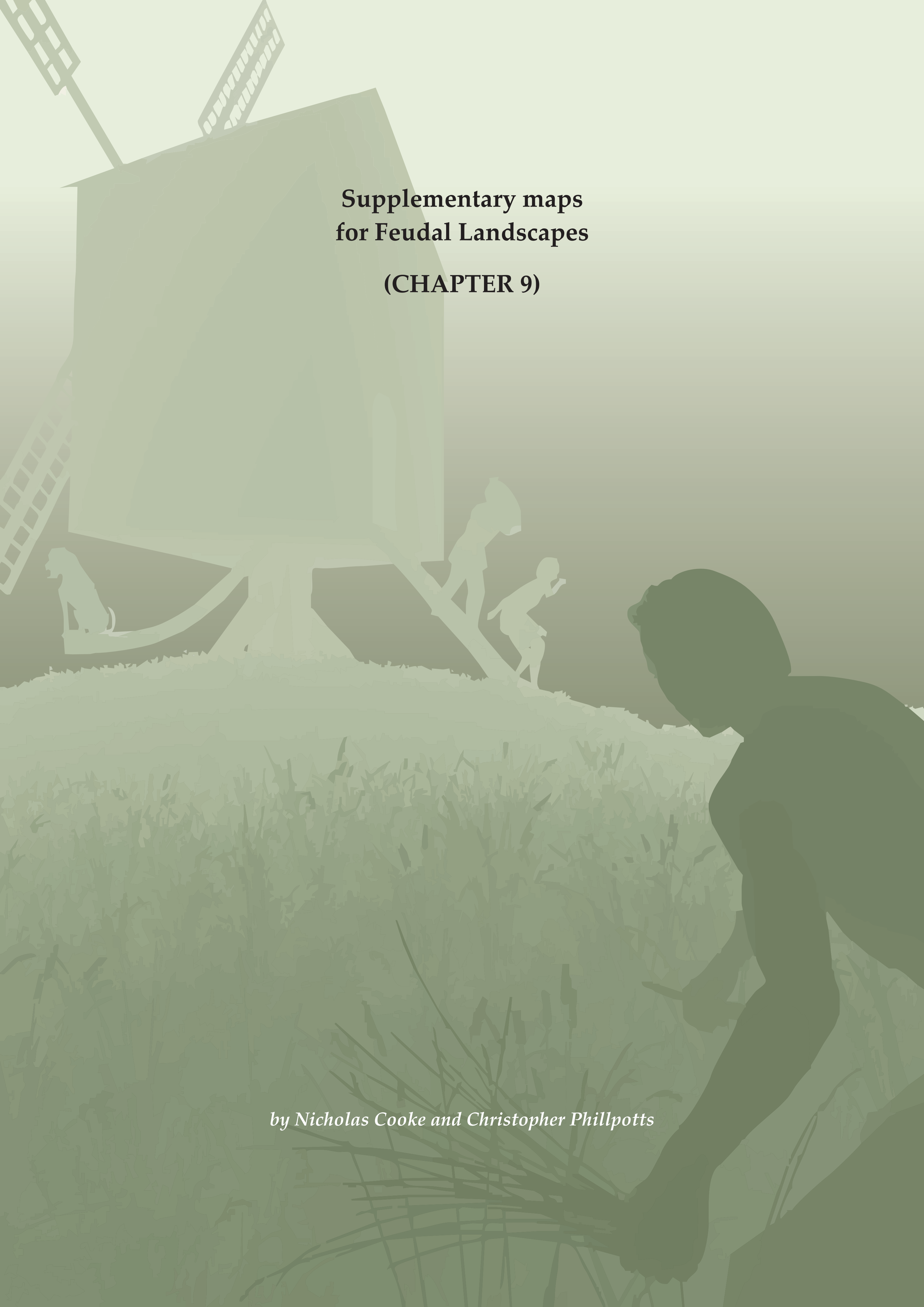


Figure 37.8: The modelled distribution for the span of the settlement on the MTCP site based on an interpretation of the stratigraphy



Supplementary maps for Feudal Landscapes

(CHAPTER 9)

by Nicholas Cooke and Christopher Phillpotts

Figure 9.9: Map of Bassingbourne Hall estate in Elsenham, Takeley and Stansted Mountfichet parishes, property of Sir Peter Parker c1804 (from ERO D/DU 726/1)

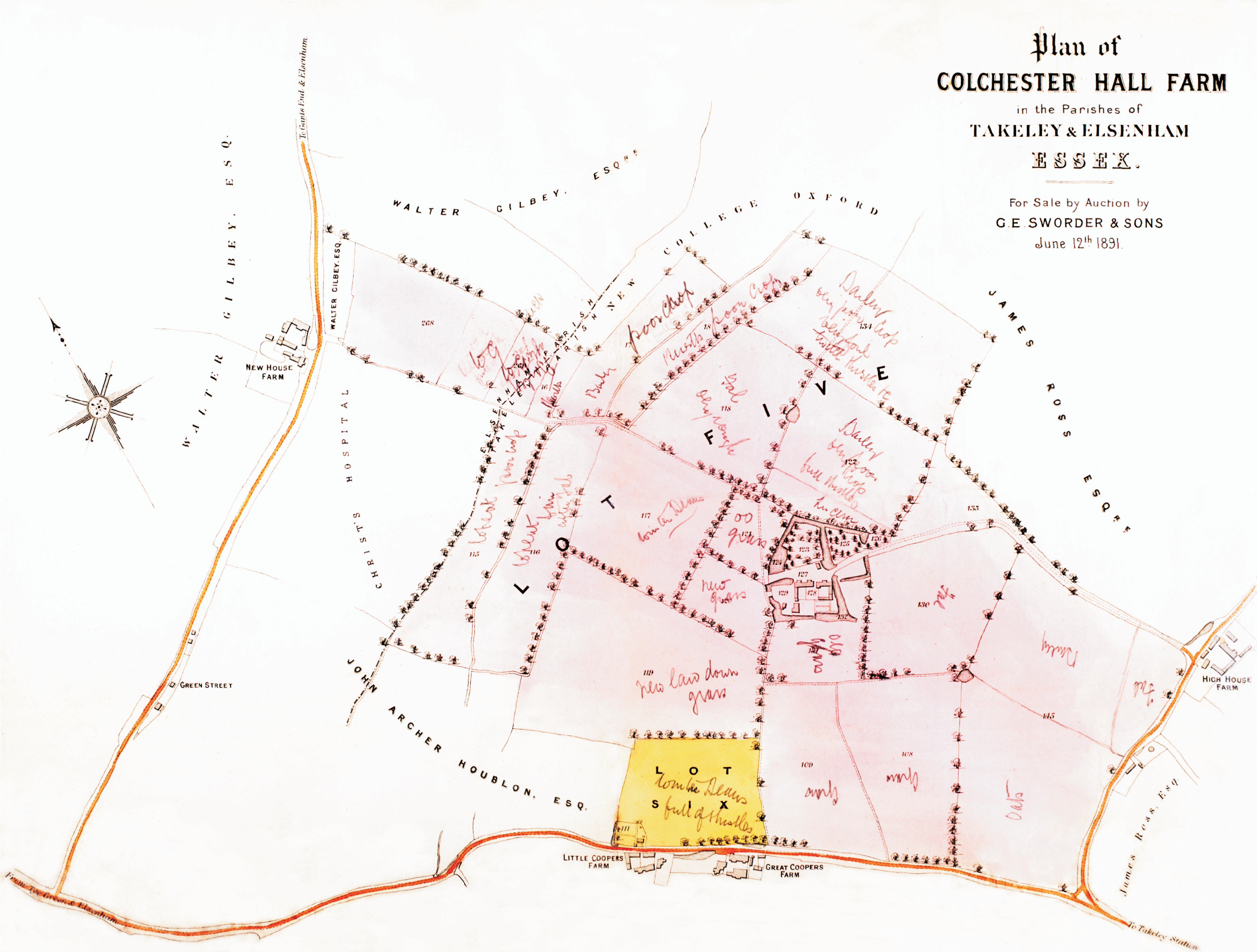


Figure 9.10: A larger version of the map showing Colchester Hall Farm and manor of Colchester Hall, property of W R Hawkes, 1891 (from HALS E441-447)

Figure 9.11: A larger version of the map of Warish Hall and Shearing Hall Farms, Takeley, by E J Eyre 1767 (from NCO 5608)
By permission of the Warden and Scholars of New College Oxford

Figure 9.12: Map showing assarting by the manors in the 11th to 13th centuries

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